3.2.1. INSTITUTION HAS CREATED AN ECOSYSTEM FOR INNOVATIONS, INDIAN KNOWLEDGE SYSTEM (IKS), INCLUDING AWARENESS ABOUT IPR, ESTABLISHMENT OF IPR CELL, INCUBATION CENTRE AND OTHER INITIATIVES FOR THE CREATION AND TRANSFER OF KNOWLEDGE/TECHNOLOGY AND THE OUTCOMES OF THE SAME AS EVIDENT.

SUPPORTING DOCUMENTS

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

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Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

3.2.1. Institution has created an ecosystem for innovations, Indian Knowledge System (IKS), including awareness about IPR, establishment of IPR cell, incubation centre and other initiatives for the creation and transfer of knowledge/technology and the outcomes of the same as evident.

V.V. Institute of Pharmaceutical Sciences (VVIPS) was established in 2010 by the AANM & VVRSR Educational Society, Gudlavaleru. Its primary objective is to provide comprehensive education in pharmaceutical sciences. The institute has implemented significant measures to develop a research and innovation ecosystem, to encourage faculty and students to actively engage in research within the pharmaceutical and healthcare industries. The institution arranged seminars and guest lectures, attracting renowned individuals from pharmaceutical firms and research institutions, to enhance the research skills of both faculty members and students.

VVIPS has dedicated IPR cell which foster knowledge and comprehension among faculty and students regarding Intellectual Property Rights (IPR). Since the inception of the IPR cell, the quantity of patent-related publications and grants has gradually increased. The IPR cell continuously organizes and delivers workshops and seminars on Intellectual Property Rights (IPR) creating awareness and enthusiasm in student fraternity. The incubation centre of the institution helps students build their ideas for newer innovations. It focuses to instill and promote awareness of start-ups and establish a dynamic start-up ecosystem in the institution.

VVIPS library offers a wide range of books by national and international authors and research journals to enrich the available resources for conducting literature surveys. Webinars were arranged during the COVID pandemic to assist the staff and students in navigating the challenges posed by the pandemic.

Our faculty members are encouraged to conduct research and apply for research grants from various funding departments like AICTE, PCI, and ISTE. VVIPS has MOUs with various pharmacy colleges to carry out academic programmes and activities for students and faculties. The list of MOUs with various colleges is as follows

1. Viswanatha Institute of Pharmaceutical Sciences, Visakhapatnam.
2. Mother Theresa Institute of Pharmaceutical Education and Research, Kurnool.
3. MRR College of Pharmacy, Nandigama.

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4. Aditya College of Pharmacy, Surampalem.
5. NRI College of Pharmacy, Agiripalli.
6. P. Rami Reddy Memorial College of Pharmacy, Kadapa.
7. Vignan Pharmacy College, Vadlamudi.
8. Krishna Teja Pharmacy College, Tirupathi.
9. Bapatla College of Pharmacy, Bapatla.
10. Shri Vishnu College of Pharmacy, Bhimavaram.
11. Joginapally BR Pharmacy College, Hyderabad.
12. VJ's College of Pharmacy, Rajamahendravaram.
13. A.S.N. College of Pharmacy, Tenali.

VVIPS is dedicated to enhancing the educational experience for both students and faculty members by actively fostering up-to-date knowledge in the pharmaceutical industry and clinical research. For that, VVIPS signed MOUs with various Pharma Industries and clinical research organizations. VVIPS plays a significant role in assisting students who aspire to pursue education abroad. For this purpose, MOUs are made with reputed professional consultancies.

The list of MOUs with various pharma industries, professional consultancies, and clinical research organizations is as follows.

1. Spectrum Pharma Research Solutions, Hyderabad.
2. Cavaxia Global Clinical Research Academy, Vijayawada.
3. Par Overseas Educational and Professional Consultancy Private Limited, London (U.K).
4. Indian Health Care BPO, Chennai.
5. Leo Global Services Private Limited, Vijayawada.
6. Delexcel Pharma Private Limited, Hyderabad.
7. Indian Biomedical Skill Consortium, Vishakhapatnam.
8. Biofact Research Pvt. Ltd., Vishakhapatnam.

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INCUBATION CENTRE

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INCUBATION CENTRE

Objectives

1. To foster and cultivate an environment of innovation on campus.
2. To instill and promote awareness of start-ups and establish a dynamic start-up ecosystem on campus.
3. To assist in the development of innovative ideas that address societal needs.
4. To offer guidance and support in order to resolve practical challenges.
5. Our goal is to transform concepts into tangible products and provide a platform for effortless commercialization with minimal financial investment.

Types of Services

- Pre-incubation services.
- Access to a sophisticated product innovation center with an internet-enabled laboratory.
- Assistance with preparing a business plan and establishing a company.
- Business skill development training.
- Mentor help.
- Product promotion assistance.
- Financial support.
- Connecting with other entrepreneurs, customers, and support agencies.

Constitution of Incubation centre

S. No.	Name and Designation of the member	Role	Contact No
1	Dr. A. Lakshmana Rao	Chairperson	9848779133
2	Dr. T. Balakrishna	Co-ordinator	9494466340
3	Mrs. B. Satyasree	Member	9491171691
4	Ms. T. Sravani	Member	9705434807
5	Mr. V.L. Vinod Kumar	Member	9948167381

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IPR CELL

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Intellectual Property Rights (IPR) Cell

Intangible works of human mind fall under the concept of intellectual property. Copy rights, patents, trademarks, designs, trade secrets, trade dress, and geographical indications are all considered forms of intellectual property.

Date of Formation: 14th July 2021.

Objectives of IPR Cell

1. To foster knowledge and comprehension among faculty and students regarding Intellectual Property Rights (IPR).
2. To facilitate training courses on the procedures involved in submitting patents.
3. To organize and deliver workshops and seminars on Intellectual Property Rights (IPR).
4. To provide guidance and instruction to staff and students on the process of submitting patent, trademark, and copyright applications.

Constitution of IPR cell

S. No.	Name and Designation of the member	Role	Contact No
1	Dr. A. Lakshmana Rao	Chairperson	9848779133
2	Dr. SK. Aminabee	Co-ordinator	8309116844
3	Dr. P. Raveesha	Member	8297509909
4	Dr. B. Mohan Gandhi	Member	9866847074
5	Dr. T. Balakrishna	Member	9494466340
6	Mrs. B. Satyasree	Member	9491171691

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Infrastructural facilities available in the college to promote activities related to IPR in the college.

- Well furnished and rich library.
- State-of-art laboratories.
- Machine room.
- Central Instrumentation lab.
- Computer facility with broadband facility.
- Animal House.

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DETAILS OF WORKSHOPS/SEMINARS/CONFERENCES INCLUDING PROGRAMS CONDUCTED ON RESEARCH METHODOLOGY, INTELLECTUAL PROPERTY RIGHTS (IPR) AND ENTREPRENEURSHIP DURING THE LAST FIVE YEARS

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List of events

A.Y. 2022-2023

S. No.	Name of the Event	Date	Details of the Resource Person	No. of Participants
1.	One day seminar on "Pharmaceutical Sciences: A Radical Approach to Revitalizing the Modern Era-An IPR approach."	25-06-2022	Mr. K. Raju, Associate Professor, Sir C.R. Reddy College of Pharmaceutical Sciences, Eluru.	27
2.	One day seminar on "Global Markets, Local Adaptations: Cross-border Entrepreneurship in Pharmacy."	19-07-2022	Mr. A. Viswanath, Associate Professor & Dean T&P Vignan Pharmacy College, Vadlamudi.	24
3.	One-day Online Webinar Series-I on "Discover the Future: Impact Lecture Series1"	25 -07-2022	Dr. P. Giridhar Senior Principal Scientist & Professor (ACSIR),Plant Cell Biotechnology Department, Central Food Technology Research Institute,Mysuru, Karnataka. Dr. H. Purushotham, DPIIT IPR Chair-Professor, Andhra University, Visakhapatnam, A.P.	314
4.	One-day Online Webinar Series-II on "Discover the Future: Impact Lecture Series1I"	06 -08- 2022	Dr. V. Sai Kishore, HOD, Department of Pharmaceutics, Bapatla College of Pharmacy,Bapatla, A.P. Dr. K. Ravi Kumar Professor & Vice Principal Hindu College of Pharmacy, Guntur, A.P.	73

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5.	One-day seminar on "Entrepreneurship and Ethics in Pharmacy"	23 -08-2022.	Dr. Chandu Nirmal Chand, HOD, Department of Business and Management Studies,Gudlavalleru Engineering College.	92
6.	One day seminar on "Explore the Alliance of Pharmaceutical & Health Sciences to Master Entrepreneurship."	24-09-2022	Dr. Pradeep Kumar, Assistant Professor, KLE College of Pharmacy, Hubbali.	24
7.	One day seminar on "New Advances and Challenges in IPR; Pharmaceutical Education & Practices."	29-10-2022	Dr. D. Raghava, Professor & Principal, K.G.R.L. College of Pharmacy, Bhimavaram.	23
8.	One day seminar on "Exploring the Pharma jobs in Government Sector: Entrepreneurship Prospectives."	09-12-2022	Mr. Pavan, Assistant Professor, Aditya College of Pharmacy, Surampalem	25
9.	One day seminar on "Review of Advancements and the Impacts of Analytical and Bioanalytical Research."	28-01-2023	Dr. R. Kalirajan, Professor & Head, Department of Pharmaceutical Chemistry, JSS College of Pharmacy, Ooty.	24
10.	One day seminar on "Futuristic Advancements in Pharmaceuticals & Clinical Research."	10-02-2023	Dr. S. Madhavi, Professor, Vikas College of Pharmacy, Vissannapeta.	26
11.	One day seminar on "IPR role in meeting the challenges to reduce global burden of diseases"	04-03-2023	Mr. Sk. Nagul Meeravali, Business Executive, Glenmark PharmaceuticalsLtd, Vijayawada.	24

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12.	One day seminar on "Shaping the Pharma graduates to upgrade the global skills to reach entrepreneur goals."	07-04-2023	Mr. P.S.S. Prasanna Kumar, Associate Professor, A.K.R.G. College of Pharmacy, Nallajerla.	25
13.	One-day online awareness webinar on "Intellectual Property Rights".	11-04-2023	Mr. Veera Raghavulu Kattula, Examiner of Patents &designs, NIPAM Officer, Chemical Division-Intellectual Property Office, GST Road-Guindy, Chennai.	417

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List of events

A.Y. 2021-2022

S. No.	Name of the Event	Date	Details of the Resource Person	No. of Participants
1.	One day seminar on "Pharmaceutical Patents and IPR: Balancing Innovation and Accessibility."	22-09-2021	Mrs. K. Nirmala Associate Professor, K.G.R.L. College of Pharmacy, Bhimavaram, West Godavari District.	30
2.	One day seminar on "Exploring Research Trends in Pharmacovigilance and Clinical Trails."	12-10-2021	Mrs. K.Soujanya, Associate Professor, Nirmala College of Pharmacy, Mangalagiri	30
3.	One day seminar on "Exploring the Recent Trends & Advances in the field of Pharma Research."	09-11-2021	Ms. G.N.A. Lakshmi, Associate Professor, Sri Venkateswara College of Pharmacy, Chittoor.	30
4.	One day seminar on "Entrepreneurship goals to meet the needs of Clinical research & Biotechnology Industry."	15-12-2021	Mr. G. Edward Raju, KGRL College of Pharmacy, Bhimavaram	24
5.	One day seminar on "Exploring Challenges in Pharmaceutics research & Process of formulation design for the future."	07-01-2022	Dr. P. Sai Kishore, Professor, Bapatla College of Pharmacy, Bapatla	32
6.	One day seminar on "Empowering New Era Technologies in Pharmaceutical Sciences: IPR Prospectives."	25-01-2022	Mr. V. Abhishek, Marketing Executive Lupin Pharmaceuticals Ltd Vijayawada, A.P.	30

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7.	One day seminar on "Unveiling the entrepreneurship and Research potentials of Pharma industry."	26-02-2022	Ms. Dasari Santhi Krupa, Assistant Professor, Krishna university College of Pharmaceutical Science and Research, Machilipatnam.	30
8.	One day seminar on "Entrepreneurship Innovations in Pharmacovigilance & Clinical Management."	11-03-2022	Mr. M.M. Eeswaradu, Associate Professor, Vignan College of Pharmacy, Vadlamudi.	26
9.	One day seminar on "Current Advances in IPR Aspects Pharma Analytical Development Trends and Research:"	08-04-2022	Dr. B. Mohan Gandhi Associate Professor Sri Vasavi Institute of Pharmaceutical Sciences Pedatadepalli, West Godavari Dist, Tadepalligudem, AP	30
10	One day seminar on "HealthTech and Entrepreneurship: Blending Pharmacy with Technology Innovations."	28-04-2022	Dr. K.S. Nataraj, Professor & Principal, Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram.	26

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List of events

A.Y. 2020-2021

S. No.	Name of the Event	Date	Details of the Resource Person	No. of Participants
1.	One day seminar on "Research in Next-Generation Drug Discovery Unveiling the Power of Artificial Intelligence."	10-11-2020	Dr. Mohan Gandhi Bonthu, Associate Professor, Sri Vasavi Institute of Pharmaceutical Sciences, Tadepalligudem, West Godavari Dt., A.P.	30
2.	One day seminar on "Pharmacy Retail Revolution: Entrepreneurship in the Era of Direct-to-Consumer Models."	27-11-2020	Dr. Chirravuri. S. Phani Kumar, Principal, Department of Pharmaceutics, Adarsa College of Pharmacy, G. Kothapalli. East Godavari District.	24
3.	One day seminar on "Pharmacoeconomic Research: Assessing the Cost-Effectiveness of New Drug Therapies."	01-12-2020	Dr. K. Nageswara Rao, Professor & Director, K.G.R.L. College of Pharmacy, Bhimavaram, W.G.Dt., A.P.	30
4.	One day seminar on "Pioneering Research Innovations in the Field of Pharma & Nano Sciences."	19-12-2020	Dr. Shaik Arifa Begum, Assistant Professor, KVSR Siddhardha College of Pharmaceutical Sciences, Vijayawada 520001	30
5.	One day seminar on "Navigating IPR Challenges in Pharmacy: From Drug Discovery to Commercialization."	08-01-2021	Dr. DSNBK Prasanth, Associate Professor, Department of Pharmacognosy, KL College of Pharmacy, K L Deemed to be University, Green Fields, Vaddeswaram-522302	30

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6.	One day seminar on "IPR in Herbal Medicine: Protecting Traditional Knowledge and Pharmaceutical Innovations."	29-01-2021	Mr. Kotte Raju, Assistant Professor, Department of Pharmaceutical Chemistry. Sri Vishnu College of Pharmacy, Bhimavaram. West Godavari Dt., A.P.	30
7.	One day seminar on "IPR Essentials in Pharmacy: An Introduction to Intellectual Property Rights and Drug Development."	19-02-2021	Ms. E. Jajili, Assistant Professor, Department of Pharmaceutical Chemistry. Sir CR Reddy College of Pharmaceutical Sciences, Eluru, West Godavari Dt., A.P.	25
8.	One day seminar on "Beyond the Pill: Entrepreneurship Opportunities in Pharmaceutical Services and Consulting."	12-03-2021	Dr. T. Balakrishna, Sr. Assistant Professor, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Guntur.	30

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List of events

A.Y. 2019-2020

S. No.	Name of the Event	Date	Details of the Resource Person	No. of Participants
1.	One day seminar on "Contemporary Advancements and Innovations in Chromatography and Analytical Techniques: IPR prospectives."	28-06-2019	Dr. Vasavi Devi, Associate Professor, Department of Pharmaceutical Analysis, P. Ramireddy Memorial College of Pharmacy, Kadapa	26
2.	One day seminar on "Current Research on Pharmaceutical Formulations & Active Pharmaceutical Ingredients."	23-08-2019	Mr. K.S. Sumanth, Assistant Professor, Sri Vasavi Institute of Pharmaceutical Sciences, Tadepalligudem. W.G. Dt.	30
3.	One day seminar on "Exploration Entrepreneurship potentials in Analytical Chemistry."	20-09-2019	Dr. V. Bhaskara Raju, Associate Professor, Sri Vasavi Institute of Pharmaceutical Sciences, Tadepalligudem, W.G. Dt.	28
4.	One day seminar on "Integration of Herbal Medicines & Nutraceuticals with Modern Medicine to Master Entrepreneurship."	11-10-2019	Ms. K. Nirmala, Associate Professor, K.G.R.L. College of Pharmacy, Bhimavaram, W.G. Dt.	30
5.	One day seminar on "Emerging Trends and Updates in Biomedical and Clinical Research."	12-11-2019	Mr. Vaddadi Abhishek, Junior Chemist, Celebrity Laboratories, Kondapalli.	30
6.	One day seminar on "Novel Ideas and Advanced Perception in Medicinal Chemistry and Drug Research."	16-12-2019	Dr. P. Naga Raju, Professor & HOD, Hindu College of Pharmacy, Guntur	30

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7.	One day seminar on "IPR Advances & Technological Innovations in Drug Discovery."	08-01-2020	Ms. G.N.A. Lakshmi, Associate Professor, Sri Venkateswara College of Pharmacy, Chitoor.	30
8.	One day seminar on "Platform to Share Novel Methods and Innovations of Pharmaceutical Research: IPR Prospectives."	23-01-2020	Ms. NVL. Sirisha Mulukuri, Assistant Professor, Nitte Collge of Pharmacy, Bangalore.	30
9.	One day seminar on "Current Advances in Pharmaceutical Industry and Development on Entrepreneurship Mode."	25-02-2020	Dr. T. Balakrishna, Sr. Assistant Professor, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Guntur.	34

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List of events

A.Y. 2018-2019

S. No.	Name of the Event	Date	Details of the Resource Person	No. of Participants
1.	One day seminar on "Frontier Areas of Research and Development in Analytical Technologies".	21-06-2018	Dr. B. Mohan Gandhi Associate Professor Sri Vasavi Institute of Pharmaceutical Sciences Pedatadepalli, West Godavari Dist., Tadepalligudem, AP	32
2.	One day workshop on "Scope of Entrepreneurship in Pharmacy."	16-07-2018	Mr. K. Vinay Kumar Associate Professor Sir C.R. Reddy Institute of Pharmaceutical Sciences Eluru, West Godavari Dist.	29
3.	One day seminar on "Intellectual Property rights and current trends in advanced drug delivery systems."	27-09-2018	Mr. T. Balakrishna, Sr. Assistant Professor, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Guntur.	29
4.	One day seminar on "Advanced Novel Therapies & Research Innovations in Pharmacognosy & Medicinal Plants."	12-10-2018	Dr. K. Bharavi, Professor, Department of Veterinary Pharmacology & Toxicology, College of Veterinary Sciences, Chitoor Road, Tirupathi-517502	27
5.	One day seminar on "Trending Research & Innovations in Pharmaceutical Sciences."	09-11-2018	Mrs. N.V.L. Sirisha Mulukuri, Assistant Professor, Karnataka College of Pharmacy, Bangalore.	30

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6.	One day seminar on "Pharmaceutical Science's Most Recent Advances and Innovations: Road map to Entrepreneurship."	17-12-2018	Dr. P. Naga Raju, Professor & HOD, Hindu College of Pharmacy, Guntur	30
7.	One day seminar on "IPR impact on Modern Drug Development Innovations & Expanding Drug Chemistry Possibilities."	10-01-2019	Dr. D. Raghava, Professor, K.G.R.L. College of Pharmacy, Bhimavaram, W.G. Dt.	28
8.	One day seminar on "Current Scenario, Scope and Challenges in Pharmaceutical Industry: An Entrepreneur View."	27-02-2019	Mr. P. Naga Raju, Associate Professor Sir C.R. Reddy Institute of Pharmaceutical Sciences Eluru, West Godavari Dist.	30
9.	One day seminar on "Future Advancements in the field of Entrepreneurship in Traditional Herbal &Ayurvedic medicine."	29-03-2019	Dr. B. Narasimha Rao, Associate Professor, P. Ramireddy Memorial College of Pharmacy, Kadapa.	32

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PUBLICATIONS

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

CALENDER YEAR 2022

S.No.	Title of paper	Name of the author/s	Department	Name of journal	ISSN number
1	Assessment of Anthelmintic Activity and *in silico* Study of Phytoconstituents in Decaschistia crotonifolia Wight & Arn. Root Extract.	P.Raveesha	Pharmacognosy	Journal of Young Pharmacists.	0975-1505
2	Assessment of Anthelmintic Activity and *in silico* Study of Phytoconstituents in Decaschistia crotonifolia Wight & Arn. Root Extract.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Young Pharmacists.	0975-1505
3	Development and Validation of a LC-MS/MS Method for Simultaneous Quantification of Ivabradine and Metoprolol in Rat Plasma.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Pharmacological and Toxicological Methods.	1873-488X
4	Prediction of Linearity and Non-Linearity in Pharmaceutical Optimization Studies with Python.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Research in Ayush and Pharmaceutical Sciences	2456-9909

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5	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum.	Sk.Aminabee	Pharmacology	Journal of Drug and Alcohol Research	2090-8342
6	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum.	P.Raveesha	Pharmacognosy	Journal of Drug and Alcohol Research	2090-8342
7	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Drug and Alcohol Research	2090-8342
8	Development and Validation of Novel Analytical Method for the Simultaneous Estimation of Bempedoic Acid and Ezetimibe in Bulk and Pharmaceutical Dosage Form by RP-UPLC.	A.Sai Datri	Pharmaceutical Analysis	Journal of Drug and Alcohol Research.	2090-8342

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9	Development and Validation of Novel Analytical Method for the Simultaneous Estimation of Bempedoic Acid and Ezetimibe in Bulk and Pharmaceutical Dosage Form by RP-UPLC.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Drug and Alcohol Research.	2090-8342
10	Formulation and Evaluation of Herbal Lipstick using Rosa Mister Lincoln.	A.Sai Datri	Pharmaceutical Analysis	International Journal of Medical Laboratory Research	2546-4400
11	Formulation and Evaluation of Herbal Lipstick using Rosa Mister Lincoln.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Medical Laboratory Research	2546-4400
12	RP-HPLC Method Development and Validation for Simultaneous Determination of Decitabine and Cedazuridine in Pure and Tablet Dosage Form. Current Trends in Biotechnology and Pharmacy	A.Lakshmana Rao	Pharmaceutical Chemistry	Current trends in biotechnology and pharmacy	2230-7303
13	Comparative In Vivo Evaluation of Marketed and Optimized Formulations of Teneligliptin and Metformin Bilayered Tablets. Current Trends in Biotechnology and Pharmacy.	A.Lakshmana Rao	Pharmaceutical Chemistry	Current trends in biotechnology and pharmacy	2230-7303

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14	Novel Approach of Stability Indicating Method Development for Determination of Metformin and Empagliflozin by High Performance Liquid Cheromatography.	A.Sai Datri	Pharmaceutical Analysis	Journal of pharmaceutical and medicinal chemistry	0973-8916
15	Novel Approach of Stability Indicating Method Development for Determination of Metformin and Empagliflozin by High Performance Liquid Cheromatography.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of pharmaceutical and medicinal chemistry	0973-8916
16	In Silico Investigation on Phytoconstituents in Pamburus missionis S. for Antioxidant Activity.	P.Raveesha	Pharmacognosy	Pharmacognosy research	0974-8490
17	In Silico Investigation on Phytoconstituents in Pamburus missionis S. for Antioxidant Activity.	A.Lakshmana Rao	Pharmaceutical Chemistry	Pharmacognosy research	0974-8490
18	Novel Validated LC-MS/MS Method for Simultaneous Estimation of Celecoxib and Amlodipine in Rat Plasmaand its Application to a Pharmacokinetic Study.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journel of pharmaceutical negative results	2229-7723
19	RP-HPLC Method Development and Validation for the Determination of Ezetimibe using Design of Experiments Approach.	A.Sai Datri	Pharmaceutical Analysis	Journal of drug and alcohol research	2090-8342

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20	RP-HPLC Method Development and Validation for the Determination of Ezetimibe using Design of Experiments Approach.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of drug and alcohol research	2090-8342
21	Anticancer Activity of Isolated Constituents from Coccinia grandis by Sulphorhodamine (SRB) Assay on DU-145 and PC-3 Cell Lines.	Sk.Aminabee	Pharmacology	European journal of molecular & clinical medicine (EJMCM)	2515-8260
22	Anticancer Activity of Isolated Constituents from Coccinia grandis by Sulphorhodamine (SRB) Assay on DU-145 and PC-3 Cell Lines.	A.Lakshmana Rao	Pharmaceutical Chemistry	European journal of molecular & clinical medicine (EJMCM)	2515-8260
23	Artificial Intelligence: Applications in Healthcare Industry.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Research in Ayush & Pharmaceutical Sciences	2456-9909
24	Clinical Trials Status and Approaches of COVID-19 Vaccines Developed Globally: The Recent Updates	A. Lakshmana Rao	Pharmaceutical Chemistry	Pharma Times	0973-452X
25	Clinical Trials Status and Approaches of COVID-19 Vaccines Developed Globally: The Recent Updates	Sk.Aminabee	Pharmacology	Pharma Times	0973-452X
26	Stability Indicating RP-HPLC Method Development and Validation of Meropenem and Vaborbactam in Pharmaceutical Dosage Form	A.Lakshmana Rao	Pharmaceutical Chemistry	Indian Drugs	0019-462X

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27	Stability Indicating RP-HPLC Method Development and Validation of Meropenem and Vaborbactam in Pharmaceutical Dosage Form	Prasanthi T	Pharmaceutical Analysis	Indian Drugs	0019-462X
28	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum	A. Lakshmana Rao	Pharmaceutical Chemistry	Journal of Drug and Alcohol Research	2090-8342
29	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum	Shaik Aminabee	Pharmacology	Journal of Drug and Alcohol Research	2090-8343
30	In-Vivo Antinociceptive Activity and In-Silico Molecular Docking of Selected Phytoconstituents of Methanolic Extract of Hypericum Japonicum	Raveesha Peeriga	Pharmacognosy	Journal of Drug and Alcohol Research	2090-8344
31	Antioxidant and Cardioprotective Activity of Indigofera barberi on Doxorubicin Induced Toxicity on Rats	Shaik Aminabee	Pharmacology	Biomedical & Pharmacology Journal	0974-6242

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32	Antioxidant and Cardioprotective Activity of Indigofera barberi on Doxorubicin Induced Toxicity on Rats	A. Lakshmana Rao	Pharmaceutical Chemistry	Biomedical & Pharmacology Journal	0974-6243
33	Computational Study Phytoconstituents in Myxopyrum Smilacifolium Blume against Inflammatory Mediator TNF-α	Skaik Aminabee	Pharmacology	Journal of Drug and Alcohol Research	2090-8342
34	Computational Study Phytoconstituents in Myxopyrum Smilacifolium Blume against Inflammatory Mediator TNF-α	A. Lakshmana Rao	Pharmaceutical Chemistry	Journal of Drug and Alcohol Research	2090-8342
35	Computational Study Phytoconstituents in Myxopyrum Smilacifolium Blume against Inflammatory Mediator TNF-α	Raveesha Peeriga	Pharmacognosy	Journal of Drug and Alcohol Research	2090-8343
36	Computational Study Phytoconstituents in Myxopyrum Smilacifolium Blume against Inflammatory Mediator TNF-α	Parimala Kolli	Pharmaceutical Analysis	Journal of Drug and Alcohol Research	2090-8344
37	Assessment of Anthelmintic Activity and Insilico Study of Phytoconstituents in Dechaschistia crotonifolia Wight and Arn. Root Extract	Raveesha Peeriga	Pharmacognosy	Journal of Young Pharmacists	0975-1505

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38	Assessment of Anthelmintic Activity and Insilico Study of Phytoconstituents in Dechaschistia crotonifolia Wight and Arn. Root Extract	A.Lakshmana Rao	Pharmaceutical Chemsitry	Journal of Young Pharmacists	0975-1505

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J Young Pharm, 2022; 14(2) : 169-173

Original Article

Assessment of Anthelmintic Activity and *in silico* Study of Phytoconstituents in *Decaschistia crotonifolia Wight & Arn.* Root Extract

Raveesha Peeriga*, Keerthi Priyanka Adarapu, Kavya Sri Sanivarapu, Jyothsna Kanumuri, Rikith Swamy Akunuri, Lakshmana Rao Atmakuri
Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.

ABSTRACT

Background: Worm infections in developing countries were reported high. Phytoconstituents have been a vital role for the treatment of many ailments. The current study was aimed assess for anthelmintic activity of different root extracts of *Decaschistia crotonifolia* belongs to the family Ebanaceae against *Pheretima posthuma*. Further *Insilico* study was carried out for phytocompounds present in *Dechaschistia*. **Methods:** The chloroform, ethylacetate and ethanol extract of *Decaschistia crotonifolia* were considered for the study of anthelmintic property on earthworms at concentrations 20 mg/ml, 40 mg/ml and 60 mg/ml. During this study, the parameters paralysis time and Death Time of adult Indian earthworms was observed. As a standard and control Albendazole 10 mg/ml and 2% Tween 80 in distilled water were taken respectively. **Results:** The study resulted that ethanolic extract was significant when compared with the Albendazole 10 mg/ml. Docking studies revealed all phytocompounds in *Dechaschistia* shown binding affinity, however comparatively scopoletin and stigmasterol had shown a good binding affinitiy about -7.7 Kcal/mol and -7.6 Kcal/mol compared to standard drug Albendazole which was shown about -8.7 Kcal/mol. **Conclusion:** The study revealed that the ethanol extract of *Decaschistia crotonifolia* at a concentration of 60mg/ml exhibited a stronger anthelmintic property compared to Albendazole 10mg/ml. A dose dependent anthelmintic activity is exerted by all the extracts in an ascending manner Chloroform<Ethyl acetate<Ethanol. These observations were made evidenced by docking studies of phytocompounds in *Dechaschistia* as the phytocompounds were shown excellent docking score when compared with standard Albendazole.

Key words: *Decaschistia crotonifolia* Wight and Arn., Ebanaceae, *Pheretima* and Anthelmintic, Docking, Lipinski rule.

Correspondence

Dr. Raveesha Peeriga, Ph.D,

Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, INDIA.

Email id: drprsha@gmail.com

DOI: 10.5530/jyp.2022.14.32

INTRODUCTION

Diseases caused by helminths are chronic. Helminthiasis is infested to human beings with worm's likely pinworm, round worm, or tapeworm.[1] The diseases caused by parasites results in morbidity and leads to the condition onchocorciasis and Schistosomiasis. A more number of worm infections has been reported in developing countries due to lack of proper hygienic conditions. By considering the affordability and various side effects of synthetic compounds, a preferability towards herbal medicines were chosen. An adult Indian earthworm *Pheretima posthuma* is selected for assessment of anthelmintic property as it shows similarity in anatomy and physiology of round worm parasites resides in intestine of human beings.

Decaschistia crotonifolia Wight and Arn is a shrub consists of dense whitish wooly on stems and branches. The leaves are in ovate lance shaped measures 3-6 cm long, 2-4 cm width. The base of leaf is heart shaped or rounded, pointed apex with coarsely toothed margins. Leaves are velvety, bears 1.5cm long stalks. It represents with yellow flowers with dark maroon centered in single leaf axils. The Sepal cup is bell in shape, 1-1.5cm long cup encloses capsules and seeds. The seeds are kidney shaped. It is most common in the deciduous forests of peninsular India. Flowering takes place in the month of March to June.

Earlier preliminary phytochemical assessment was made.[2,3] As the Investigations on *Decaschistia crotonifolia* Wight and Arn. were very limited based on literature survey and existence of insecticidal activity in the family Ebanaceae. The current study is focussed to evaluate anthelmintic activity of three extracts viz., Chloroform, Ethylacetate and Ethanol extract of *Decaschistia crotonifolia Wight and Arn.*

METHODS

Plant Material

The roots of *Decaschistia crotonifolia* Wight and Arn belonging to the family to Ebaenaceae were collected from surroundings of Tirumala, Andhra Pradesh, India in the month of June and it was authenticated by Dr. K. Madhava Chetty, Head of Department, Department of Botany, SV University, Tirupati. Voucher Specimen (PHCOG/VVIPS/056) were preserved. The roots of *Decaschistia crotonifolia* were shade dried, powdered and stored in well closed container.

Preparation of Extracts

About 300gm of dried root powdered drug of *Decaschistia crotonifolia* Wight and Arn. was extracted by successive solvent extraction using chloroform, ethyl acetate and ethanol by Soxhlet extraction for 72 hr. The extract was made concentrated by rotary evaporator and placed in desiccator for further use.

Evaluation of Anthelmintic Property

Anthelmintic property of chloroform, ethyl acetate and ethanol root extracts of *Decaschistia crotonifolia* Wight and Arn. was examined by using an Indian earthworm *Pheretima posthuma*.[4-5] Choosing of *Pheretima posthuma* is made as it resembles identical towards anatomy and physiology of roundworm parasite which occurs in alimentary tract of *Homosapiens*.

Adult earth worms measure an average size 4-7cm in length and 0.3–0.7 cm in width was collected from medicinal garden of

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Original Article

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Development and validation of a LC-MS/MS method for simultaneous quantification of Ivabradine and Metoprolol in rat plasma

M. Mukkanti Eswarudu [a,b,*], A. Lakshmana Rao [c], K. Vijay [d,e]

[a] Faculty of Pharmacy, Jawaharlal Nehru Technological University, Kakinada 533003, Andhra Pradesh, India
[b] Vignan Pharmacy College, Vadlamudi 522213, Andhra Pradesh, India
[c] V. V. Institute of Pharmaceutical Sciences, Gudlavalleru 521356, Andhra Pradesh, India
[d] University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur 522510, Andhra Pradesh, India
[e] Quest International University, Perak 30250, Malaysia

ARTICLE INFO

Keywords:
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Metoprolol
Quantitation
Rat plasma
Validation

ABSTRACT

The combination of Ivabradine (IVA) and Metoprolol (MET) was approved by US-FDA for symptomatic treatment of chronic stable angina pectoris. Hence, a potential analytical method that can simultaneously quantify these two drugs is required. In view of this, a novel and fully validated LC-ESI-MS/MS method has been established for the quantification of IVA and MET in rat plasma. Analytes and their deuterated analogues were quantitatively extracted from rat plasma by protein precipitation technique. The analytes were separated using acetonitrile–water consisting 0.1% orthophosphoric acid buffer (30:70 *v/v*) as a mobile phase with a flow-rate of 1.0 mL/min and 5 min run time on Waters, X-Bridge-C18 (150× 4.6 mm, 3.5 μm) analytical column. The multiple reaction monitoring transitions, *m/z* 638.14 → 124.22 for IVA, 498.33 → 110.59 for MET; 644.37 → 130.41 for IVA-D6 and 504.46 → 116.28 for MET-D6 were chosen to achieve high selectivity in the analysis. The method exhibited great improvement in sensitivity and good linearity over the concentration range of 0.1–1.5 ng/mL for IVA, 1.0–15.0 ng/mL for MET, with satisfactory precision and accuracy according to USFDA guidelines. Accuracy was within 99.71–100.3% and 99.9–100.31% for IVA and MET. The intra- and inter-day precision ranged between 0.048 and 12.68% and 0.1–2.66% CV for IVA and MET respectively. Further, the results of the pharmacokinetic parameters including C_{max}, t_{max}, AUC_{0-t}, $AUC_{0-\infty}$ and $t_{1/2}$ values of drugs indicated that the method is useful for successful quantification of the drugs in rat plasma. The developed method is significant and is useful for simultaneous quantification of IVA and MET.

1. Introduction

Selective and sensitive analytical methods for the quantitative evaluation of drugs and their metabolites are critical for the successful evaluation of preclinical, biopharmaceutical and clinical studies (*Bioanalytical Method Validation - Guidance for Industry*, 2018). Bioanalytical method validation comprises the protocols that demonstrate a particular method that is used for the quantitative measurement of analytes in a given biological matrix, such as blood, plasma, serum, or urine. These methods are reliable and reproducible (Mukkanti Eswarudu, Lakshmana Rao. & Vijay, 2019).

Ivabradine (IVA) is a recently approved drug used for symptomatic management of chronic stable angina pectoris. It is chemically 3-[3({7 s)-3,4-dimethoxy bicycle [4,2,0] octa-1,3,5-trien-7yl-] methyl} (methyl) amino propyl]-7,8-dimethoxy-2,3,4,5-tetrahydro-H-3-benzazepine-2-one. It is a specific antiarrhythmic agent that acts by reducing the rate of cardiac pacemaker activity in the sinoatrial node (De Silva & Fox, 2009; Dilaveris. Giannopoulos. Synetos, Gatzoulis, & Stefanadis, 2006; Francesco. 2005; Postea & Biel, 2011). Metoprolol (MET) [1-[4-(2-methoxyethyl)-1-phenoxy]-3- [(1-methyl ethyl) amino]-2-propanol] on the other hand is a cardio selective β_1-adrenoreceptor antagonist that is used in the treatment of cardiovascular complications. For oral administration, it is available as immediate release (metoprolol tartrate) or controlled release tablets (metoprolol tartrate, metoprolol succinate). MET has good oral bioavailability and is almost completely absorbed from the gastrointestinal tract (Leonova, Maneshina, & Belousov, 2010; O'Neil, Heckelman, Koch. & Roman. 2006; Zhang, Cui, & Zhang, 2009).

Analytical chemists have established few methods for the estimation

* Corresponding author at: Vignan Pharmacy College, Vadlamudi 522213, Andhra Pradesh, India.
E-mail address: eswarmunnangi@gmail.com (M.M. Eswarudu).

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Research Article

PREDICTION OF LINEARITY AND NON-LINEARITY IN PHARMACEUTICAL OPTIMIZATION STUDIES WITH PYTHON

T. Bhanuteja[1], A. Lakshmana Rao[2]*, T.E.G.K. Murthy[3], T. Pallavi[4]

[1]VIT University, Vellore, Tamil Nadu, India.

*[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[3]Bapatla College of Pharmacy, Bapatla, Andhra Pradesh, India.

[4]KL University, Guntur, Andhra Pradesh, India.

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ABSTRACT

Novel simple user-friendly python programme was developed to predict linearity and non-linearity in pharmaceutical optimization. Optimization is the process of obtaining optimum formulation. There are independent and dependent variables in optimization techniques regarding pharmaceutical formulations. The number of levels of independent factor is usually selected based on the linear/ non-linear relationship existing between the dependent and independent variable. The programme is run after entering the independent and dependent variables. The program is used to detect the best fitted model based on the observed correlation between dependent and independent factors, to predict the outcome against the input (independent variables). The program output is the regression coefficients, regression equations, predicted dependent variable and standard error of point estimate. The model offering the low error of point estimate is assumed to be the best fitted model for the given data. The model is applied successfully for both linear and non-linear data.

INTRODUCTION

Optimization refers to obtaining resulting actions of our own interest by changing the independent variables one by one [1]. Orthogonal functions satisfying a second order differential equation, rotatable design and simplex lattice designs are commonly employed to optimise the composition of pharmaceutical formulations [2]. Evolutionary operations, Lagrangian, search and canonical analysis are commonly used for optimisation studies. The preferred optimization techniques are sequential optimization techniques, simultaneous optimization techniques and combination of both. A sequential model- based optimization (SMBO) study involves the performance of experiments repeatedly and the observations are fitted in to different models to identify the better choices about the configurations to be investigated. It allows interpolation of performance observed between parameter settings and facilitate for extrapolation to other regions of design space. Simultaneous methods involve (a) framing the experimental design (b) performing the experiments as per experimental design (c) insertion of the results in appropriate mathematical model (d) observing the maximum or minimum response through the best fitted model identified from a set of equations. To ascertain the system behaviour, a predictive model is required. Optimization algorithms are used in (a) experimental design, model development, parameter estimation, and statistical analysis; (b) process design, development, analysis, and retrofit; (c) model predictive control of risk factors and real-time optimization; and (d) identification, implementation and the coordination of a series of process operations related to the manufacturing and distribution of drug product. In the operation of pharmaceutical processes, there is huge interest in improving the scheduling and

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Research Article

In-Vivo Antinociceptive Activity and *In-Silico* Molecular Docking of Selected Phytoconstituents of Methanolic Extract of *Hypericum Japonicum*

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Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, India

**Address Correspondence to Shaik Aminabee, aminaammi786@gmail.com*

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Abstract

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Keywords: *Hypericum Japonicum*; Kielcorin; Mesuaxanthone B; Analgesic; Celecoxib

Abbreviations: (TAE) Tannic Acid Equivalent; (GAE) Gallic Acid Equivalents; (CE) Catechin Equivalents; (AE) Atropine Equivalent; (RT) Retention Time; (PA) Peak Area

Introduction

To recognize the location that is damaged and harmed by numerous stimulations, pain is a tool that is beneficial in body's immune system. For the treatment of pain, many drugs like non-steroidal anti-inflammatory drugs (NSAIDs), analgesics opioid in nature, opioid anaesthetics and steroidal medicines are used [1]. They are having many harmful effects like kidney failure, liver damage, cardiac problems, high blood pressure, erectile dysfunction, skin degeneration, manic depression, reduced bone density, constipation, abscess and respiratory problems. So it gained importance for herbal based antinoceptive drug which can be available at low cost, more potent and has less negative effects [2]. In order to generate highly active compound with minimum adverse effects, drug design has become a vital tool in medicinal chemistry field where novel compounds are synthesized by chemical or molecular modification of lead moiety. *In-silico* docking method was a huge breakthrough in drug design and development to predict therapeutic efficacy of the novel molecules [3]. To design new drugs, molecular docking has become an essential element where selected protein will show binding affinity for ligand. To understand chemical properties and drug receptor interactions, *In-silico* docking methods are largely useful [4]. *Hypericum Japonicum* is an annual herb flowering plant belonging to the family hypericaceae. It is only 2-5 cm long. Its stems are green, 4 angled and 2-52 mm long internodes that exceed the leaves. The leaves are persistent, spreading and sessile. This species is 30 flowered and flowers are branched upto 3 nodes. The flowers are 4-8 mm in diameter and petals are bright orange or yellow. The stamens are 5-30 in number arranged in irregular groups. Seeds are 50 mm long approximately. It is distributed in India, China, Laos, Japan, Vietnam, Myanmar, Thailand, Malaysia, and Indonesia, Philippines to New Guinea, New Zealand, and Australia. It is well grown in good drained and soil that retains moisture. Flourish and semi shade under sun. Sunny region is better foe flowers. Mostly this species was distributed in wet soils. The plant is harvested from the wild for local use as a medicine. The plant is antiphlogistic, alternative, astringent, febrifuge, depurative, vulnerary and stomachic. For use it can be boiled with water. Also used in the therapy of dysentery, appendicitis, acute hepa-

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Research Article

Development and Validation of Novel Analytical Method for the Simultaneous Estimation of Bempadoic Acid and Ezetimibe in Bulk and Pharmaceutical Dosage Form by RP-UPLC

A Sai Datri[1*], KS Nataraj[2] and A Lakshmana Rao[3]

[1]*University College of Pharmaceutical Sciences, Andhra University, India.*
[2]*Shri Vishnu College of Pharmacy, Andhra Pradesh, India.*
[3]*V. V. Institute of Pharmaceutical Sciences, Andhra Pradesh, India.*

[*]*Address Correspondence to A Sai Datri, E-mail: sai.dhatri_arige@yahoo.co.in*

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Abstract

Objectives: A selective and novel method has been optimized for the evaluation of Bempadoic Acid and Ezetimibe using RP-UPLC.

Materials and methods: The principle analytes chromatogram was run through SB C18 100 x 1.8 mm, 2 µm. Mobile Phase containing 0.01% OPA:Acetonitrile (60:40%, v/v) was pumped through column at 0.3 mL/min flow rate. Optimized wavelength selected was 226 nm.

Results: The retention times of Bempadoic Acid and Ezetimibe were 1.865 min and 1.234 min respectively with a total run time of 5 min. The calibration curve indicates that the correlation coefficient (r2) was superior with a value of 1.000 in the linear range of 22.5 - 135 µg/mL for Bempadoic Acid and 1.25 – 7.5 µg/mL for Ezetimibe. The lower limits of quantification and detection for Bempadoic Acid and Ezetimibe were found to be 2.34 µg/mL and 0.77 µg/mL and 0.28 µg/mL and 0.09 µg/mL, respectively.

Conclusion: The developed method was validated and applied to the bulk drug and formulation of Bempadoic Acid and Ezetimibe. All the results obtained with this method were accurate and precise.

Keywords: Bempadoic Acid; Ezetimibe; Bulk drug; Formulation; UPLC

Introduction

Bempadoic Acid [1] (8-hydroxy-2,2,14,14-tetramethylpentadecanedioic acid) is a prodrug that requires activation in the liver. The very-long-chain acyl-CoA synthetase-1 (ACSVL1) enzyme is responsible for its activation to ETC-1002-CoA, the pharmacologically active metabolite. ATP lyase (also known as ATP synthase) plays an important part of cholesterol synthesis. ETC-1002-CoA directly inhibits this enzyme after the parent drug is activated in the liver by coenzyme A (CoA). This inhibition leads to upregulation of the LDL cholesterol receptor, reducing serum LDL-C via increased uptake and LDL clearance in the liver. Ezetimibe2 [(3R,4S)-1-(4-fluorophenyl)-3-[(3S)-3-(4-fluorophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl) azetidin-2-one] mediates blood cholesterol-lowering effect via selectively inhibiting the absorption of cholesterol and phytosterol by the small intestine without altering the absorption of fat-soluble vitamins and nutrients.

Based on a literature survey, only two analytical methods are reported for this new formulation, i.e., Bempadoic Acid and Ezetimibe. One is with HPLC3 and other is with UPLC4. For the Bempadoic Acid and Ezetimibe combination, there was a lack of sensitive analytical methods for the identification and quantification in bulk and in formulations. The proposed methods are simple, convenient, precise, accurate, and economical than the reported method and validated as per ICH guidelines.

Materials and Methods

Diluent

Based up on the solubility of the drugs, diluent was selected, Methanol and Water taken in the ratio of 50:50.

Buffer (0.1N Potassium dihydrogen Ortho phosphate)

Accurately weighed 1.36 gm of Potassium dihydrogen Ortho phosphate in a 1000 mL of Volumetric flask, add about

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RESEARCH ARTICLE

FORMULATION AND EVALUATION OF HERBAL LIPSTICK USING ROSA 'MISTER LINCOLN'

Sai Datri A[1], Lakshmana Rao A[2], B.D.VVinayaki M[3], Zakir Md[4], Sri Snigdhanjani M[5], Pavani N[6]

[1]*Assistant Professor,* [2]*Professor and Principal and* [3-6]*Students, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru.*

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ABSTRACT: Objectives: The objective of the present study was to synthesis a lipstick with natural color pigment - anthocyanin which extracted from Rosa 'Mister Lincoln' and studies its color stability during storage period. **Materials and Methods:** Different organic ingredients such as beeswax, Shreeji Wax, vanilla essence, castor oil, olive oil, lemon juice and Anthocyanin extracted from Rosa 'Mister Lincoln' was used for the formulation of herbal lipstick. **Results:** The Physico-chemical properties of the synthesized lipstick such as spreadability, skin irritation test, and breaking point, surface anomalies, melting point, and perfume stability, homogeneity and color uniformity were determined and compared with commercial lipsticks. The stability of the synthesized lipstick found to be stable under dark condition while color loss was greater for lipstick in light condition. **Conclusion:** Due to the low pigmentation from method, Anthocyanin is suggested incorporate in to lip balm application. This study has proven that Anthocyanin could replace synthetic dye in cosmetics industry for lip balm application.

KEYWORDS: Anthocyanin, Organic ingredients, Rosa 'Mister Lincoln' and lip balm.

INTRODUCTION:

Herbal cosmetics [1-4] are defined as the beauty products which having desirable physiological activity like enhancing, smoothing appearance, healing, conditioning properties due to the presence of herbal ingredients. These are purely made by herbs and shrubs and thus are side effects free. These products provide nutrients and other useful nutrients to the body. Herbal lipsticks are the natural products that are prepared by using herbal ingredients. These products moisturize and smoothen your lips and also impart color to lips by using pigments. Rose flowers grow in many different places with different colors usually red in color. Anthocyanins [5-10] are responsible to produce red color in Rose's which are belonging to the family of flavonoids. These anthocyanins are obtained from anthocyanins by adding sugars. Anthocyanins are present in the cell vacuoles which are generally water-soluble pigments. Additionally, anthocyanin pigments have been used as antibacterial agent.

Corresponding Author:
Dr Sai Datri Arige,
Assistant Professor,
V. V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village,
Gudlavalleru,

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RESEARCH ARTICLE

FORMULATION AND EVALUATION OF HERBAL LIPSTICK USING ROSA 'MISTER LINCOLN'

Sai Datri A[1], Lakshmana Rao A[2], B.D.VVinayaki M[3], Zakir Md[4], Sri Snigdhanjani M[5], Pavani N[6]

[1]Assistant Professor, [2]Professor and Principal and [3-6]Students, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru.

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Assistant Professor,
V. V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village,
Gudlavalleru,

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RP-HPLC Method Development and Validation for Simultaneous Determination of Decitabine and Cedazuridine in Pure and Tablet Dosage Form

Alimunnisa and Lakshmana Rao A*

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

*Corresponding author: dralrao@gmail.com

Abstract

A simple, rapid, accurate and precise isocratic reversed phase high performance liquid chromatographic method has been developed and validated for simultaneous estimation of Decitabine and Cedazuridine in tablet dosage form. The chromatographic separation was carried out on Zorbax C18 column (150 mm x 4.6 mm I.D., 5 µm particle size) with a mixture of 0.01N potassium dihydrogen phosphate buffer and acetonitrile in the ratio of 65:35% v/v as a mobile phase at a flow rate of 1.0 mL/min. UV detection was performed at 245 nm. The retention times were 2.263 minutes and 3.001 minutes for Decitabine and Cedazuridine respectively. Calibration plots were linear (r^2=0.999 for both Decitabine and Cedazuridine respectively) over the concentration range of 8.75-52.5 µg/mL for Decitabine and 25-150 µg/mL for Cedazuridine. The method was validated for linearity, precision, accuracy, ruggedness and robustness. The proposed method was successfully used for simultaneous estimation of Decitabine and Cedazuridine in tablet dosage form. Validation studies revealed that the proposed method is specific, rapid, reliable and reproducible. The high % recovery and low % RSD confirms the suitability of the proposed method for routine quality control analysis of Decitabine and Cedazuridine in bulk and tablet dosage form.

Keywords: Decitabine, Cedazuridine, Validation, HPLC.

Introduction

Decitabine is indicated for the treatment of patients with myelodysplastic syndromes (MDS) including refractory anaemia, refractory anaemia with ringed sideroblasts, refractory anaemia with excess blasts, refractory anaemia with excess blasts in transformation and chronic myelomonocyticleukaemia (1). Chemically it is, 4-amino-1-[(2R,4S,5R)-4-hydroxy-5-(hydroxymethyl)oxolan-2-yl]-1,2-dihydro-1,3,5-triazin-2-one (2) (Fig. 1). It acts as nucleoside metabolic inhibitor, Decitabine is recognized as a substrate by DNA methyl transferase enzymes (DNMTs). This mode of action depletes DNMTs and results in global DNA hypomethylation (3).

Cedazuridine is acytidine deaminase inhibitor co-administered with the hypomethylating agent. Decitabine is indicated for the treatment of variable forms of myelodysplastic syndrome (MDS) (4). Chemically it is, (4R)-1-[(2R,4R,5R)-3,3-difluoro-4-hydroxy-5-(hydroxymethyl)oxolan-2-yl]-4-hydroxy-1,3-diazinan-2-one (Fig.2). It acts as DNA methyltransferase (DNMT) inhibitor

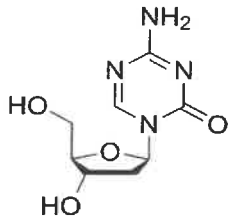

Fig 1. Chemical structure of decitabine

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Comparative *In Vivo* Evaluation of Marketed and Optimized Formulations of Teneligliptin and Metformin Bilayered Tablets

Rajani V[1]*, Rajendra Prasad Y[2] and Lakshmana Rao A[3]

[1]Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar, Andhra Pradesh, India

[2]College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, Andhra Pradesh, India

[3]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

*Corresponding author: E-mail id: rajanivetapalem@gmail.com

Abstract

The combination of Metformin and Teneligliptin is an attractive approach for the management of type-2 diabetes because the two pharmacological approaches have different and potentially complementary targets. A novel bilayer tablet, consisting of an immediate release layer containing Teneligliptin (20 mg) and prolonged release layer containing Metformin (500 mg) was developed. *In vivo* studies were carried out in rabbits by using the optimised formulation as a test product and marketed formulation as a reference. Based on the *in vivo* performance, the developed bilayer tablets showed superior bioavailability than the marketed tablets. A simple, sensitive and selective HPLC method was developed for the simultaneous determination for Metformin and Teneligliptin in rabbit plasma using a novel sample extraction procedure. Method validation was carried out according to ICH guidelines in rabbit plasma in order to evaluate the method for selectivity, linearity of response, accuracy, precision, recovery and stability of analytes during processing and storage. The total area under plasma concentration time curve ($AUC_{0-\infty}$), the maximum plasma concentration (C_{max}), and time to reach the maximum plasma concentration (Tmax) were selected as parameters for pharmacokinetic evaluation. The C_{max} and Tmax were obtained directly from the experimental data of plasma concentration versus time. $AUC_{0-\infty}$ was obtained by adding the AUC_{0-24h}, which was calculated by the trapezoidal rule. The differences in average of data were compared by sample analysis of variance (one way analysis of variance) or independent sample t test. The significance of the difference was determined at 95% confident limit (P=0.05).

Keywords: Metformin, Teneligliptin, Bilayer Tablets, Formulation.

Introduction

Teneligliptin is a potent and selective inhibitor of dipeptidyl peptidase-IV (DPP-4), orally active, that improves glycemic control in patients with type 2 diabetes (T2DM) primarily by enhancing pancreatic (α and β) islet function. Thus Teneligliptin has been shown both to improve insulin secretion and to suppress the inappropriate glucagon secretion seen in patients with T2DM. Teneligliptin reduces HbA_{1c} when given as monotherapy, without weight gain and with minimal hypoglycemia, or in combination with the most commonly prescribed classes of oral hypoglycemic drugs: Metformin, a sulfonylurea, a thiazolidinedione, or insulin. Metformin, with a different mode of action not addressing β-cell dysfunction, has been used for about 50 years and still represents the universal first line therapy of all guidelines (1). However, given the multiple pathophysiological abnormalities in T2DM and the progressive nature of the disease, intensification of therapy with combinations is typically required over time.

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V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

ORIGINAL ARTICLE

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Novel Approach of Stability Indicating Method Development for Determination of Metformin and Empagliflozin by High Performance Liquid Chromatography

A Sai Datri [1], A Lakshmana Rao[2], Ch Purna Durganjali[3]

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Abstract

A simple, accurate, precise RP-HPLC method was developed for the simultaneous estimation of the Metformin and Empagliflozin in the tablet dosage form. ***Materials and Methods:*** Chromatogram was run through Std Agilent 18 (150 x 4.6mm, 5µm). Mobile phase taken as 0.1% OPA Buffer: Acetonitrile in 60:40% v/v ratio, and pumped through the column at a flow rate of 1mL/min. The buffer used in this method was 0.1% OPA buffer. The temperature was maintained at 25°C. ***Results and Discussion:*** Optimized wave length selected was 245 nm. The retention times of Metformin and Empagliflozin were found to be 2.193 min and 2.668 min respectively. %RSD of the Metformin and Empagliflozin was found to be 1.4 and 0.8 respectively. %Recovery was obtained as 99.66% and 100.24% for Metformin and Empagliflozin respectively. LOD, LOQ values obtained from regression equations of Metformin and Empagliflozin were 0.02, 1.48, and 0.05, 4.93 respectively. Regression equation of Metformin is y = 20952x + 9914.5 and y = 41842x + 571.79 of Empagliflozin. Retention times were decreased and that run time was decreased, The Reverse Phase HPLC isocratic method for Metformin and Empagliflozin is developed and validated as per ICH guidelines. ***Conclusion:*** The test method is found to be sensitive, accurate, precise, linear, convenient, and economical that can be adopted in regular quality control tests in Industries.

Keywords: Metformin; Empagliflozin; RP-HPLC; Validation.

INTRODUCTION

Metformin (Fig. 1) is chemically 1,1-dimethyl biguanide hydrochloride. Metformin is an antihyperglycemic agent that decreases blood glucose levels by decreasing hepatic glucose production, decreasing intestinal absorption of glucose, and improving insulin sensitivity by increasing peripheral glucose uptake and utilization.[1]

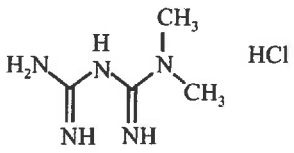

Fig. 1: Molecular structure of Metformin Hydrochloride

Empagliflozin (Fig. 2) is chemically (2S,3R,4R,5S,6R)-2-[4-chloro-3-[[4-[(3S)-oxolan-3-

Author's Affiliations: [1]Assistant Professor, [2]Professor, [3]Student, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

Corresponding Author: A Sai Datri, Assistant Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

Email: ajay.pharma3006@gmail.com.

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ORIGINAL ARTICLE

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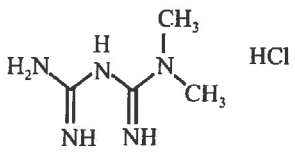

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Pharmacogn Res. 2022; 14(3):246-250

Original Article

In silico Investigation on Phytoconstituents in *Pamburus missionis* S. for Antioxidant Activity

Raveesha Peeriga[1,*], Keerthi Priyanka Adarapu[1], Akhila Kurama[1], Naseemunnisa Mohammed[1], Lakshmana Rao Atmakuri[1], Deepak Kumar[2]

ABSTRACT

Background: *Pamburus missionis* is geographically originated from southern India and it has been used for ailments. **Objectives:** This current research was performed to analyze *in silico* evaluation of phytoconstituents present in *Pamburus missionis* for antioxidant activity. **Materials and Methods:** *In silico* activity of the isolated constituents for antioxidant activity was carried out by Autodock 4.0 and absorption, distribution, metabolism, excretion/toxicity assessed by online tools. **Results:** The results revealed that the phytocompounds, benzoic acid 2,3-dimethyl showed the good docking score of -5.8 kcal/mol, which was a mere docking score of standard curcumin, i.e., -6.6 kcal/mol hence proving that a good binding compatibility among the ligand and the receptor site NADPH oxidase. The Absorption, distribution, metabolism, excretion/toxicity evaluation of phytoconstituents assures that they had obeyed Lipinski's guideline of five suggesting their safety consumption. **Conclusion:** To conclude, *Pamburus missionis* can be a good resource of antioxidant activity and simulation studies is needed to ensure the antioxidant activity of benzoic acid 2,3-dimethyl.

Keywords: Lipinski's, *Pamburus missionis, in silico*, Benzoic acid 2,3-dimethyl, Docking.

Raveesha Peeriga[1,*], Keerthi Priyanka Adarapu[1], Akhila Kurama[1], Naseemunnisa Mohammed[1], Lakshmana Rao Atmakuri[1], Deepak Kumar[2]

[1]Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.
[2]Department of Pharmacognosy, Ranchi College of Pharmacy, Ranchi, Jharkhand, INDIA.

Correspondence

Dr. Raveesha Peeriga

Associate Professor, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, INDIA.
Email id: drprsha@gmail.com
ORCID iD: 0000-0002-5169-6971

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INTRODUCTION

Rutaceae family comprises of about 150 genera and 1310 species out of 71 species were identified only in India. The plants under family were widely spread in tropical and temperate regions. *Pamburus* genus is characterized crown compact or dense. Leaflets will have the fragrance of lemon when crushed. Fruits will be broad and long usually colored of orange to yellowish.[1] All the species under this particular genus of *Pamburus* were categorized under subtribe of Triphasiinae, as it consists of leaves of very short, non-articulated petioles. Earlier investigations were carried out to evaluate on antiarthritic and anti-inflammatory activity.[2-3]

Oxidative stress is the risk factor leads to numerous chronic diseases. The free radicals and other reactive oxygen species are identified to be involved in the pathogenesis of diseases such as asthma, inflammatory diabetes, cancers, atherosclerosis and as many. Reactive oxygen species are said to be cause for the human aging.[4-5] Many antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide, hydroperoxide or lipid peroxyl and thus inhibit the oxidative mechanisms that lead to degenerative diseases.[6] Herbal plants are considered as good antioxidant sources since ancient times. Hence the current study is focused on to evaluate *in vitro* and *in silico* antioxidant activity of *Pamburus missionis* Swingle.

Discovery of therapeutic drugs is possible by molecular docking in multiple ways like Identification, screening, designing, prediction and synthesis of chemical compounds. Molecular docking is considered as a efficient method for the designing, synthesis and discovery of therapeutically important drugs. It is being implemented in medicinal chemistry, protein engineering, cheminformatics, bioremediation and many other biological and medicinal fields. Molecular docking method has been used to predict potent drug molecules especially from naturally occurring compounds against various disease. Molecular docking is cost and time effective to analyze complexity of protein-ligand interaction.[7-8]

MATERIALS AND METHODS

Molecular docking: Receptor and Ligand Preparation

In earlier study, the chemical composition of *Pamburus missionis* was investigated by GC and GC-MS.[9] The structures of phytoconstituents in *Pamburus missionis* was retrieved by PubChem and the receptor NADPH oxidase was retrieved from

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Research Article

Novel Validated LC-MS/MS Method for Simultaneous Estimation of Celecoxib and Amlodipine in Rat Plasma and its Application to a Pharmacokinetic Study

M. Mukkanti Eswarudu[1,2], A. Lakshmana Rao[3*] and K. Vijay[4]

[1]*Department of Pharmacy, Jawaharlal Nehru Technological University, India*
[2]*Department of Pharmacy, Vignan Pharmacy College, India*
[3]*Department of Pharmacy, V.V. Institute of Pharmaceutical Sciences, India*
[4]*Department of Pharmacy, Quest International University, Malaysia*

[*]*Address Correspondence to A. Lakshmana Rao, E-mail: dralrao@gmail.com*

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Abstract

The combination of celecoxib (CLX) and Amlodipine (AMD) was approved for hypertensive patients with osteoarthritis by US-FDA. Hence, a potential analytical method that can simultaneously quantify these two drugs is required. In view of this, a novel and fully validated liquid chromatography-electrospray ionization-tandem mass spectrometric (LC-ESI-MS/MS) method has been established for the quantification of CLX and AMD in rat plasma simultaneously. Protein precipitation extraction technique was employed for the extraction of analytes and their deuterated analogues from rat plasma quantitatively. The analytes were separated using the mobile phase comprising of acetonitrile–water with 0.1% formic acid buffer (70:30 v/v) and a flow-rate of 1.0 mL/min and 10 minutes run time on Agilent SB-C18 analytical column. The multiple reaction monitoring transitions, m/z 504.7→98.1 for CLX, 492.8→129.3 for AMD; 385.6→102.8 for CLX-D4 and 496.8.5→412.3 for AMD-D4 were utilized for the analysis in order to attain high selectivity. The method showed good sensitivity and linearity in the range of the concentration 20 ng/mL–800 ng/mL for CLX and 0.25 ng/mL–10 ng/mL for AMD respectively. Moreover, the method also displayed decent accuracy (87.9%-100.27% and 99.28%-103.26%) for CLX and AMD and precision according to US-FDA guidelines. The precision values for inter-and intra-day were between 1.92.02%-7.085% and 0.083%-3.43% and for CLX and AMD respectively. Further, the results of the pharmacokinetic parameters including Cmax, tmax, AUC_{0-t}, $AUC_{0-\infty}$ and $t_{1/2}$ values of drugs indicated that the developed method is valuable for the successful quantification of the analytes in rat plasma. The developed method is significant and is useful for simultaneous quantification of CLX and AMD.

Keywords: Amlodipine; Celecoxib; LC-MS/MS; Rat plasma; Validation

Introduction

Due to modern lifestyles and stress, hypertension and osteoarthritis are significant health issues in the middle and older age population. In general, these two illnesses coexist, with hypertension being identified in 40% of osteoarthritis patients [1]. Hence, a fixed dose combination of Celecoxib and Amlodipine besylate was approved by US-FDA for the treatment of hypertension and osteoarthritis [2,3].

Celecoxib (CLX) is chemically 4-[5-(4-methylphenyl)-3,7-(trifluoromethyl)-1H-pyrazol-1-yl] benzene sulphonamide. It is an NSAID that selectively inhibits cyclooxygenase-2 (COX-2) enzyme and is used to treat osteoarthritis with superior in action to other NSAIDS with minimal gastrointestinal and renal toxicity [4-6]. Amlodipine (AMD) is chemically [3-ethyl5-methyl (4RS)-2-[(2-aminoethoxy) methyl]-4-(2-chlorophenyl)-methyl-1-dihydropyridine3,5-dicarboxylate] benzenesulfonate that inhibit L-type calcium ion channels of the blood vessels and is used in the treatment of hypertension and angina pectoris. The Absolute bioavailability of CLX and AMD are 64%-88% and 64%-90% respectively [7].

Scientists have reported different analytical methods for the quantification of the above fixed dose combination in synthetic mixtures, pharmaceutical formulation and biological fluids. For instance, UV, TLC, HPLC and LC-MS/MS methods have been developed [8-17]. Overall, 10 studies have been reported for the estimation of Celecoxib and Amlodipine simultaneously among which only two papers had

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Research Article

RP-HPLC Method Development and Validation for the Determination of Ezetimibe Using Design of Experiments Approach

A. Sai Datri[1]*, K. S. Nataraj[2] and A. Lakshmana Rao[3]

[1]*Department of Pharmaceutical Sciences, Andhra University College of Pharmaceutical Sciences, India*
[2]*Department of Pharmaceutical Sciences, Shri Vishnu College of Pharmacy, India*
[3]*Department of Pharmaceutical Sciences, V. V. Institute of Pharmaceutical Sciences, India*

Address Correspondence to Sai Datri, sai.dhatri_arige@yahoo.co.in

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Abstract

The present research aims to develop and validate a simple and accurate RP-HPLC method for the determination of Ezetimibe by using the Design of Experiments Approach. This approach was useful for multivariate optimization of the method. The critical method parameters (CMPs) were optimized using the Box-Behnken design. Minitab software was equipped for the study. Chromatographic separation was done on Phenomenex C18 column with specifications 150 mm × 4.6 mm × 5 µm at 30°C. The predicted and optimized data from the software consisted of mobile phase 0.02 N Ortho phosphoric acid (OPA) and Acetonitrile (53:47% v/v), pumped at a flow rate of 0.96 ml/min brought the desirability function of 1. The UV detector was adjusted at 232.6 nm. The developed method was shows linearity with a correlation coefficient of 0.999. The optimized chromatographic method was validated as per the guidelines of ICH Q2 (R1). The stability of drug was forcibly studied under different stress conditions.

Keywords: Ezetimibe; Design of Experiments Approach; Box-Behnken design; ICH Q2 (R1).

Introduction

Ezetimibe [1,2] is marked under the brand name Zetiheal, which is approved for the management of hypercholestrerolemia. Generally, this drug decreases the absorption of cholesterol and phytosterol via small intestine without disturbing the absorption of fat-soluble vitamins and minerals by that means it lowers blood cholesterol levels. The IUPAC name of the compound is (3R,4S)-1-(4-fluorophenyl)-3-[(3S)-3-(4-fluorophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl)azetidin-2-one and the chemical structure of the compound is shown in Figure 1. After detailed literature review of Ezetimibe, a few methods are reported based on a variety of techniques such as UV-spectroscopy, Liquid chromatographic-tandem mass spectrometric (LC-MS/MS) methods and HPLC Methods [3-5]. None of the reported analytical methods describes a simple HPLC method for studying the effect of stress on pharmaceutical dosage forms of Ezetimibe. Hence the present work was focused on the development and validation of the estimation of Ezetimibe by Analytical Quality by Design (AQbD) approach with the help of Minitab software. This approach helps in understanding the empirical relationship between one or more measured responses and several independent variables in the form of a polynomial equation. Mapping of those responses related to the experimental domain helps in developing an optimized method. Optimization of the method for the present research was performed with the help of the Box-Behnken design.

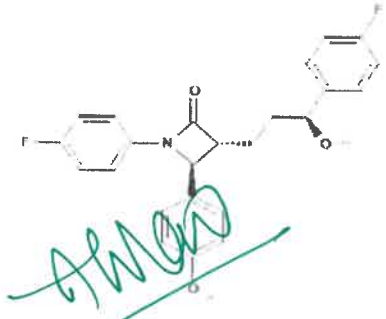

Figure 1: Chemical structure of Ezetimibe

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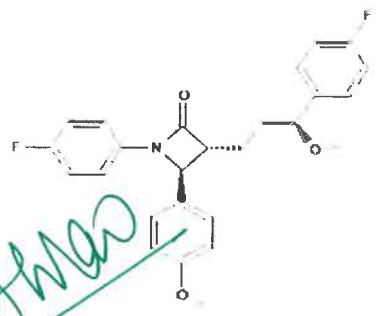

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ANTICANCER ACTIVITY OF ISOLATED CONSTITUENTS FROM *COCCINIA GRANDIS* BY SULPHORHODAMINE (SRB) ASSAY ON DU-145 AND PC-3 CELL LINES

Shaik Aminabee[*1], V. Deepthi[1], S. Haribabu[1], Shaherbanu[1], S. Karthik[1], M. Tejaswi[1], P. Naga Sai[1], Atmakuri Lakshmana Rao[1]

Department of Pharmacology[*1], V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh.

ABSTRACT:

Aim: To study the anticancer activity of isolated compounds from root of *Coccinia grandis* whole plant by SRB assay method on DU-145 and PC-3 human prostate cancer cell lines. Materials and methods: Anticancer activity of isolated constituents of *Coccinia grandis* was performed on SCC-29B and Ishikawa cancer cell lines by the Advanced Centre for Treatment Research and Education in Cancer (ACTREC) Mumbai, India. Cell line had been developed within RPMI 1640 medium that contains 10% fetal bovine serum and 2 mM L-glutamine with the help of SRB assay along with the absorbance had been recorded on an Elisa plate reader at a wavelength of 540 nm with 690 nm. Results: Isolated constituents particularly kampferol showed LC50, TGI and GI50 activity at >80, 69.7 and <10µg/ ml on DU-145 and >80µg/ ml of GI50 activity on PC-3 cell lines. Conclusion: Kampferol from *Coccinia grandis* has showed potent anticancer activity on DU-145 and PC-3 human prostate cancer cell lines.

Keywords: *Coccinia grandis*, Kampferol, Anticancer activity and Human prostate cancer.

INTRODUCTION:

Plants, the most wonderful gift from nature have been used as an origin of drugs. Various types of drugs are obtained from them. These types of plants are known as medicinal plants[1]. We use one or more of its organ for therapeutic purpose as a precursor of synthesizing of many useful drugs[2]. According to some generous estimates, almost 80% of the present day medicines are directly or indirectly obtained from plants[3].

Coccinia grandis is a type plant belonging to the Cucurbitaceae (commonly known as gourd). It is commonly known as Telachucha, Tindora, Scarlet-fruited gourd and Ivy-gourd. It is natively found in India, Asia and Central Africa[4]. It is a climbing perennial herb which spread vegetatively or by seed. Seeds may be the valuable sources for oils and proteins which can cover both industrial and edible demand[5]. The stem is an herbaceous climber or perennial slender climber with occasional adventitious roots forming where the stem runs

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Review Article

ARTIFICIAL INTELLIGENCE: APPLICATIONS IN HEALTHCARE INDUSTRY

T. Pallavi[1], A. Lakshmana Rao[2]*, T. Bhanuteja[3], T.E.G.K. Murthy[4]

[1]KL University, Guntur, Andhra Pradesh, India.

*[2]Professor & Principal, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[3]School of Computing and Augmented Intelligence, Arizona State University, Tempe, USA.

[4]Professor & Principal, Bapatla College of Pharmacy, Bapatla, Andhra Pradesh, India.

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ABSTRACT

Artificial intelligence (AI) is becoming a core part of the digital health systems to shape and support modern medicine. The situations such as pandemic COVID-19 pressing health systems to consider technology, such as artificial intelligence powered clinical decision support for faster and more informed decisions. AI utilises machine learning models to search medical data and uncover insights to improve health outcomes and patient experiences. AI is mainly used for clinical decision support and imaging analysis. Clinical decision support tools help the physician to take decisions about treatments, medications, physical and psychological health and other patient needs by providing quick access to information or research that's relevant to their patient. In medical imaging, AI tools are used to analyze CT scans, X-rays, MRIs and other images/ findings that a human radiologist might miss. Many healthcare organizations around the world started field-testing new AI-supported technologies to overcome the challenges like COVID-19 pandemic created. Various healthcare applications with AI are presented in this article.

INTRODUCTION

The pandemic crisis such as COVID-19 stressed the need to develop effective drugs and drug delivery systems within short period of time. The traditional healthcare system approach involves lot of time, huge investment with limited success rate. Artificial intelligence is defined as a branch of computer science that enables computer systems to perform various tasks with intelligence similar to humans[1]. AI is mainly dealing with the design and application of algorithms for analyzing, learning and interpreting data [2]. The process of AI involves obtaining information, developing rules for using information, approximate or accurate conclusions, and self-correction [3].

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With the implementation of AI, the computers or machines exhibit the characteristics of humans such as reasoning, generalizing and learning from past experience, etc. The use of AI in diverse sectors of the pharmaceutical industry includes drug discovery and development, drug repurposing, improving pharmaceutical productivity and clinical trials [4]. AI allows the rapid discovery and development of drugs. Different AI tools are being applied to support the drug development process [5]. The response towards the administered drug is different from individual to individual and hence therapeutic drug monitoring is required. The monitoring of patient response and the dispensing of personalised medicine is possible with the help of AI. AI has inspired computer-aided drug discovery [6]. The pros of AI are improved diagnosis, better clinical decisions, streamlining of process and opportunity to serve rural community. The cons include complications of learning, difficulties to adapt, need of human assistance and problems involved in selection of correct AI platform. Several programmes of AI are reported along with their applications. AI appears to be transforming the future of healthcare field but still it has to make an impactful

CLINICAL TRIALS STATUS AND APPROACHES OF COVID-19 VACCINES DEVELOPED GLOBALLY: THE RECENT UPDATES

Shaik Aminabee[a] and Atmakuri Lakshmana Rao[a]
[a]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh.

Abstract

All around the world COVID-19 pandemic has influenced human life massively since 2019. Although many precautionary measures are followed worldwide, it is strongly believed that this vicious pandemic can be controlled only by an effective and safer vaccine. After the outbreak of COVID-19, China first initiated the vaccine development strategies and then it was declared as pandemic by WHO globally. By different technologies like viral vector, DNA, RNA, protein subunit, live attenuated and inactivated and approach efficacious and safe vaccines are designed for development. The researchers around the universe are associating with various medical agencies, pharmaceutical companies and educational institutions for designing and developing SARS-CoV2 advanced vaccines. This review illustrates details on vaccine development technologies for COVID-19, protocols, clinical Phase status and vaccines that failed to progress further.

Keywords: COVID-19, viral vector, DNA, RNA, protein subunit, live attenuated.

Vaccine Strategies

Around the globe many researchers and scientists had made greater efforts towards the evolution of vaccines against COVID-19. Currently, until 2nd week of May 2021, 25 vaccines are in Phase III, 35 vaccines in Phase II, 32 vaccines in Phase I and 184 vaccines are in pre-clinical Phase globally[1]. Regulatory authorities approved 14 vaccines and 4 vaccines are in Phase IV clinical trials in different countries. The enormous vaccine development approaches like protein subunit, viral vector, RNA, DNA, inactivated, live attenuated have been prospected. However, prior to comprehensive evolution of a vaccine with safety, efficacy and no side effects, considerable facts have to be taken into account[2].

Vaccine Development Approach

Protein Subunit Vaccine:

As protein subunit has less immunogenicity to potentiate immune responses that are induced by vaccine; it requires support of adjuvant[3]. It is of different types such as bacterial or viral pathogen, chains of sugar moieties are there in polysaccharide vaccines as found in the cell wall of many strains of bacteria (Figure 1). By using recombinant DNA technology, there is development of viral surface protein and by whole pathogen preparation purification there is development of bacterial protein vaccine[4]. Polysaccharide vaccine is prepared by bacteria grown in industrial bioreactors; they are opened and harvested for polysaccharides from cell walls before splitting them (Table 1).

Novax-CoV2373

Novavax in the United States of America developed this vaccine. By implanting nanoparticle technology this vaccine was designed for the spike protein of SARS-CoV-2 to develop antigen[5]. In August, 2020 Phase III clinical trials were started in South Africa and in September, 2020 Phase III clinical trials were initiated in the United Kingdom and in December, 2020 in the United States of America. Phase III trials demonstrated an 89.3% efficacy rate in the United Kingdom.

ZF2001

The Chinese Academy of Sciences and Anhui Zhifei Longcom Biopharmaceutical Company in China jointly developed the ZF2001 vaccine. In October, 2020 Phase I/II clinical trials were completed and now it is in the final Phase of clinical trials in Indonesia, Pakistan and Uzbekistan[6]. This vaccine was permitted for emergency use from 01st March, 2021 in Uzbekistan.

VAT00002

Sanofi Pasteur in France followed the same principle used in Flublok (vaccine for influenza virus) and developed the VAT00002 vaccine. In December 2020, Phase I/II clinical trials demonstrated that the old population were not responding firmly to VAT00002[7]. In February 2021 Phase II clinical trials are initiated with different formulations of VAT00002 and if there are promising results Phase IV trials will be initiated in 2021.

Finlay-FR-1

It is a protein subunit vaccine popularly known as Soberaba 01. In January 2021, Instituto Finlay De Vacunas in Cuba made an agreement with Pasteur Institute of Iran to initiate Phase III clinical trials for this vaccine[8].

EpiVacCorona

It is designed in Russia by the Russian Biological Research Center. Currently this vaccine is in Phase III trials but in October 2020, regulatory approval was given by the president of Russia. This is the 2nd vaccine for SARS-CoV-2 that got approval from the Russian government[9].

Abdala

Abdala was designed in Cuba by the Center for Genetic Engineering and Biotechnology of Cuba. In February 2021, Phase II clinical trials were initiated and expected that Phase III clinical studies will be done on 40,000 volunteers this year[10].

SCB- 2019

It is an s-trimer vaccine designed by Clover Biopharmaceuticals in Australia. In December 2020, Phase II/III clinical studies will be initiated.

UB-612

UB-612 (United Biomedical-612), Vaxxinity (also known as COVAXX) is a protein subunit vaccine. In February 2021, they started Phase II/III clinical trials in Brazil[11].

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SHORT COMMUNICATIONS

STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION OF MEROPENEM AND VABORBACTAM IN PHARMACEUTICAL DOSAGE FORM

ABSTRACT

A simple, novel, rapid, accurate and precise stability indicating RP-HPLC method was developed and validated for simultaneous estimation of meropenem and vaborbactum in pharmaceutical dosage form. Meropenem an antibacterial, and vaborbactam, a beta-lactamase inhibitor are indicated for the treatment of complicated urinary tract infections including pyelonephritis caused by designated susceptible bacteria. The drugs in this combination were determined by using *o*-Phosphoric acid (OPA) buffer: acetonitrile (50:50 V/V) as a solvent. Meropenem and vaborbactum peaks were detected at 2.334 and 3.542 min, respectively. The flow rate was 1 mL min^{-1} and the effluent was monitored at 260 nm. The developed method was validated for different parameters according to ICH guidelines. Linearity range was adjusted to 25-150 µg mL^{-1} for both drugs. % RSD values for precision studies were found to be within the limits. The % mean recovery was found to be 98.93 for meropenem and 99.94 for vaborbactum. Degradation studies were conducted and the method separates the drug from its degradation products, hence it can be used as stability indicating method for estimation of both drugs in combined dosage form.

Keywords: Meropenem, vaborbactum, linearity and degradation

INTRODUCTION

Meropenem (Fig. 1) is a broad-spectrum carbapenem antibiotic. It is (4*R*,5*S*,6*S*)-3-{[(3*S*,5*S*)-5-(dimethylcarbamoyl)pyrrolidin-3-yl]sulfanyl}-6-[(1*R*)-1-hydroxyethyl]-4-methyl-7-oxo-1-azabicyclohept-2-ene-2-carboxylic acid[1]. It is active against Gram-positive and Gram-negative bacteria. Meropenem exerts its action by penetrating bacterial cells readily and interfering with the synthesis of vital cell wall components, which leads to cell death. Vaborbactam is a new beta-lactamase inhibitor based on a cyclic boronic acid pharmacophore. It is chemically 2-[(3*R*,6*S*)-2-hydroxy-3-[2-(thiophen-2-yl)acetamido]-1,2-oxaborinan-6-yl]acetic acid. It has been used in trials investigating the treatment of bacterial infections in subjects with varying degrees of renal insufficiency[2]. Vaborbactam is a potent inhibitor of class A carbapenemases, as well as an inhibitor of other class A and class C lactamases.

A thorough literature survey reveals that various methods have been reported for determination of meropenem and vaborbactum for individual estimation[3-5] and in combination with other drugs[6-8] only two methods[9-10] have been reported for analysis of these drugs in combination. The main objective here was to develop and validate a simple, precise, accurate and stability indicating RP-HPLC method for simultaneous estimation of meropenem and vaborbactum in pharmaceutical dosage form.

MATERIALS AND METHODS

Instrumentation

HPLC instrument used was of Waters HPLC 2965 system with auto injector and PDA 2996 detector. Software used was Empower 2. UV-VIS spectrophotometer (PG Instruments T60) with special bandwidth of 2 mm and 10 mm and matched quartz was used for measuring absorbance for meropenem and vaborbactum solutions.

Chemicals and solvents

Meropenem and vaborbactum pure drugs (API) were obtained from Spectrum Pharma Research Solutions, Hyderabad. Meropenem and vaborbactum combination tablets were obtained from a local pharmacy store. Acetonitrile and OPA were obtained from Rankem Chemicals Ltd., Mumbai, India.

Mobile phase

A mixture of 50 volumes of 0.1 % OPA buffer: 50 volumes of acetonitrile was prepared. The mobile phase was sonicated for 10 min to remove any gases.

Preparation of buffer (0.1 % OPA)

To 1 mL of OPA solution in a 1000 mL of volumetric flask, about 100 mL of milli-Q water was added and final volume made up to 1000 mL with milli-Q water. The buffer was filtered through 0.45 µm filter to remove all fine particles and gases.

vaborbactum in pharmaceutical dosage form. Retention times of meropenem and vaborbactum were found to be 2.334 min and 3.542 min, respectively. The developed method was successfully validated as per ICH guidelines and the results obtained satisfied the acceptance criteria. % RSD of meropenem and vaborbactum were found to be 0.9 and 0.6, respectively. % Recovery obtained was 98.44 % and 98.81 % for meropenem and vaborbactum. LOD and LOQ values obtained from regression equations of meropenem and vaborbactum were 0.06 µg mL^{-1}, 0.19 µg mL^{-1} and 0.18 µg mL^{-1} and 0.53 µg mL^{-1}, respectively. From the above results it was concluded that the method can have suitable application in routine laboratory analysis and in pharmaceutical industries.

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[a]Department of Pharmaceutical Analysis,
V. V. Institute of Pharmaceutical Sciences,
Gudlavalleru - 521 356, A.P., India

Prasanth T.[a]*, Lakshmana Rao A.[a] and Mohana Rao B.[a]

(Received 01 July 2019) (Accepted 19 October 2021)

***For Correspondence: E-mail: prasanthi8585@gmail.com**

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V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

SHORT COMMUNICATIONS

STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION OF MEROPENEM AND VABORBACTAM IN PHARMACEUTICAL DOSAGE FORM

ABSTRACT

A simple, novel, rapid, accurate and precise stability indicating RP-HPLC method was developed and validated for simultaneous estimation of meropenem and vaborbactum in pharmaceutical dosage form. Meropenem an antibacterial, and vaborbactam, a beta-lactamase inhibitor are indicated for the treatment of complicated urinary tract infections including pyelonephritis caused by designated susceptible bacteria. The drugs in this combination were determined by using *o*-Phosphoric acid (OPA) buffer: acetonitrile (50:50 V/V) as a solvent. Meropenem and vaborbactum peaks were detected at 2.334 and 3.542 min, respectively. The flow rate was 1 mL min^{-1} and the effluent was monitored at 260 nm. The developed method was validated for different parameters according to ICH guidelines. Linearity range was adjusted to 25-150 µg mL^{-1} for both drugs. % RSD values for precision studies were found to be within the limits. The % mean recovery was found to be 98.93 for meropenem and 99.94 for vaborbactum. Degradation studies were conducted and the method separates the drug from its degradation products, hence it can be used as stability indicating method for estimation of both drugs in combined dosage form.

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[a]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru - 521 356, A.P., India

Prasanth T.[a]*, Lakshmana Rao A.[a] and Mohana Rao B.[a]

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PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

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Research Article

In-Vivo Antinociceptive Activity and *In-Silico* Molecular Docking of Selected Phytoconstituents of Methanolic Extract of *Hypericum Japonicum*

Shaik Aminabee*, Raveesha Peeriga, V. Adithya, M. Mohansai, Shaherbanu, K. Harshitha, K. Himaja Kasthuri, M. Lakshmi Priya, G. Chandini Naga Mallika and Lakshmana Rao Atmakuri

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, India

**Address Correspondence to Shaik Aminabee, aminaammi786@gmail.com*

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Abstract

This research work was carried out to analyse and evaluate the antinociceptive activity of methanolic extract of *Hypericum Japonicum* (MEHJ) and *in-silico* molecular docking of selected phytoconstitutents with cyclooxygenase-2 (COX-2) enzyme along with absorption (A), distribution (D), metabolism (M), excretion (E) and toxicity (T) studies. *In-vivo* antinociceptive activity was performed by hot plate method, tail immersion method and acetic acid induced writhing response method in rat. In-silico molecular docking was done by using Autodock Vina and Discovery Studio Visualizer. Absorption, distribution, metabolism, excretion and toxicity (ADMET) studies were examined by Swiss ADME software. The results proved that methanolic extract of *Hypericum Japonicum* has dose dependent antinoceptive activity at all doses. Among all the phytoconstitutents saroaspidin B has very best docking rate of -7.1 kcal/mol which was better virtually than standard celecoxib which has docking rate of -7.4 kcal/mol. This shows that there is good binding affinity between ligand and receptor than the standard i.e celecoxib. ADMET evaluation using swissADME and admeSAR software assures that saroaspidin B has followed all the 5 Lipinski's guidelines suggesting that it is safety for consumption. Hence by this research, we conclude that *Hypericum Japonicum* can be a potent agent as antinociceptive activity and further studies are required to for the development of performance of saroaspidin B.

Keywords: *Hypericum Japonicum*; Kielcorin; Mesuaxanthone B; Analgesic; Celecoxib

Abbreviations: (TAE) Tannic Acid Equivalent; (GAE) Gallic Acid Equivalents; (CE) Catechin Equivalents; (AE) Atropine Equivalent; (RT) Retention Time; (PA) Peak Area

Introduction

To recognize the location that is damaged and harmed by numerous stimulations, pain is a tool that is beneficial in body's immune system. For the treatment of pain, many drugs like non-steroidal anti-inflammatory drugs (NSAIDs), analgesics opioid in nature, opioid anaesthetics and steroidal medicines are used [1]. They are having many harmful effects like kidney failure, liver damage, cardiac problems, high blood pressure, erectile dysfunction, skin degeneration, manic depression, reduced bone density, constipation, abscess and respiratory problems. So it gained importance for herbal based antinoceptive drug which can be available at low cost, more potent and has less negative effects [2]. In order to generate highly active compound with minimum adverse effects, drug design has become a vital tool in medicinal chemistry field where novel compounds are synthesized by chemical or molecular modification of lead moiety. *In-silico* docking method was a huge breakthrough in drug design and development to predict therapeutic efficacy of the novel molecules [3]. To design new drugs, molecular docking has become an essential element where selected protein will show binding affinity for ligand. To understand chemical properties and drug receptor interactions, *In-silico* docking methods are largely useful [4]. *Hypericum Japonicum* is an annual herb flowering plant belonging to the family hypericaceae. It is only 2-5 cm long. Its stems are green, 4 angled and 2-52 mm long internodes that exceed the leaves. The leaves are persistent, spreading and sessile. This species is 30 flowered and flowers are branched upto 3 nodes. The flowers are 4-8 mm in diameter and petals are bright orange or yellow. The stamens are 5-30 in number arranged in irregular groups. Seeds are 50 mm long approximately. It is distributed in India, China, Laos, Japan, Vietnam, Myanmar, Thailand, Malaysia, and Indonesia, Philippines to New Guinea, New Zealand, and Australia. It is well grown in good drained and soil that retains moisture. Flourish and semi shade under sun. Sunny region is better foe flowers. Mostly this species was distributed in wet soils. The plant is harvested from the wild for local use as a medicine. The plant is antiphlogistic, alternative, astringent, febrifuge, depurative, vulnerary and stomachic. For use it can be boiled with water. Also used in the therapy of dysentery, appendicitis, acute hepa-

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S.K. Aminabee*, **K. Indraja, K. Matha Manogna, K. Naga Devika, K. Ramya Sri, A. Lakshmana Rao**

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.
*Corresponding Author E-mail: aminaammi786@gmail.com

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Worldwide, the major death causing diseases are cardiovascular diseases and today the need for herb based therapeutics is needed. Present study was undertaken the whole plant of Indigofera Barberi (IB) to evaluate its cardioprotective activity against cardiotoxicity on rats induced by Doxorubicin (DXR). Soxlet extraction was used to prepare extracts. Preliminary phytochemical tests and in-vitro antioxidant activity are the methods used for standardization of all the extracts. Chloroform extract of Indigofera barberi (CEIB) and aqueous extract of Indigofera barberi (AQIB) are two extracts obtained from above activity were selected against induced cardiotoxicity of DXR to determine in-vivo cardioprotective activity. Total flavonoid and phenol content was determined. Endogenous antioxidants (MDA, GSH), ECG and histophological studies are the parameters of serum (CK, CK-MB, LDH) and non serum to evaluate the cardioprotective activity. Serum elevated levels of biomarker, decreased antioxidant activity, changes in electrocardiogram (ECG) and histopathological studies are shown by DXR alone treated rats. The toxicity produced by DXR has reversed on the rats pre-treated with CEIB and AQIB. CEIB has shown more activity when compared to AQIB. Compared to standard vitamin E the activity of CEIB was found to be significant. The protective effect of IB plant on DXR induced cardiotoxicity was revealed. To understand the mechanism of action and to reveal phytochemical responsible for the said activity the further research to be undertaken.

Keywords: Antioxidant; Cardioprotective; Cardiotoxicity; doxorubicin; heart failure; Indigofera barberi.

Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can be caused by bleeding from a blood vessel in the brain or from blood clots. The most important behavioral risk factors of heart disease and stroke are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol. The effects of behavioral risk factors may show up in individuals as raised blood pressure, raised blood glucose, raised blood lipids, and overweight and obesity. These "intermediate risks factors" can be measured in primary care facilities and indicate an increased risk of heart attack, stroke, heart failure and other complications.

The antioxidant properties of medicinal plants which could be ascribed to antioxidants phytochemicals related to therapeutics actions. Numerous medicinal plants and plant products

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Antioxidant and Cardioprotective Activity of *Indigofera barberi* on Doxorubicin Induced Toxicity on Rats

S.K. Aminabee*, K. Indraja, K. Matha Manogna, K. Naga Devika, K. Ramya Sri, A. Lakshmana Rao

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.
*Corresponding Author E-mail: aminaammi786@gmail.com

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Computational Study of Phytoconstituents in Myxopyrum Smilacifolium Blume against Inflammatory Mediator TNF-α

Author(s): Raveesha Peeriga*, Aminabee Shaik, Parimala Kolli, Adithya Veeroji, Anusha Kandula, Praneeth Varma, Mohansai Maraganti, Jhansi Chintalapudi, Sri Akhil Yenduri, Alekhya Kodali, Pravallika Gunturu, Sireesha Kancherla, Sindhu Sri Reddy, Lakshmana Rao Atmakuri and Bharghava Bhushan Rao Pathangi

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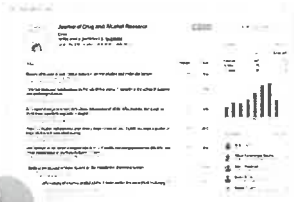

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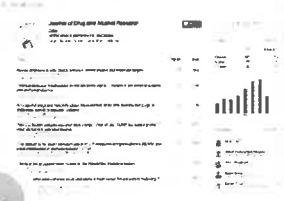

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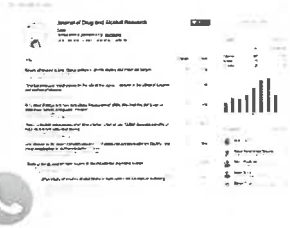

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Original Article

Assessment of Anthelmintic Activity and *in silico* Study of Phytoconstituents in *Decaschistia crotonifolia Wight & Arn.* Root Extract

Raveesha Peeriga*, Keerthi Priyanka Adarapu, Kavya Sri Sanivarapu, Jyothsna Kanumuri, Rikith Swamy Akunuri, Lakshmana Rao Atmakuri
Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.

ABSTRACT

Background: Worm infections in developing countries were reported high. Phytoconstituents have been a vital role for the treatment of many ailments. The current study was aimed assess for anthelmintic activity of different root extracts of *Decaschistia crotonifolia* belongs to the family Ebanaceae against *Pheretima posthuma*. Further *Insilico* study was carried out for phytocompounds present in *Dechaschistia*. **Methods:** The chloroform, ethylacetate and ethanol extract of *Decaschistia crotonifolia* were considered for the study of anthelmintic property on earthworms at concentrations 20 mg/ml, 40 mg/ml and 60 mg/ml. During this study, the parameters paralysis time and Death Time of adult Indian earthworms was observed. As a standard and control Albendazole 10 mg/ml and 2% Tween 80 in distilled water were taken respectively. **Results:** The study resulted that ethanolic extract was significant when compared with the Albendazole 10 mg/ml. Docking studies revealed all phytocompounds in *Dechaschistia* shown binding affinity, however comparatively scopoletin and stigmasterol had shown a good binding affinitiy about -7.7 Kcal/mol and -7.6 Kcal/mol compared to standard drug Albendazole which was shown about -8.7 Kcal/mol. **Conclusion:** The study revealed that the ethanol extract of *Decaschistia crotonifolia* at a concentration of 60mg/ml exhibited a stronger anthelmintic property compared to Albendazole 10mg/ml. A dose dependent anthelmintic activity is exerted by all the extracts in an ascending manner Chloroform<Ethyl acetate<Ethanol. These observations were made evidenced by docking studies of phytocompounds in *Dechaschistia* as the phytocompounds were shown excellent docking score when compared with standard Albendazole.

Key words: *Decaschistia crotonifolia* Wight and Arn., Ebanaceae, *Pheretima* and Anthelmintic, Docking, Lipinski rule.

Correspondence

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Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, INDIA.

Email id: drprsha@gmail.com

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INTRODUCTION

Diseases caused by helminths are chronic. Helminthiasis is infested to human beings with worm's likely pinworm, round worm, or tapeworm.[1] The diseases caused by parasites results in morbidity and leads to the condition onchocorciasis and Schistosomiasis. A more number of worm infections has been reported in developing countries due to lack of proper hygienic conditions. By considering the affordability and various side effects of synthetic compounds, a preferability towards herbal medicines were chosen. An adult Indian earthworm *Pheretima posthuma* is selected for assessment of anthelmintic property as it shows similarity in anatomy and physiology of round worm parasites resides in intestine of human beings.

Decaschistia crotonifolia Wight and Arn is a shrub consists of dense whitish wooly on stems and branches. The leaves are in ovate lance shaped measures 3-6 cm long, 2-4 cm width. The base of leaf is heart shaped or rounded, pointed apex with coarsely toothed margins. Leaves are velvety, bears 1.5cm long stalks. It represents with yellow flowers with dark maroon centered in single leaf axils. The Sepal cup is bell in shape, 1-1.5cm long cup encloses capsules and seeds. The seeds are kidney shaped. It is most common in the deciduous forests of peninsular India. Flowering takes place in the month of March to June.

Earlier preliminary phytochemical assessment was made.[2,3] As the Investigations on *Decaschistia crotonifolia* Wight and Arn. were very limited based on literature survey and existence of insecticidal activity in the family Ebanaceae. The current study is focussed to evaluate anthelmintic activity of three extracts viz., Chloroform, Ethylacetate and Ethanol extract of *Decaschistia crotonifolia Wight and Arn.*

METHODS

Plant Material

The roots of *Decaschistia crotonifolia* Wight and Arn belonging to the family to Ebaenaceae were collected from surroundings of Tirumala, Andhra Pradesh, India in the month of June and it was authenticated by Dr. K. Madhava Chetty, Head of Department, Department of Botany, SV University, Tirupati. Voucher Specimen (PHCOG/VVIPS/056) were preserved. The roots of *Decaschistia crotonifolia* were shade dried, powdered and stored in well closed container.

Preparation of Extracts

About 300gm of dried root powdered drug of *Decaschistia crotonifolia* Wight and Arn. was extracted by successive solvent extraction using chloroform, ethyl acetate and ethanol by Soxhlet extraction for 72 hr. The extract was made concentrated by rotary evaporator and placed in desiccator for further use.

Evaluation of Anthelmintic Property

Anthelmintic property of chloroform, ethyl acetate and ethanol root extracts of *Decaschistia crotonifolia* Wight and Arn. was examined by using an Indian earthworm *Pheretima posthuma*.[4-5] Choosing of *Pheretima posthuma* is made as it resembles identical towards anatomy and physiology of roundworm parasite which occurs in alimentary tract of *Homosapiens*.

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

CALENDER YEAR 2021

S.No.	Title of paper	Name of the author/s	Department	Name of journal	ISSN number
1	Computational Study for Identifyting Promising Therapeutic Agents of Hydroxychloroquine Analogues against SARS-CoV-2.	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Biomolecular Structure and Dynamics.	1538-0254
2	Development and Validation of a Method for Simultaneous Estimation of Sitagliptin and Ertugliflozin in Rat Plasma by LC-MS Method.	A.Lakshmana Rao	Pharmaceutical Chemistry	Current Pharmaceutical Analysis	1875-676X
3	Design, Synthesis, Hypoglycemic Activity and Molecular Docking Studies of 3-substituted-5-[(furan-2-yl)-methylene]-thiazolidine-2,4-dione Derivatives.	K. Srikanth	Pharmaceutical Chemistry	Indian Journal of Pharmaceutical Education and Research.	0019-5464
4	Design, Synthesis, Hypoglycemic Activity and Molecular Docking Studies of 3-substituted-5-[(furan-2-yl)-methylene]-	A.Lakshmana Rao	Pharmaceutical Chemistry	Indian Journal of Pharmaceutical Education and Research.	0019-5464

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	thiazolidine-2,4-dione Derivatives.				
5	Rapid Quantitative Estimation of Metformin and Ertugliflozin in Rat Plasma by Liquid Chromatography-Tandem Mass Spectroscopy and its Application to Pharmacokinetic Studies.	A.Lakshmana Rao	Pharmaceutical Chemistry	Egyptian Pharmaceutical Journal.	2090-9853
6	Validation of a Developed Analytical Method for Determination of Nateglinide and Metformin HCl in Pure and Pharmaceutical Dosage Form by Reverse Phase High Performance Liquid Chromatography and its Degradation Studies.	A.Lakshmana Rao	Pharmaceutical Chemistry	Asian Journal of Pharmaceutical and Clinical Research. 2021:	2455-3891
7	Antidiabetic Activity of Methanolic Extract of *Searsia mysorensis* in Alloxan Induced Diabetic Rats.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Pharmaceutical Sciences and Clinical Research	NA
8	Estimation of Daclatasvir in Pharmaceutical Dosge Form by Ultra Performance Liquid Chromatography.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Pharmaceutical Sciences and Research.	0975-8232
9	Development of Metoprolol Tartrate Sustained Release Formulations by using Modified Starches.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of pharmacy &Pharmaceutical Scienc	2664-7230
10	A Review on Inductively Coupled Plasma: Mass Spectrometry with Laser Ablation.	A.Sai Datri	Pharmaceutical Analysis	Journal of Pharmaceutical and Medicinal Chemistry.	2455-8346

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31	Estimation of Daclatasvir in Pharmaceutical Dosge Form by Ultra Performance Liquid Chromatography	A. Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Pharmaceutical Sciences and Research	2320-5148
32	Stability-Indicating Method Development and Validation for the Concurrent Determination of Darunavir, Cobicistat, Emtricitabine and Tenofovir Alafenamide by UPLC in Bulk and Tablet Dosage Forms	A. Lakshmana Rao	Pharmaceutical Chemistry	Future Journal of Pharmaceutical Sciences	2314-7253

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33	Stability Indicating HPLC Method Development and Validation for the Simultaneous Estimation of Lamivudine and Dolutegravir in Bulk and Tablet Dosage Forms	A. Lakshmana Rao	Pharmaceutical Chemistry	Indian Drugs	0019-462X
34	Bio-Analytical Method Development and Validation for Simultaneous Quantifi cation of Glecaprevir and Pibrentasvir in Rat Plasma by Using RP-HPLC	Prasanthi T	Pharmaceutical Analysis	Journal of Drug and Alcohol Research	2090-8334

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Computational study for identifying promising therapeutic agents of hydroxychloroquine analogues against SARS-CoV-2

D. S. N. B. K. Prasanth[a], Manikanta Murahari[b], Vivek Chandramohan[c], Chakravarthi Guntupalli[a] and Lakshmana Rao Atmakuri[d]

[a]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India; [b]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences, Bangalore, India; [c]Department of Biotechnology, Siddaganga Institute of Technology, Tumakuru, India; [d]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, India

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ABSTRACT

Hydroxychloroquine (HCQ) and its derivatives have recently gained tremendous attention as a probable medicinal agent in the COVID-19 outbreak caused by SARS-CoV-2. An efficient agent to act directly in inhibiting the SARS-CoV-2 replication is yet to be achieved. Thus, the goal is to investigate the dynamic nature of HCQ derivatives against SARS-CoV-2 main protease and spike proteins. Molecular docking studies were also performed to understand their binding affinity *in silico* methods using the vital protein domains and enzymes involved in replicating and multiplying SARS-CoV-2, which were the main protease and spike protein. Molecular Dynamic simulations integrated with MM-PBSA calculations have identified *In silico* potential inhibitors ZINC05135012 and ZINC59378113 against the main protease with -185.171 ± 16.388, -130.759 ± 15.741 kJ/mol respectively, ZINC16638693 and ZINC59378113 against spike protein -141.425 ± 22.447, -129.149 ± 11.449 kJ/mol. Identified Hit molecules had demonstrated Drug Likeliness features, PASS values and ADMET predictions with no violations.

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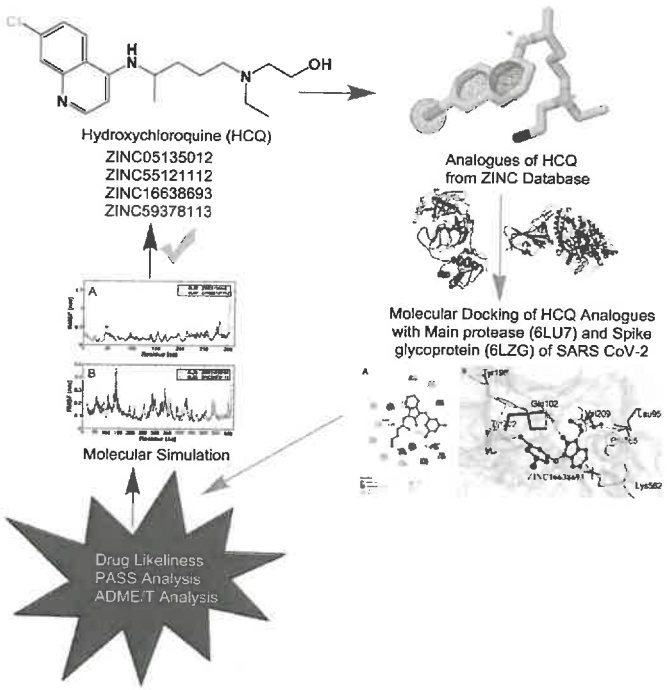
Hydroxychloroquine analogues; *in silico*; molecular dynamics; ADMET; PASS analysis



CONTACT D. S. N. B. K. Prasanth dsnbkprasanth@kluniversity.in; dsnbkprasanth@gmail.com Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India

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RESEARCH ARTICLE

BENTHAM SCIENCE

Development and Validation of a Method for Simultaneous Estimation of Sitagliptin and Ertugliflozin in Rat Plasma by LC-MS method

Pallepogu Venkateswara Rao[1,*], Atmakuri Lakshmana Rao[2] and Sahini Venkata Uma Maheswara Prasad[1]

[1]*School of Pharmacy, Jawaharlal Nehru Technological University, Kakinada, A.P -533003, India,* [2]*Vallabhaneni Venkatadri. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P-521 356, India*

Abstract: ***Background*:** The development of sound bioanalytical LC-MS (liquid chromatography-mass spectroscopy) method(s) is of paramount importance during the process of drug discovery, development and culminating in a marketing approval. The use of oral antidiabetic agents has been increased significantly from the last decades and till now no bioanalytical method is available for quantitation of sitagliptin (SG) and ertugliflozin (EG) in biological matrix which can be applied to pharmacokinetic studies using LC-MS/MS.

***Objective*:** To develop a new, rapid and sensitive LC-MS/MS method for the simultaneous estimation of sitagliptin (SG) and ertugliflozin (EG) in rat plasma by Liquid-Liquid Extraction method (LLE) using deutereated sitagliptin (SGd6) and ertugliflozin (EGd6).

***Methods*:** Chromatographic separation was carried out on a reverse phase Waters, Xetrra C_{18} (150mm x 4.6mm, 2µm) column using a mixture of acetonitrile and OPA buffer (50:50v/v) at a flow rate of 1ml/min in isocratic mode. Quantification was achieved using an electrospray ion interface operating in positive mode, under Multiple Reaction Monitoring (MRM) conditions.

***Results*:** The method showed excellent linearity over the concentration range of 5.00- 75.00pg/mL for sitagliptin and 0.75- 11.35pg/mL ertugliflozin. The intra-batch and inter batch precision (%CV) was ≤ 4.3% and matrix effect (%CV) was 0.02% and 0.12% for sitagliptin at HQC and LQC, respectively. Matrix effect (%CV) was 0.08% and 0.33% for ertugliflozin at HQC and LQC, respectively.

***Conclusion*:** The simplicity of the method allows for application in laboratories, presents a valuable tool for pharmacokinetic studies. The particular assay has been proficiently put on pharmacokinetic study in rats subjects.

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1. INTRODUCTION

Type-2 Diabetes Mellitus (DM) is a chronic metabolic disorder in which prevalence has been increasing steadily all over the world. As a result of this trend, it is fast becoming an epidemic in some countries of the world with the number of people affected expected to double in the next decade due to an increase in the ageing population. Sitagliptin is an oral dipeptidyl peptidase-4 (DPP-4) inhibitor used in conjunction with diet and exercise to improve glycemic control in patients with type-2 diabetes mellitus [1]. The effect of this medication leads to glucose dependent increases in insulin and decreases in glucagon to improve control of blood sugar, Chemical name for Sitagliptin (Fig. **1**) is (3R)-3-amino-1[3(trifluoromethyl)-5H,6H,7H,8H-[1,2,4]triazolo[4,3-a]pyrazin-7-yl]-4-(2,4,5-trifluorophenyl)butan-1-one. It has a molecular formula of $C_{16}H_{15}F_6N_5O$ and a molecular weight of 407.3 [2-4].

Ertugliflozin is in a class of medication called sodium-glucose co-trasporter 2 inhibitors belongs to glifolins class and used for the treatment of type2 diabetes. It lowers blood sugar level by causing the kidneys to get rid of more glucose in the urine. Chemically ertugliflozin (ERT) is (1S,2S,3S,4R,5S)5-(4-chlorp-3-(4-ethoxybenzyl)phenyl)-1-(hydroxymethyl)-6,8-dioxabicyclo octane-2,3,4-triol,with (2S)-5oxopyrrolidine-2-carboxylic acid (Fig. **2**). In the United States, it was approved by the FDA (Food & Drug Administration) for use as monotherapy and as affixed dose combination with either sitagliptin or metformin. It has a molecular formula of $C_{22}H_{25}ClO_7$ and a molecular weight of 436.89 [5-9].

Literature survey reveals that some chromatographic methods are available for estimation of sitagliptin alone and

*Address correspondence to this author at the School of Pharmacy Jawaharlal Nehru Technological University, Kakinada, A.P -533003, India; Tel: 9949963007; E-mail: venkats0425@gmail.com

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Original Article

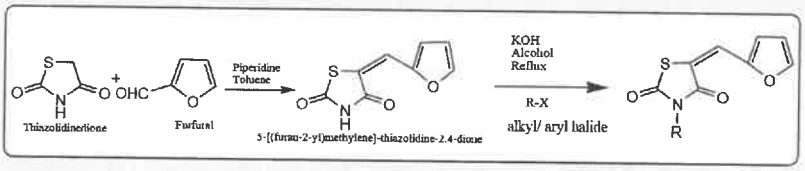
Design, Synthesis, Hypoglycemic Activity and Molecular Docking Studies of 3-substituted-5-[(furan-2-yl)-methylene]-thiazolidine-2,4-dione Derivatives

Karumanchi Srikanth Kumar[1], Atmakuri Lakshmana Rao[1]*, Dachuru Rama Sekhara Reddy[2]

[1]Department of Pharmaceutical Chemistry, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.
[2]Department of Chemistry, Krishna University, Machilipatnam, Andhra Pradesh, INDIA.

ABSTRACT

Background: From the wide range of previous literature studies indicated that thiazolidinedione's reacts with substituted benzaldehydes undergoes knoevenagel condensation gives respective arylidene derivatives. In our attempt all the titled compounds were designed and developed by replacement of substituted benzaldehydes with furan- 2-aldehyde, so that furan moiety was introduced in the molecule. **Materials and Methods:** 5-[(furan-2-yl)-methylene]-thiazolidine-2,4-dione was prepared via knoevenagel condensation by the reaction of thiazolidine-2,4-dione and furfural. Further it was coupled with various alkyl/ aryl halides in alcoholic potassium hydroxide to produce various derivatives 2a-2j. The titled compounds furthermore prepared by microwave assisted synthesis technique. Synthesized compounds were analysed by physical and spectral characterization methods. Developed furan bearing thiazolidine-2,4-diones were evaluated for *in-vivo* hypoglycemic property. Molecular docking analysis was carried out to observe the binding interaction of designed ligands at PPARγ target receptor protein. **Results and Conclusion:** Microwave irradiation technique produced high yield at less reaction time in comparison with traditional conventional method. *In-vivo* hypoglycemic activity evaluation revealed that, electron releasing groups (-OH and –OCH3) containing compounds 2d and 2g found to possess significant activity in acute study as well as in chronic study. Even the molecular docking studies at PPARγ receptor protein (PDB ID-2PRG), electron releasing groups containing compounds 2d and 2g exhibit significant binding affinity having high binding energy of -9.02 kcal/mol and -8.61 kcal/mol when compared with standard ligand rosiglitazone.



Key words: Thiazolidinedione derivatives, Synthesis, Hypoglycemic Activity, Molecular Docking, PDB ID-2PRG.

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Correspondence:
Dr. A. Lakshmana Rao
Professor, Department of Pharmaceutical Chemistry,
VV Institute of Pharmaceutical Sciences,
Gudlavalleru-521356,
Andhra Pradesh, INDIA.
Phone no: +91 9848779133
Email id: dralrao@gmail.com

INTRODUCTION

Diabetes mellitus (DM) is universally widespread chronic metabolic disorder during which elevated blood sugar levels take place over a prolonged period of time and symptoms comprises recurrent urination, increased hunger and thirsty. DM is allied with rigorous degenerative complications for instance nephropathy, cataract, neuropathy, accelerated atherosclerosis, retinopathy and stroke and increased the risk of myocardial infarction. Onset of these pathologies is a remarkable event throughout both

Original Article

Design, Synthesis, Hypoglycemic Activity and Molecular Docking Studies of 3-substituted-5-[(furan-2-yl)-methylene]-thiazolidine-2,4-dione Derivatives

Karumanchi Srikanth Kumar[1], Atmakuri Lakshmana Rao[1,*], Dachuru Rama Sekhara Reddy[2]

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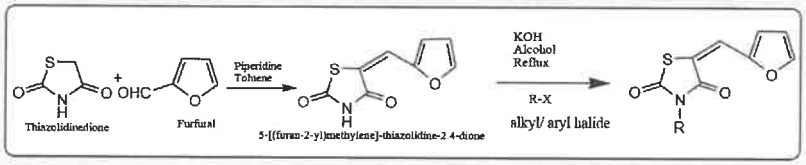

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Correspondence:
Dr. A. Lakshmana Rao
Professor, Department of Pharmaceutical Chemistry,
VV Institute of Pharmaceutical Sciences,
Gudlavalleru-521356,
Andhra Pradesh, INDIA.
Phone no: +91 9848779133
Email id: dralrao@gmail.com

INTRODUCTION

Diabetes mellitus (DM) is universally widespread chronic metabolic disorder during which elevated blood sugar levels take place over a prolonged period of time and symptoms comprises recurrent urination, increased hunger and thirsty. DM is allied with rigorous degenerative complications for instance nephropathy, cataract, neuropathy, accelerated atherosclerosis, retinopathy and stroke and increased the risk of myocardial infarction. Onset of these pathologies is a remarkable event throughout both

Rapid quantitative estimation of metformin and ertugliflozin in rat plasma by liquid chromatography-tandam mass spectroscopy and its application to pharmacokinetic studies

P Venkateswarao Rao[a], A Lakshmana Rao[b], SVUM Prasad[c]

[a]Vikas college of Pharmacy, Vissannapeta and PhD Research Scholar, JNTUK Kakinada, AP, India, [b]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, AP, India, [c]School of Pharmacy, JNTUK Kakinada, AP, India

Correspondence to P. Venkateswara Rao, M. Pharm (PhD), Associate Professor, Department of Pharmaceutical Analysis,Vikas College of Pharmacy, Vissanapeta, Krishna DT, AP-521215, India. Mob: 99499 63007; e-mail: venkats0425@gmail.com

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Background
The development of sound bioanalytical liquid chromatography-mass spectroscopy (LC-MS) method(s) is of paramount importance during the process of drug discovery and development, eventually culminating in marketing approval. The use of oral antidiabetic agents has been increased significantly from past decades, and till now, no bioanalytical method is available for quantitation of metformin (MET) and ertugliflozin (ERT) in the biological matrix that can be applied in bioequivalence studies using LC-MS/MS.

Objective
To study the use of highly responsive simple liquid–liquid extraction method development using deuterated MET and deuterated ERT, LC-MS/MS method for gradation of MET and ERT in the rat plasma.

Materials and methods
The chromatographic condition involves isocratic mode using Waters XBridge C_{18} 3.5 µ (150×4.6 mm) column. Mobile phase was 0.1% orthophosphoric acid and acetonitrile in the ratio of 80 : 20 v/v. Detection was carried out on a triple quadrapole MS employing electrospray ionization technique, operating multiple reactions, monitoring with the transitions of m/z 258.2→174.1, m/z 250.1→210.2, m/z 258.2→174.1, and m/z 260.3→210.2 for MET, ERT, deuterated MET, and deuterated ERT, respectively, in the positive ion mode.

Results and conclusion
The method has been validated, and the linearity was observed in the range of 10–150 ng/ml and 0.1–1.5 ng/ml for MET and ERT, respectively. For intraday and interday %RSD, the values were found to be within the acceptable limits. Recovery studies for MET and ERT obtained, mean recovery of 99.5 and 98.6%, respectively. A battery of stability studies like bench-top stability, autosampler stability, freeze-thaw stability, and long-term stability were performed. Highly responsive simple LC-tandem MS assay method was developed and witnessed for the gradation of MET and ERT in the rat plasma; the developed method was applied to pharmacokinetic studies.

Keywords:
ertugliflozin, liquid chromatography-mass spectroscopy, metformin, method validation, pharmacokinetic study

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Introduction

An oral antidiabetic drug used for the treatment of type 2 diabetes is metformin (MET), and chemically, it is 3-(diaminomethylidene)-1, 1-dimethylaniline (Fig. 1). MET is an oral antihyperglycemic agent of the biguanide class and used for the treatment of type 2 diabetes. MET is the first drug of choice for the treatment of type 2 diabetes. So MET is considered as an antihyperglycemic agent because it lowers blood glucose concentration in type 2 diabetes without causing hypoglycemia. Control of high blood sugar levels helps to prevent kidney damage, nerve problems, blindness, loss of limbs, and sexual problems. MET helps restore body's proper response to the insulin as well as helps in the natural production of insulin. It also decreases the amount of sugar level made by the liver and that absorbed by the stomach and intestines [1–6].

Ertugliflozin (ERT) is in a class of medication called sodium-glucose cotransporter 2 inhibitors, which belongs to gliflozin class and is used for the treatment of type 2 diabetes. It lowers blood sugar level by causing the kidneys to get rid of more glucose in the urine. Chemically, ERT is (1S,2S,3S,4R,5S)5-(4-chlorp-3-(4-ethoxybenzyl)phenyl)-1-(hydroxymethyl)-6,8-dioxabicyclo octane-2,3,4-triol, with (2S)-5oxopyrrolidine-2-carboxylic acid (Fig. 2). In the United states, it was approved by the FDA for use as monotherapy and as affixed dose combination with either sitagliptin or MET [7–10].

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Research Article

VALIDATION OF A DEVELOPED ANALYTICAL METHOD FOR DETERMINATION OF NATEGLINIDE AND METFORMIN HCL IN PURE AND PHARMACEUTICAL DOSAGE FORM BY REVERSED-PHASE HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY AND ITS DEGRADATION STUDIES

K.MD ISMAIL[1], A LAKSHMANA RAO[2]*

[1]Department ofPharmaceutical Analysis, Nizam Institute of Pharmacy, Deshmukhi Village, Nalgonda, Telangana, India. [2]Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, India. Email: dralrao@gmail.com

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ABSTRACT

Objective: The objective of the study was to develop a versatile analytical method and validate according to International Council for Harmonization guidelines for simultaneous estimation of nateglinide and metformin HCl by reversed-phase high-performance liquid chromatography (RP-HPLC) in active pharmaceutical ingredient and in tablet dosage form.

Methods: Analytes, metformin and nateglinide, are separated and eluted from stationary phase luna phenyl hexyl column (150 mm ×4.6 mm, 3.5 µm) (micrometer) using polar mobile phase composed of acetonitrile:1% orthophosphoric acid 30:70 v/v, with flow rate of 1 ml/min for 8 min at ambient column temperature, at 221 nm (nanometer) detection. Acid, base, peroxide, thermal, and photolytic-induced degradation studies were performed on nateglinide and metformin.

Results: Through isocratic flow, both metformin and nateglinide are detected at retention times of 2.79 min and 5.13 min, respectively, at 221 nm. The linearity and range of analytical method for nateglinide and metformin were 0.61–9.15 µg/ml and 7.5–75.15 µg/ml, respectively. The R^2 value for nateglinide was 0.9998 and for metformin HCl was 0.9991. The limit of detection and limit of quantification for nateglinide were 0.21 µg/ml and 0.63 µg/ml and for metformin were 4.8 µg/ml and 14.6 µg/ml, respectively. The % relative standard deviation for method precision was found to be 0.22% and 0.64% for both nateglinide and metformin, respectively. The mean %recovery for nateglinide and metformin was 99.88% and 99.21%, respectively. The %thermal degradation was identified as 17.7% and 17.5% for nateglinide and metformin, respectively.

Conclusion: The developed chromatographic (RP-HPLC) method was selective, specific, economic, precise, and accurate. Hence, it can be one of the preferred analytical methods of choice for the estimation of nateglinide and metformin by RP-HPLC in pure and in tablet dosage form.

Key words: Nateglinide, Metformin, Reversed-phase high-performance liquid chromatography, Isocratic, Acetonitrile.

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INTRODUCTION

Nateglinide is chemically 3-phenyl-2-[(4-propan-2-yl cyclohexane carbonyl) amino] propanoic acid (Fig. 1) with molecular formula $C_{19}H_{27}NO_3$. It acts by blocking adenosine triphosphate sensitive potassium channels of beta cells of pancreas, causes membrane depolarization results in calcium influx and their by stimulation of insulin secretion. Metformin HCl is chemically N, N-Dimethyl imidodicarbonimidic diamide hydrochloride (Fig. 2) with molecular formula $C_4H_{11}N_5$.HCl. The main mechanism of metformin HCl was lowering glucose intestinal absorption, inhibition of hepatic glucose production, and improving glucose uptake and utilization [1-6].

It was found that very few articles are available in detailed literature survey on simultaneous estimation of nateglinide and metformin HCl by reversed-phase high-performance liquid chromatography (RP-HPLC) in pure and dosage form [7-9]. The resting literature was found on analytical and bioanalytical methods by HPLC, LC–MS/MS, RP-LC, high-performance thin-layer chromatographic, and ultraviolet (UV) spectrophotometric estimations, in combination with glinides (nateglinide, repaglinide, and mitiglinide) and metformin HCl [10-21].

The comprehensive literature survey disclosed diverse analytical techniques of estimating nateglinide and metformin HCl in single and in combination with other drugs. The present study was taken up to develop a sensitive, accurate, precise, and simple method of analysis for the estimation of both drugs in combined dosage forms.

METHODS

Chemicals and reagents

The active pharmaceutical ingredients (APIs), nateglinide and metformin hydrochloride, were supplied as a gift sample by Care Labs, L.B Nagar, Hyderabad, and marketed formulation was purchased from the local market. HPLC grade orthophosphoric acid, acetonitrile, and water were of Merck grade. Waters autosampler RP-HPLC, e2695 pump, and 2998 photodiode array (PDA) detector with Empower2 software were employed in this method.

Selection and preparation of mobile phase and diluent

In RP-HPLC, pure API mixture containing nateglinide and metformin HCl at lower concentration levels were prepared, injected, and run with different solvent systems. Different combination of solvents using acetonitrile, triethylamine, and orthophosphoric acid at different compositions, flow rates, and ratios were tried to optimize the mobile phase. Finally from the trials, mobile phase and diluent (acetonitrile and 0.1% orthophosphoric acid in a ratio of 30:70 v/v) are selected since they were fulfilling the requirements and the results obtained were within the acceptable limits.

Preparation of standard stock solution

Powder analytes equivalent to 6 mg and 50 mg of nateglinide and metformin HCl, respectively, were accurately weighed and transferred

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RESEARCH ARTICLE

Antidiabetic Activity of Methanolic Extract of *Searsia mysorensis* in Alloxan Induced Diabetic Rats

Gaddamedi Narender[1], A. Lakshmana Rao[2], N. V. Satish kumar[3], Nayudu Teja[4], Tera Sandhya[5], Pasumarthy Sree Mahalakshmi[5]

[1]Department of Pharmaceutical Analysis, Career Point University, Kota, Rajasthan, India, [2]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [3]Department of Analytical Chemistry, Andhra University, Andhra Pradesh, India, [4]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [5]Department of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavathi Mahila Viswavidyalayam, Tirupathi, Andhra Pradesh, India

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ABSTRACT

This dreadful disease is found in all parts of the world and is becoming a serious threat to the mankind. There are a lot of chemical agents available to control and to treat diabetic patients but total recovery from diabetes has not been reported up to this date. Alternative to these synthetic agents' plants provide a potential source of hypoglycemic drugs and are used widely in several traditional systems of medicine to prevent diabetes. The aim of the present study was to evaluate the antidiabetic activity of methanolic leaf extract of *Rhus mysorensis* in alloxan-induced diabetic rats.

Keywords: Antidiabetic, Methanolic, Searsia mysorensis

INTRODUCTION

Traditional medicine is looked on as an alternative or supplement to modern medicine and has made significant contributions to the healthcare of the world over the past decades. Various diseases such as diarrhea, skin problems, headache, fever, cough, wounds, hypertension, diabetes, and rheumatism are treated with herbal medicine. Traditional medicines continue to be practiced by the community to treat disease and maintain health especially in remote areas where modern facilities are not readily available. Most of the medicinal plant species are collected from the wild, a few are being cultivated.[1]

***Corresponding Author:**
Gaddamedi Narender,
E-mail: gnarendergoud@gmail.com

DIABETES MELLITUS

Diabetes mellitus commonly known as diabetes is a group of metabolic disorder characterized by high glucose blood level over a prolonged period of time.[2] Diabetes is due to either pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.[3]

Types of diabetes mellitus

WHO classified diabetes mellitus into three types based on the etiology.[4]

- Type 1 diabetes (Insulin Dependent Diabetes Mellitus [IDDM])
- Type 2 diabetes (Non-IDDM)
- Gestational diabetes.

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ESTIMATION OF DACLATASVIR IN PHARMACEUTICAL DOSAGE FORM BY ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY

A. Viswanath [1], A. Lakshmanrao [1], Aziz Unnisa [2], B. Anupama * [3] and Kondepati Haritha [3]

Acharya Nagarjuna University [1], Guntur – 522510, Andhra Pradesh, India.
University of Hail [2], Saudi Arabia.
KVSR Siddhartha College of Pharmaceutical Sciences [3], Vijayawada - 520008, Andhra Pradesh, India.

Keywords:

UPLC, Daclatasvir, Orthophosphoric acid, Acetonitrile

Correspondence to Author:
Dr. B. Anupama

Associate Professor and HOD, Department of Pharmaceutical Chemistry, KVSR Siddhartha College of Pharmaceutical Sciences, Poly Clinic Road, Vijayawada Krishna - 520008, Andhra Pradesh, India.

E-mail: anurochi8@gmail.com

ABSTRACT: Daclatasvir is an antiviral drug used in combination with other drugs includes sofosbuvir, ribavirin, and interferon, depending on the virus type to treat cirrhosis caused by hepatitis C (HCV). Several methods have been found for quantification, but those are not cost-effective, and they are time-consuming. The present study developed a simple, precise, accurate and cost-effective UPLC method to determine daclatasvir quantity in tablet dosage forms. A simple and selective UPLC method is described for the determination of Daclatasvir Chromatographic separation was achieved on a Acquity BEH C18 (50 × 3.0mm. 1.7 µm) using a mobile phase consisting 0.1% of Orthophosphoric acid: Acetonitrile in a ratio of 60:40 v/v with detection of 248 nm. Linearity was observed in the range 50-150 µg/ml for Daclatasvir (r^2 = 1.000). The amount of drugs estimated by the proposed method was in good agreement with the label claim. The proposed method was validated as per ICH guidelines and applied for the determination of the cited drug in the dosage form.

INTRODUCTION: Daclatasvir is chemically dimethyl N, N'-([1,1'-biphenyl]-4, 4'-diylbis{1H-imidazole-5,2-diyl-[(2S)-pyrrolidine-2,1-diyl][(2S)-3- methyl- 1- oxobutane-1, 2-diyl]}) dicarbamate. Daclatasvir has molecular weight: 738.89 g/mol and molecular formula: $C_{40}H_{50}N_8O_6$. It is an antiviral drug used in combination with other medicaments to treat hepatitis C (HCV). The other medicines used in combination include interferon, sofosbuvir, and ribavirin, depending on the virus type 1. The dose of daclatasvir present in the formulation was determined by using the Ultra Performance Liquid Chromatography method. UPLC has greater sensitivity, resolution, and speed of analysis.

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UPLC operates at high pressure than HPLC, and fine particles, *i.e.*, less than 2.5 µm are used, and mobile phases at high linear velocities decrease the length of the column, reduces solvent consumption, and save time [2].

The UPLC is based on the use of a stationary phase consisting of particles less than 2.5 µm whereas the HPLC column is typically filled with 3-5 µm particles. The principle of this evolution is governed by the Van Deemeter equation, which is an empirical formula that describes the relationship between the linear velocity of flow rate and plate height [3, 4].

$$H = A + B / v + Cv$$

Where; A, B and C are constants, v is the linear velocity, the carrier gas flow rate.

*The A term is independent of velocity and represents "eddy" mixing. It is the smallest when the packed column particles are small and uniform.

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RESEARCH ARTICLE

Development of Metoprolol Tartrate Sustained Release Formulations by using Modified Starches

Tirumalasetti Jaswitha[1], Atmakuri Lakshmana Rao[2]

[1]Department of Pharmaceutics, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India,
[2]Principal, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

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ABSTRACT

This study is aimed to design oral sustained-release formulations for the anti-hypertension drug Metoprolol tartrate. This drug exhibits required physicochemical and pharmacokinetic parameters to formulate sustained-release formulations. The literature survey reveals that Sustained Release formulations for some drugs were prepared by employing Modified Starch known as Calcium Starch. Natural Starches such as potato starch, rice starch, and corn starches can be chemically modified using cross-linking agents such as calcium chloride and it may be used as release retardants. The functional characteristics of starch may vary from source to source. Hence, there is a scope to evaluate the effect of starch on release characteristics of the drug. Further, the drug release is expected to be altered by the proportion of release retardant and hence there is a need to optimize the composition by screening the composition. Hence, there is scope for comparative evaluation of modified starches prepared using different naturally occurring starches and their effect on release characteristics of metoprolol tartrate for sustained release formulations.

Keyword: Metoprolol, Starch, Tartrate

INTRODUCTION

Starch is a natural, cheap, available, renewable, and biodegradable polymer produced by many plants as a source of stored energy. It is the second most abundant biomass material in nature. It is found in plant leaves, stems, roots, bulbs, nuts, stalks, crop seeds, and staple crops such as rice, corn, wheat, cassava, and potato. From serving as food for man, starch has been found to be effective in drying up skin lesions (dermatitis), especially where there are watery exudates consequently, starch is a major component of dusting powders, pastes, and ointments meant to provide protective and healing effect on skins. Starch mucilage has also performed emollient and major base in enemas. Because of its ability to form complex with iodine, starch has been used in treating iodine poisoning. Acute diarrhea has also been effectively prevented or treated with starch-based solutions due to the excellent ability of starch to take up water. In pharmacy, starch appears indispensable; it is used as excipients in several medicines. Its traditional role as a disintegrate or diluents is giving way to the more modern role as drug carrier; the therapeutic effect of the starch-adsorbed or starch-encapsulated or starch-conjugated drug largely depends on the type of starch.

Basic structural design of starch

Starch, which is the major dietary source of carbohydrates, is the most abundant storage polysaccharide in plants and occurs as granules in the chloroplast of green leaves and the amyloplast

***Corresponding Author:**
Tirumalasetti Jaswitha
E-mail: jassujaswitha@gmail.com

Review Article

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A Review on Inductively Coupled Plasma: Mass Spectrometry with Laser Ablation

[1]Sai Datri A, [2]Nataraj KS, [3]Lakshmana Rao A

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Author's Affiliations: [1]Research Scholar, University College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India, [2]Professor and Principal, Shri Vishnu College of Pharmacy, Bhimavaram, Kovvada, Andhra Pradesh 534202, India, [3]Professor and Principal, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

Corresponding Author: Sai Datri A, Research Scholar, University College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India.

Email: sai.dhatri_arige@yahoo.co.in

Abstract

Inductively coupled plasma mass spectrometry (ICP-MS) is a kind of mass spectroscopy which is used in many diverse research fields such as earth, environmental, life and forensic sciences and in food, material, chemical, semiconductor and nuclear industries. In this sort of MS, Laser ablation (LA) ICP-MS is widely used to determine elements directly in virtually all types of solid samples with minimal sample preparation. UV lasers are widely used with ICP-MS because of their highly controllable spatial resolution (spot size) and relatively low cost. This technique is used to determine low-concentrations and even ultra-low-concentrations of elements. Atomic elements are lead through a plasma source where they become ionized. The high ion density and the high temperature in plasma provide an ideal atomizer and element ionizer for all types of samples and matrices introduced by a variety of specialized devices. Then, these ions are sorted on account of their mass. ICP-MS holds a distinctive position by virtue of its speed, sensitivity, dynamic range and elemental coverage. It can be considered as a viable alternative to ICP-Optical Emission Spectroscopy (OES) (also known as Atomic Emission Spectroscopy or AES) for fast measurement of higher concentration elements. At the same time, ICP-MS in many cases exceeds the detection capability of Graphite Furnace Atomic Absorption Spectroscopy (GFAAS) for the determination of trace and ultra-trace elements (ng/L or ppt concentrations). One of the fastest growing areas of ICP-MS is in speciation measurement: the combination of chromatographic techniques with ICP-MS as a detector to determine the chemical form of elements in the sample. This review provides an overview of recent developments and abilities of inductively coupled plasma mass spectrometry (ICPMS) coupled with different separation techniques for applications in the field of analysis and also highlighted numerous technical improvements, over the past few years which helped to promote the evolution of ICP-MS to one of the most versatile tools for elemental quantification as Laser ablation (LA) ICP-MS. In particular, the benefits and possibilities of using state-of-the-art hyphenated ICP-MS approaches for quantitative analysis applications.

Keywords: Inductively couple plasma mass spectrometry; ICP-MS; Laser ablation; Hyphenated techniques; Quantification and Trace elements.

Introduction

Inductively coupled plasma mass spectrometry[1] (ICP-MS) is a type of mass spectroscopy which is used in many diverse research fields. This technique is used to determine low-concentrations and even ultra-low-concentrations of elements. While many sampling methods have been investigated for use with ICP-MS, some have become outdated, or remain of academic interest, such as spark ablation and slurry nebulization for solids analysis, and electro thermal vaporization (ETV) as a sample introduction device.

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RESEARCH ARTICLE

Novel RP-HPLC Method Development and Validation for Estimation of Pravastatin in Pure and Pharmaceutical Formulation

Prasanthi T [1*], Lakshmana Rao A[2], Reshma P[3], Susanthi P[3], Merwin P[3], Ajay P[3]

Abstract

Introduction: A simple, rapid, precise, accurate, sensitive and stability indicating RP-HPLC method for the determination of Pravastatin in pure and tablet dosage form.

Materials & Methods: HPLC Method was developed using Zorbax ODS (250×4.6 mm ×5 µ) with the mobile phase of 0.1% formic acid pH adjusted to 3 and methanol in the ratio 50:50 v/v. Pravastatin peak was monitored at 238 nm, and the retention time was 4.44 minutes.

Results and Discussion: ICH guidelines were followed to validate the proposed method regarding specificity, precision, linearity, accuracy, system suitability, and robustness. The method was found to be linear in the range of 10–50 µg/mL, and also the regression equation was found to be y=124936 x+19884 R^2=0.997. For intra- and inter-day precision, the %RSD for Pravastatin was 1.05 and 0.917%. Percentage mean recovery was found to be 98.36%. LOD and LOQ values were 0.231 and 0.701 µg/mL, respectively. Pravastatin stability was inspected under various forced degradation conditions, and it was found to be easily degraded in acidic and basic conditions.

Conclusion: The developed method was found to be having a suitable application for routine quality control analysis of Pravastain in pharmaceutical formulations.

Keywords: Degradation, Pravastatin, RP-HPLC. Validation.

Journal of Applied Pharmaceutical Sciences and Research, (2022); DOI: 10.31069/japsr.v4i3.3

Introduction

Pravastatin is chemically known as (3R,5R)-7-[(1S,2S,6S,8S,8aR)-6-hydroxy-2-methyl-8-{[(2S)-2-methylbutanoyl]oxy}-1,2,6,7,8,8a-hexahydronaphthalen-1-yl]-3,5-dihydroxyheptanoic acid.[1] Pravastatin (Figure 1) is a specific inhibitor of the hepatic HMG-CoA reductase in humans. The inhibition of this enzyme produces a reduction in cholesterol biosynthesis as HMG-CoA reductase activity is an early-limiting step in cholesterol biosynthesis.[2] Pravastatin is also used to lower the risk of stroke, heart attack, and other heart complications.[3]

Literature survey reveals that very few HPLC[4-8] methods were reported to estimate Pravastatin in pharmaceutical dosage forms. In the present work an attempt has been made to develop a novel, rapid and economic RP-HPLC method for estimation of Pravastatin in pure and tablet dosage form.

Materials and Methods

Instrument

Agilent 1260 infinity binary pump HPLC equipped with PDA detector and EZ Chrome open lab software was used for chromatographic studies. The column used was Zorbax ODS with dimensions 250 mm×4.6 mm ×5 µ.

Chemicals

Pravastatin pure drug was purchased from Yarrow Chemicals, Mumbai. HPLC grade methanol, formic acid, and all other chemicals were purchased from Merck Limited, Mumbai. Triple distilled water was used throughout the study. Pravastatin tablets were procured from local pharmacy.

[1]Associate Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India.

[2]Professor & Principal, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India.

[3]Students, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India.

Corresponding author: Prasanthi T, Associate Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India, prasanthi8585@gmail.com

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Source of support: Nil

Conflict of interest: None

Preparation of Standard Stock Solution

A standard stock solution was prepared by dissolving 10 mg of Pravastatin in 10 mL mobile phase, then sonicated for about 10 minutes to get the primary standard stock solution containing 1000 µg/mL of Pravastatin. Working standard solution was prepared by further dilution with mobile phase.

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[3]Students, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India.

Corresponding author: Prasanthi T, Associate Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, India, prasanthi8585@gmail.com

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RESEARCH ARTICLE

SPECTROSCOPICAL METHOD FOR ESTIMATION OF ATENOLOL AND HYDROCHLOROTHIAZIDE IN PHARMACEUTICAL DOSAGE FORM

Sai Datri A[1], Lakshmana Rao A[1], Chandini U[1], Anil Kumar V[1], Prudhvi Raj V[1], Veera Naga Anjali V[1]

[1]*Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.*

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ABSTRACT: Introduction: A sensitive and validated spectroscopic estimation of Atenolol and Hydrochlorothiazide in pharmaceutical dosage form, without prior separation, by three different techniques (Simultaneous Equation, Dual Wavelength Method, and Derivative Spectroscopic Method) has been developed. Method: The works were carried out on Shimadzu electron UV1800 double beam UV-Visible spectrophotometer. The absorption spectra of reference and test solutions were carried out in 1 cm matched quartz cell over the range of 200 - 400 nm. The linearity ranges for Atenolol and Hydrochlorothiazide were 2-10 µg/ml and 1-5 µg/ml. Conclusion: The results of the analysis have been validated statistically and by recovery studies. The proposed procedures are rapid, simple, require no preliminary separation steps, and can be used for routine analysis of both drugs in quality control laboratories.

KEYWORD: Atenolol, Hydrochlorothiazide, UV spectroscopy, and Validation.

INTRODUCTION:

Chemically, Atenolol (Figure 1) is *(RS)-4-2(2-hydroxy-3-isopropyl amino propoxy) phenylacetamide*. It is a selective beta-1 adrenergic receptor antagonist. It is used in the treatment of cardiovascular diseases such as angina, hypertension, cardiac arrhythmias, and myocardial infarctions. Atenolol competitively blocks beta-adrenergic receptors in the heart and juxtaglomerular apparatus. They lead to decreased heart rate decreasing the workload of the heart. They do not produce coronary vasodilatation but lead to a shift and redistribution of the coronary circulation to the ischemic areas.

It decreases the release of renin from the kidney, thus lowering blood pressure. [1] Chemically, Hydrochlorothiazide (Figure 1) is *6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazine-7-sulfanamide 1,1-dioxide*. It is a diuretic used for the treatment of edema associated with heart (congestive heart failure), liver (hepatic cirrhosis), renal (nephritic syndrome, chronic renal failure, and glomerulonephritis) diseases. Hydrochlorothiazide acts on the kidneys to reduce sodium (Na) reabsorption in the distal convulated tubule. [2]

Corresponding Author:
Miss Sai Datri
Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

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RESEARCH ARTICLE

SPECTROSCOPICAL METHOD FOR ESTIMATION OF ATENOLOL AND HYDROCHLOROTHIAZIDE IN PHARMACEUTICAL DOSAGE FORM

Sai Datri A[1], Lakshmana Rao A[1], Chandini U[1], Anil Kumar V[1], Prudhvi Raj V[1], Veera Naga Anjali V[1]

[1]*Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.*

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Corresponding Author:
Miss Sai Datri
Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

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2021: 17 (4): 107-122
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Original Article

Some Selected Phytoconstituents from *Rhus succedanea* as SARS CoV-2 Main Protease and Spike protein (COVID-19) Inhibitors

Prasanth D. S. N. B. K. [a*], Siva Prasad Panda[b], Lakshmana Rao Atmakuri[c], Chakravarti Guntupalli[a], Narayana Rao Alla[b], G. S. N. Koteswara Rao [d], Teja Nayudu[e], Sandhya Tera[f], Bhargavi Koti[e], Monika Chigurupati[e], Likhith Kolla[e], Praveena Tata[e], Purnadurganjali Chittiprolu[e]

[a]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [b]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [c]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [d]Pharmaceutics Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [e]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [f]Department of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavati Manila Viswavidyalayam, Tirupati, Andhra Pradesh, India.

Abstract

Rhus succedanea (Anacardiaceae) was used to treat multiple human afflictions. Literary works demonstrate that it has many biological activities. Today's research aims to recognize Rhus succedanea Phyto-derived anti-viral compounds against the main protease and spike protein of the viral agent of COVID-19 (SARS-CoV-2) gain insight into the molecular interactions. In the current study, ten molecules taken from *R. succedanea* are analyzed through docking, derived from the PubChem database. Docking experiments with Autodock vina and PyRx tools were conducted. AdmetSAR and DruLito servers were eventually used for drug-like prediction. Our research shows that the phytoconstituents from *R. succedanea*, namely, Amentoflavone, Rhoifolin, and Agathisflavone acts against SARS CoV-2 main protease with the binding affinity of -9.3, -8.6 and -8.4 Kcal/mol; Hinokiflavone Robustaflavone and Amentoflavone acts against the SARS-CoV-2 receptor-binding domain of spike protein with a binding affinity of -10.5, -10.4 and -10.1 Kcal/mol respectively. These phyto-compounds can use contemporary strategies to develop effective medicines from natural origins. The substances identified potential anti-viral as likely. However, *In-vitro* studies are even more necessary to assess their effectiveness versus SARS CoV-2.

Keywords: ADMET, In-silico, Lipinski's Rule, PyRx, Rhus succedanea.

Corresponding Author: Prasanth D. S. N. B. K., Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India
Tel: +91-7382027437
Email: dsnbkprasanth@gmail.com
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1. Introduction

WHO has currently stated a typical emergency and pandemic for the novel coronavirus (SARS CoV-2) that has proactively propagated worldwide. The virus SARS-CoV-2 can easily trigger signs and symptoms such as fever, coughing, pneumonia, nausea, as well as

Research Paper

In vivo Antinociceptive Effect of Methanolic Extract of *Ipomoea marginata* Desr. in Rodents as well as *In silico* Molecular Docking of Some Phytoconstituents from the Plant

HARITHA POTLURI, D S N B K PRASANTH[1]* AND L. R. ATMAKURI[2]

Department of Chemistry, Gudlavalleru Engineering College, Gudlavalleru 521356, [1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, [2]Department of Pharmaceutical Analysis, Vallabhaneni Venkatadri Institute of Pharmaceutical Sciences, Gudlavalleru 521356, Andhra Pradesh, India

This research was performed to analyze the antinociceptive task of methanolic extract of *Ipomoea marginata* in addition to *in silico* evaluation of the antinociceptive task of the separated constituents from *Ipomoea marginata* versus cyclooxygenase 2 enzyme together with absorption, distribution, metabolism, excretion/toxicity analysis of separated substances. *In vivo* antinociceptive task of methanolic extract of *Ipomoea marginata* was examined by acetic acid-induced agonizing, tail immersion and the hot plate on rodents. *In silico* activity of the isolated substances, absorption, distribution, metabolism, excretion/toxicity assessment was carried out by Autodock 4.0 and data warrior software applications. The results revealed that methanolic extract of *Ipomoea marginata* has the greatest possible dose-dependent antinociceptive task at all doses. Amongst the substances, Ipalbidine showed the very best docking score of -8.26, which was virtually better than standard diclofenac, i.e., -7.03, guaranteeing good binding compatibility among the ligand and the receptor than the standard and absorption, distribution, metabolism, excretion/toxicity evaluation using data warrior assures the compound has not breached Lipinski's guideline of five suggesting its safety consumption. To conclude, *Ipomoea marginata* can be a potent resource of antinociceptive activity and also additional simulation studies are needed to develop the performance of Ipalbidine.

Key words: *Ipomoea marginata*, leucorrhoea, depression, analgesic

Pain is a beneficial tool for the body's immune system to safeguard the location harmed by various stimulations. To care for the pain, vast arrays of antinociceptive like nonsteroidal anti-inflammatory drugs (NSAIDs), steroidal medicines in addition to opioid anaesthetics are utilized, which have a different harmful effect such as hepatic damage, cardio troubles, kidney failure, erectile dysfunction, manic depression, high blood pressure, aches as well as dizziness, look of inactive diabetes mellitus, skin degeneration, reduced bone density, intestinal system, abscess, reliance, constipation and also respiratory problems. So, it is crucial to the globe to make sure a resource of cost-abusing herbal-based antinociceptive medicines with more potent and less negative results may be acquired with the medicinal plant[1-4].

Molecular docking is an essential strategy of making plans and designing new drugs, where it is expected that a tiny molecule will certainly show affinity and bind experimentally to the binding site of the target receptor. Therefore, a practical docking approach must adequately forecast the native ligand model to the receptor-binding site and the linked physico-chemical molecular communications[5-8].

Ipomoea marginata (*I. marginata*) Verdc. (Family Convolvulaceae) is a perennial twiner with ovate-cordate acute leaves having reddish patches; light pink (having a dark eye), funnel-shaped flowers in pedunculate subumbellate cymes and ovoid, glabrous

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***Address for correspondence**
E-mail: dsnbkprasanth@gmail.com

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International Journal of Research in AYUSH and Pharmaceutical Sciences

Research Article

Development and Evaluation of Controlled Release Formulations of Esomeprazole

K. Deepika, M. Sai Vishnu*, A. Lakshmana Rao

Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P.

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Keywords: Esomeprazole, Eudragit-S100, Eudragit-L100, Eudragit-RSPO, Eudragit-RS100, Eudragit-RL100, Eudragit RLPO.

ABSTRACT

The present work was aimed to development of controlled release formulations of Esomeprazole to improve bioavailability. Esomeprazole is the proton pump inhibitor that suppresses gastric acid secretion by specific inhibition of the H+/K+-ATPase in the gastric parietal cell. By acting specifically on the proton pump, Esomeprazole blocks the final step in acid production, thus reducing gastric acidity. Construction of calibration curve of Esomeprazole and to investigate the drug and polymer interaction studies by FTIR and DSC. To prepare the different controlled release formulations of Esomeprazole tablets with different polymers like Polymethacrylates such as Eudragit-S100, Eudragit-L100, Eudragit-RSPO, Eudragit-RS100, Eudragit-RL100 and Eudragit RLPO by Direct Compression method. Evaluation of Esomeprazole pre compression parameters such as Bulk density, Tapped density, Hausner's ratio, Carr's index, Angle of repose. Evaluation of post-compression parameters of Esomeprazole controlled release tablets such as Weight variation, Hardness, Friability test, Thickness, Drug Content and *In-vitro* dissolution studies. Evaluation of *in-vitro* dissolution uniqueness of all the formulations of Esomeprazole by using USP dissolution apparatus type-II (paddle). To study the mechanism of drug dissolution by applying kinetic parameters. To perform the stability studies of optimized formulations of Esomeprazole as per ICH guidelines.

INTRODUCTION

Most conventional oral drug products, such as tablets and capsules, are formulated to release the active drug immediately after oral administration, to acquire quick and entire systemic drug absorption. Such immediate release products result in comparatively rapid drug absorption and onset of associated pharmacodynamic effects. Although, after absorption of the drug from the dosage form is whole, plasma drug concentrations refuse according to the drugs PK profile. Ultimately plasma drug concentrations reduce below the minimum effective plasma concentration (MEC), ensuing in loss of therapeutic activity. Before this point is reached, another dose is frequently given if a sustained therapeutic effect is required. A substitute to administer an additional dose is to use a dosage form that will afford sustained drug release, and hence maintain plasma drug concentrations, ahead of what is typically seen using immediate release dosage forms.

MATERIALS AND METHODS

Esomeprazole is highly effective inhibitor of gastric acid secretion used in the therapy of stomach ulcers and zollinger-ellison syndrome. The drug inhibits the H(+)-K(+)-ATPase (H(+)-K(+)- exchanging ATPase) in the proton pump of gastric parietal cells.

Structure:

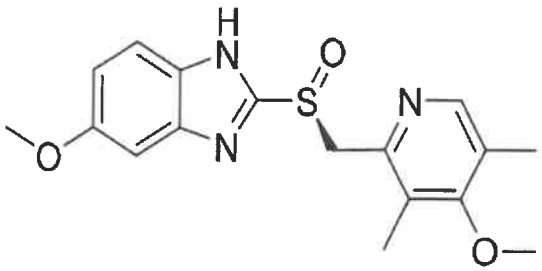

Figure No: 1 Structure of Esomeprazole

Chemical Formula: $C_{17}H_{19}N_3O_3S$

Molecular weight: Average: 345.416, Monoisotopic: 345.114712179 g/mol.

ISSN: 2456-9909 (Online)

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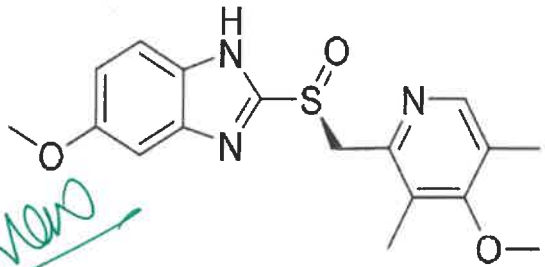

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Original Article

Thai Journal of Pharmaceutical Sciences

Simultaneous estimation of ivacaftor and tezacaftor in rat plasma by Liquid chromatography coupled with tandem-mass-spectrometry: Application to pharmacokinetic studies

M. Satya Venkata Sakuntala[1], A. Lakshmana Rao[2], M. William Carey[3]

[1]Department of Pharmacy, Government Polytechnic for Women, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India, [2]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [3]Department of Pharmacy, Government Polytechnic, Visakhapatnam, Andhra Pradesh, India

Corresponding Author:
M. Satya Venkata Sakuntala, Department of Pharmacy, Government Polytechnic for Women, Kakinada - 533 003, Andhra Pradesh, India.
Phone: +91-9951287148.
E-mail: m.sakuntala1@gmail.com

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ABSTRACT

Background: Ivacaftor and Tezacaftor belong to the CFTR potentiator class, in combination approved to manage cystic fibrosis. **Objective:** To establish a sensitive LC-MS/MS approach for the synchronized analysis of Ivacaftor and Tezacaftor and its appliance to rat pharmacokinetic investigation. **Methodology:** Method is developed with protein precipitation by acetonitrile and Ivacaftor-d4, Tezacaftor-d4 are used as internal standards. Separation is done on an Eclipse plus C18 analysis column (100 mm × 4.6 mm 1.8 μm) with a mobile phase consisting of 0.1% trifluoroacetic acid: acetonitrile (ratio 60:40, v/v, and pH 2.5) and flow stream of 1.0 mL/min at ambient temperature. **Results:** The approach developed showed fine calibration curve in the quantity range of 1.5-22.53 ng/mL (r2 – 0.99974) for ivacaftor and 1-15.02 ng/mL (r2 – 0.99988) for tezacaftor and the accuracy and precision meets F.D.A guidelines. **Conclusion:** The newly designed and validated approach was simple, fast and applied effectively for rat pharmacokinetic investigation.

Keywords: Ivacaftor, Tezacaftor, LC-MS/MS, Method Validation, Pharmacokinetic study, Rat plasma

BACKGROUND

Cystic fibrosis, a progressive genetic disease, induces chronic lung infections and reduces breathing capacity over time.[1] Cystic fibrosis is caused by variations in the transmembrane conductance regulator (cystic fibrosis transmembrane regulator [C.F.T.R]) gene for cystic fibrosis.

C.F.T.R protein regulator works as an ion channel that controls the volume of liquid on the epithelial surfaces by inhibiting sodium absorption and chloride secretion,[2] resulting in thicker and stickier mucus than usual, which is difficult to remove from the lungs by cough leading to difficulty in breathing and severe lung infections.

Symdeko tablet formulation (labeled claim: 150 mg ivacaftor and 100 mg tezacaftor) was approved by Food and Drug Administration (FDA) in 2018.[3,4] Symdeko tablet is suggested for treating patients (aged 12 or older) with cystic fibrosis, patients with homozygous mutation (F508del), or mutation in the C.F.T.R gene. Ivacaftor [Figure 1] is a chloride channel agonist.[5-7] Tezacaftor [Figure 1] is a corrector of C.F.T.R protein,[8] cumulative effects of ivacaftor, and tezacaftor stimulates the C.F.T.R protein functions on the cell's surface, resulting in increased transport of chloride out of the body.[9-11]

To the best of our literature search, stability indicating RP-HPLC method,[12,13] UPLC[14] and UV spectrophotometric methods[15] were published to quantify tezacaftor and ivacaftor simultaneously in tablet formulations. For most of the analytes, liquid chromatography with mass spectrometry is considered as the most sensitive and specific approach compared to all other techniques. Liquid chromatography with mass spectrometry becomes the first option of quantitation for drugs in biological matrices. Three LC-M.S methods have been

Original Article

Thai Journal of Pharmaceutical Sciences

Inhibitory effects of *Manosa alliacea* in Freund's adjuvant arthritis on inflammatory markers and its confirmation by *In-silico* strategy

D. S. N. B. K. Prasanth[1], Sk. Aminabee[2], A. Lakshmana Rao[3], Chakravarthi Guntupalli[1], Alavala Rajasekhar Reddy[4], Umasankar Kulandaivelu[4], S. N. Koteswara Rao[5], P. Rajeshwari[6]

[1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India, [2]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Krishna, Andhra Pradesh, India, [3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Krishna, Andhra Pradesh, India, [4]Pharmaceutical Chemistry Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India, [5]Pharmaceutics Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India, [6]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Guntur, Andhra Pradesh, India

Corresponding Author:
Dr. D. S. N. B. K. Prasanth, Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India.
Ph: +91-7382027437.
E-mail: dsnbkprasanth@kluniversity.in

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ABSTRACT

For the assessment of the curative effect of *Manosa alliacea* on Freud's adjuvant (FA) arthritis on Swiss albino rats. Methanol extract from *M. alliacea* (MEMA) was administered orally at 200 mg/kg and 400 mg/kg, 28 days after FA immunization. For control and treatment groups, paw volume, body weight, hematological parameters, X-ray, and histological tests were measured. In addition, reverse transcription-polymerase chain reaction (RT-PCR) was used to measure the levels of various inflammatory markers. *In vitro*, DPPH and H_2O_2 tests were used to evaluate the antioxidant capability. MEMA decreased paw volume and paw thickness, bodyweight considerably ($P < 0.05, 0.01, 0.001$), compared to hematological anomalies of arthritis control. X- rays tests and histological tests did not reveal significant structural changes in the rat ankle joints administered with MEMA. The levels of expression tumor necrosis factor - α, NF-Kβ, IL-1β, and COX-2 were significantly suppressed in the treatment groups. The *in-silico* study has shown that a number of chemical components in the plants under study can effectively bind to various inflammatory targets. That is why we say *M. alliacea* is a good source for treating rheumatoid arthritis.

Keywords: *Manosa alliacea, In silico, In vivo,* Freund's adjuvant arthritis

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, paralytic joint disease that affects 1% of the adult population worldwide.[1] This results in a significant loss of quality of life and the resulting degradation that has a significant socio-economic impact.[2,3] An inflammatory reaction to synovial membrane inflammation, joint lining, which is typically made up of macrophage, and fibroblast-like cells, was activated and called synoviocytes.[4] Free radicals, in particular reactive oxygen species (ROS), also involve RA pathogenesis and cause cartilage destruction either through a direct degradation of the matrix or through activation of the matrix metalloproteinase (MMP).[5]

The most common forms of RA are under the category of Inflammatory immune arthritis (IIA).[6] The cytokines, proteinases, oxygen derivatives, and interleukins (ILs) are inflammatory mediators found in the blood plasma

Original Article

Thai Journal of Pharmaceutical Sciences

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Keywords: *Manosa alliacea, In silico, In vivo,* Freund's adjuvant arthritis

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, paralytic joint disease that affects 1% of the adult population worldwide.[1] This results in a significant loss of quality of life and the resulting degradation that has a significant socio-economic impact.[2,3] An inflammatory reaction to synovial membrane inflammation, joint lining, which is typically made up of macrophage, and fibroblast-like cells, was activated and called synoviocytes.[4] Free radicals, in particular reactive oxygen species (ROS), also involve RA pathogenesis and cause cartilage destruction either through a direct degradation of the matrix or through activation of the matrix metalloproteinase (MMP).[5]

The most common forms of RA are under the category of Inflammatory immune arthritis (IIA).[6] The cytokines, proteinases, oxygen derivatives, and interleukins (IL's) are inflammatory mediators found in the blood plasma

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In-silico strategies of some selected phytoconstituents from *Melissa officinalis* as SARS CoV-2 main protease and spike protein (COVID-19) inhibitors

D. S. N. B. K. Prasanth [a], Manikanta Murahari [b], Vivek Chandramohan[c], Gangadharappa Bhavya[d], Atmakuri Lakshmana Rao[e], Siva Prasad Panda[a], G. S. N. Koteswara Rao[f], Guntupalli Chakravarthi[a], Nayudu Teja[g], Peddireddy Suguna Rani[h], Gummadi Ashu[g], Chittiprolu Purnadurganjali[e], Puvvala Akhil[e], Gorriputti Vedita Bhavani[e] and Tirumalasetti Jaswitha[e]

[a]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India; [b]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences, Bangalore, India; [c]Siddaganga Institute of Technology, Department of Biotechnology, Siddaganga Institute of Technology, Tumakuru, India; [d]Department of Biotechnology, M.S. Ramaiah Institute of Technology, Bangalore, India; [e]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, India; [f]Pharmaceutics Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India; [g]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, India; [h]Sri Venkateswara University, Department of Pharmacology, Sri Venkateswara University, Tirupati, India

ABSTRACT

Melissa officinalis (Lamiaceae) was used to treat multiple human afflictions. Literary works demonstrated that it has many biological activities. Today's research aims to recognise *Melissa officinalis* phyto-derived anti-viral compounds against main protease and spike protein of COVID-19, to gain insight into the molecular interactions. In the current study, 12 molecules taken from *Melissa officinalis* were analysed through docking, which is derived from the PubMed database. Docking experiments were conducted with Autodock tool. AdmetSAR and Data warrior servers were eventually used for drug-like prediction. Our research shows that three phytoconstituents from *Melissa officinalis*, namely, Luteolin-7-glucoside-3′-glucuronide, Melitric acid-A and Quadranoside-III have exhibited better binding affinity and stability with the targets of COVID-19 main protease and spike protein. The identified substances can be further extended for *in vitro* and *in vivo* studies to assess their effectiveness against COVID-19.

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KEYWORDS
Melissa officinalis; ADMET; Autodock; Physico-chemical; PASS analysis

1. Introduction

WHO has currently stated an emergency condition due to pandemic coronavirus (COVID-19) that has proactively propagating around the entire world. The virus SARS-CoV-2 can easily trigger signs and symptoms such as high temperature, coughing, pneumonia, queasiness, as well as exhaustion [1,2]. Exact origin of the preliminary transmission to human beings is still unidentified. Presently, there are >100 total genome patterns recognised in the NCBI GenBank, coming from over 10 nations [3]. The variant in between these series is much less than 1%. SARS-CoV-2 has been identified as β-coronavirus which causes severe respiratory tract infection in humans by utilising angiotensin-converting enzyme-2 (ACE2) receptors to infect humans [3]. Chinese experts separated SARS-CoV-2 and also sequenced the genome SARS-CoV-2 on 7 January 2020 [4]. The Main protease (Mpro) is an essential protein required for proteolytic maturation of the virus [5]. Thus, targeting Mpro has the potential to provide effective treatment against SARS-CoV-2 by inhibition of the viral polypeptide cleavage. Spike protein of virus binds to the tissue membrane layer with a receptor-mediated communication which enables a way to host cell. Also makes it possible for the application of well-known protein designed to rapidly develop a version for medicine breakthrough on this brand-new SARS-CoV-2 [6].

The COVID-19 pandemic triggered by SARS CoV-2 has resulted in substantial rates of morbidity and mortality worldwide. The strategy adopted here was to look for *in silico* potential of phyto-constituents against SARS-COV-2 by computational protocols against spike glycoprotein as well as main protease. On the other hand, plants have been essential to human welfare for their uses as therapeutics since ancient times [7,8]. A significant amount of antiviral compounds produced from numerous kinds of plants have been used in many studies [9–11]. Researchers across the globe are screening therapeutic molecules from existing antiviral plant secondary metabolites and are also trying to find novel compounds from medicinal plants to avert this pandemic crisis [12]. *In-silico* based testing has been confirmed to be a handy tool to overcome the obstacles of drug discovery. These computational strategies conserve information in terms of money and time [13–16]. Screening from existing plant metabolites, researchers have been trying to identify and optimise novel compounds from medicinal plants to prevent numerous diseases, including COVID-19.

CONTACT D. S. N. B. K. Prasanth dsnbkprasanth@gmail.com

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Research Article

STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR THE ESTIMATION OF ONDANSETRON IN BULK AND THEIR PHARMACEUTICAL DOSAGE FORM

A. Lakshmana Rao*, G. Akanksha, G. Neelima, G. Sneha, G.V. Pavan Kumar, G. Lavanya

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Keywords: Ondansetron, Validation, HPLC, Dosage Form.

ABSTRACT

A simple, rapid, precise and accurate stability indicating RP-HPLC method was developed and validated for the estimation of Ondansetron in bulk drug and pharmaceutical dosage form. A Phenomenex C18 (150 mm × 4.6 mm I.D., 5 µm particle size) column was used as stationary phase with mobile phase consisting of 0.1% Formic acid (pH 4.25):Acetonitrile in the ratio of 50:50 V/V. The flow rate was maintained at 0.6 mL/min and effluents was monitored at 250 nm. The retention time was 2.91 min. The linearity of the method was observed in the concentration range of 5-25 µg/mL with correlation coefficient of 0.999. The method developed was validated for linearity, precision, accuracy, system suitability and forced degradation studies like acidic, alkaline, oxidative and hydrolytic stress conditions were performed as per ICH guidelines. The results obtained in the study were within the acceptable limits and hence this method can be used for the estimation of Ondansetron in pure drug and pharmaceutical dosage form.

INTRODUCTION

Ondansetron (Figure 1) is a competitive serotonin type 3 receptor antagonist. It is effective in the treatment of nausea and vomiting [1-3]. Chemically it is 9-methyl-3-[(2-methyl-1*H*-imidazol-1-yl)methyl]-2,3,4,9-tetrahydro-1*H*-carbazol-4-one. Ondansetron is a selective antagonist of the serotonin receptor subtype, 5-HT_3. Cytotoxic chemotherapy and radiotherapy are associated with the release of serotonin (5-HT) from enterochromaffin cells of the small intestine, presumably initiating a vomiting reflex through stimulation of 5-HT_3 receptors located on vagal afferents [4]. Ondansetron may block the initiation of this reflex. Activation of vagal afferents may also cause a central release of serotonin from the chemoreceptor trigger zone of the area postrema, located on the floor of the fourth ventricle [5-6].

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Literature survey revealed that few HPLC methods [7-14] were reported for the estimation of Ondansetron. Hence a novel, new, sensitive, specific, accurate and precise HPLC method was developed and validated as per ICH guidelines [15-16] for the estimation of Ondansetron in bulk drug and pharmaceutical dosage form.

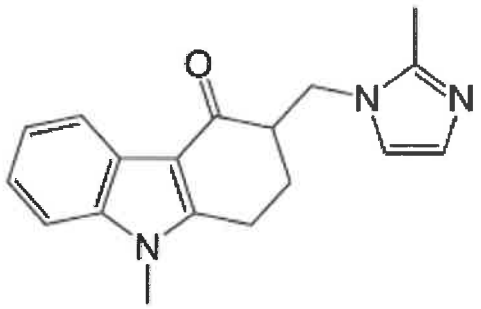

Fig. 1: Chemical structure of Ondansetron

MATERIALS AND METHODS

Instrumentation: To develop a high pressure liquid chromatographic method for estimation of Ondansetron using Agilent Technologies 1260

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Research Article

SIMULTANEOUS ESTIMATION OF METFORMIN AND TENELIGLIPTIN IN PHARMACEUTICAL FORMULATION BY USING UV SPECTROSCOPY

A. Lakshmana Rao*, G. Uha, G. Manasa, J. Jessica, J.P.S.S. Krishna

Department of Pharmaceutical Analysis, V.V.Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Keywords: Metformin, Teneligliptin, Wavelength, Validation.

ABSTRACT

Three new UV spectrophotometric methods namely simultaneous equation, absorbance ratio and dual wavelength methods were developed and validated for simultaneous estimation of Metformin and Teneligliptin in bulk drug and tablet formulation which were simple, rapid, sensitive, precise and accurate. In simultaneous equation method, absorbance was measured at 233nm for Metformin and 241nm for Teneligliptin. In absorbance ratio method, absorbance was measured at 244nm for Metformin and 233nm for Teneligliptin. In dual wavelength method, two wavelengths were selected for each drug, the absorbances was measured at 225 and 251nm for Metformin and 240 and 221nm for Teneligliptin. Developed methods were validated according to ICH guidelines including parameters viz., specificity, linearity and range, precision, accuracy, limit of detection and limit of quantification. All the three methods showed linear response in the concentration range of 2-10µg/mL for Metformin and 0.5-2.5µg/mL for Teneligliptin with a low correlation coefficient. Results of method validation parameters follows ICH guideline acceptable limits. Methods were found to be simple, rapid, sensitive, economical and hence can be useful for simultaneous estimation of Metformin and Teneligliptin in pure drug and commercial tablet formulation for routine quality control analysis.

INTRODUCTION

Metformin (MET) (Figure 1) is an oral anti-diabetic drug in the biguanide class. It is the first-line drug of choice for the treatment of type 2 diabetes mellitus[1]. Chemically it is 1-carbamimidamido-N, N-dimethylmethanimidamide. Metformin decreases hepatic glucose production, decreases intestinal absorption of glucose and improves insulin sensitivity by increasing peripheral glucose uptake and utilization.[2-3]

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Teneligliptin (TEN) (Figure 2) is a pharmaceutical drug for the treatment of type 2 diabetes mellitus[4]. It belongs to the class of anti-diabetic drugs known as dipeptidyl peptidase-4 inhibitors. Chemically it is [(2S,4S)-4-[4-(5-methyl-2-phenylpyrazol-3-yl) piperazin-1-yl]pyrrolidin-2-yl]-(1,3-thiazolidin-3-yl) methanone. Teneligliptin inhibits the enzyme dipeptidyl peptidase-4 (DPP4) which degrades incretin, a hormone adjusting blood glucose control[5,6].

Literature review revealed that few analytical methods have been reported for the simultaneous determination of Metformin and Teneligliptin in combined pharmaceutical dosage forms using spectrophotometry [7-12]. Hence the objective of the present work is to develop a new, simple, sensitive, specific, precise and accurate UV Spectrophotometric

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FORMULATION AND EVALUATION OF PARACETAMOL SUSPENSION BY USING NATURAL SUSPENDING AGENT EXTRACTED FROM PEDALIUM MUREX SEEDS

M. Sai Vishnu*, A. Lakshmana Rao, T. Divya Sree, T. Mounika, T. Navya Sri and T. Vineela

Assistant Professor, Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru- 521 356, Andhra Pradesh.

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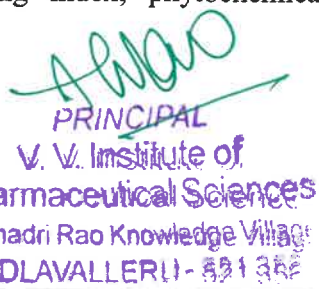
***Corresponding Author**
M. Sai Vishnu
Assistant Professor, Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences Gudlavalleru- 521 356, Andhra Pradesh.

ABSTRACT

The present work was aimed to formulate and evaluate a new, cheap and effective natural suspending agent that can be used as an effective alternative for traditional suspending agent. The study procedure involved extraction of suspending agent from the *Pedalium murex* seeds, determination of swelling index, phytochemical testing, Micromeritic properties of mucilage like Bulk density, Tapped density, Carr's index, Angle of repose, Calibration of paracetamol, preparation of paracetamol suspensions and evaluated for P^H determination, determination of sedimentation volume, redispersibility, determination of flow rate, measurement of viscosity, effect of temperature, drug content, particle size determination and *In-vitro* dissolution studies. The study showed that the extraction of suspending agent from *Pedalium murex* seeds. The swelling index was found to be 60% in distilled water, 40% in 0.1N hydrochloric acid and 30% in phosphate buffer pH 7.4. The photochemical test showed contains carbohydrates. As the concentration of suspending agent increases therefore viscosity of suspension increases which ultimately reduces the sedimentation of suspension.

KEYWORDS: *Pedalium murex,* paracetamol, swelling index, phytochemical testing, Micromeritic properties, sedimentation volume.



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KEYWORDS: *Pedalium murex,* paracetamol, swelling index, phytochemical testing, Micromeritic properties, sedimentation volume.

Asian Journal of Medicine and Health Sciences Vol 4 Supplement 1 October 2021

ORIGINAL ARTICLE

DEVELOPMENT AND VALIDATION OF AN LC-MS/MS METHOD FOR DETERMINATION OF ATORVASTATIN IN HUMAN PLASMA.

Prem Kumar Bichala[1*], Lakshmana Rao Atmakuri[2], Vijay Kotra[3]

[1]School of Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India*
[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh., India
[3]University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India

Corresponding Author
Prem Kumar Bichala
School of Pharmaceutical Sciences,
Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India.
Email: prembichala@gmail.com

Abstract
Background: A novel method for the estimation of Atorvastatin in human plasma by using LC-MS/MS and the analyte is Atorvastatin and internal standard is Rosuvastatin have extracted with the tertbutyl methyl ether: n-hexane (70:30, v/v) from human plasma.
Methods: The chromatographic severance was attained of the peak using Agilent Zorbax Eclipse XDB-C_8, (100 mm X 4.6 mm, 3.5 µm) column with a run time is 2.5 min. Atorvastatin and Rosuvastatin were recorded at the total ion current of their relevant multiple reaction monitoring. The LC-MS/MS system composed an Agilent 1100 infinity combined with an AB Sciex Qtrap4000 Thermo Finnigan TSQ quantum discovery triple quadrupole mass spectrometer. All of the parameters must be validated like selectivity, accuracy, precision, linearity, lower limit of quantification, matrix effect, recovery reached the acceptance criteria under the following ICH guidelines.
Results: Atorvastatin has checked the various stability studies like short-term stability at 25 °C, long-term stability for 55 days at -70°C, wet extract stability for 54 hours, autosampler stability for 63 hours, benchtop stability for 14 hours and, freeze-thaw stability at -60 °C. Hence, it can be used for routine drug analysis and bioequivalence studies of Atorvastatin in human plasma samples.
Conclusion: The proposed LC-MS/MS method was simple, rapid, precise and accurate for the determination of Atorvastatin in human plasma. The developed LC-MS/MS method can apply for the bioequivalence and pharmacokinetic studies of Atorvastatin in human plasma samples.

Keywords: Atorvastatin, rosuvastatin, estimation, human plasma, LC-MS/MS and validation.

Satya Venkata Sakuntala *et al.*
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https://doi.org/10.1186/s43094-021-00384-3

Future Journal of Pharmaceutical Sciences

RESEARCH Open Access

Stability-indicating method development and validation for the concurrent determination of darunavir, cobicistat, emtricitabine and tenofovir alafenamide by UPLC in bulk and tablet dosage forms

M. Satya Venkata Sakuntala[1,2*], A. Lakshmana Rao[3] and M. William Carey[4]

Abstract

Background: Tablet dosage forms containing combination of darunavir a protease inhibitor, cobicistat a cytochrome P450 3A inhibitor, emtricitabine and tenofovir alafenamide which were nucleoside reverse transcriptase inhibitors were approved by USFDA on 1st July 2018 to suppress the viral load in HIV patients. It can be used as a complete regimen for the treatment of HIV-1 infection in adults and paediatric patients weighing at least 40 kg. An UPLC method was developed, and separation was done on SB C_8 column of dimensions 50 × 2.1 × 1.8 µ with mobile phase 0.01 N potassium dihydrogen ortho phosphate (p^H-4.8) and acetonitrile in 60:40 ratio, at a flow rate of 0.3 mL/min and an injection volume of 2 µL. The column temperature was maintained at 30 °C, and detection wavelength was 267 nm. The method was validated according to ICH guidelines.

Results: The retention times were 1.031, 1.341, 1.630 and 2.153 min, and they were linear in the concentration range of 1.25–7.5 µg/mL, 18.75–112.5 µg/mL, 25–150 µg/mL and 100–600 µg/mL for tenofovir alafenamide, cobicistat, emtricitabine and darunavir, respectively. The intraday and interday precisions were found to be within acceptable limits. LOD was found to be 0.06 µg/mL, 0.51 µg/mL, 1.31 µg/mL and 3.01 µg/mL, and LOQ was 0.19 µg/mL, 1.54 µg/mL, 3.96 µg/mL and 9.13 µg/mL for tenofovir alafenamide, cobicistat, emtricitabine and darunavir. The correlation coefficients were found to be more than 0.999, and recovery was more than 99.52% indicating the method was accurate. Forced degradation studies reveal that the drugs are unstable under acidic conditions. The method was simple, accurate, precise, stable and can be analysed in less runtime of 4 min.

Conclusions: The flexibility, accuracy and precision of the developed method ensure its applicability in routine analysis of tablet dosage forms.

Keywords: UPLC, Stability indicating, Tenofovir alafenamide, Cobicistat, Emtricitabine, Darunavir

*Correspondence: m.sakuntala1@gmail.com
[1] Department of Pharmacy, Government Polytechnic for Women, Kakinada, Andhra Pradesh 533003, India
Full list of author information is available at the end of the article

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Research Article

Bio-Analytical Method Development and Validation for Simultaneous Quantification of Glecaprevir and Pibrentasvir in Rat Plasma by Using RP-HPLC

Prasanthi T[1,2*] and Gowri Shankar D[3]

[1]*Research Scholar, AU College of Pharmaceutical Sciences, Visakhapatnam, Andhra Pradesh, India*
[2]*Associate Professor, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*
[3]*Professor, AU College of Pharmaceutical Sciences, Visakhapatnam, Andhra Pradesh, India*

[*]*Address Correspondence to Prasanthi T, prasanthi8585@gmail.com*

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Abstract

A novel bio-anlytical method was developed for the simultaneous determination of Glecaprevir and Pibrentasvir in rat plasma by using RP-HPLC method. The chromatographic separation was performed on Xterra RP18, (150 mm × 4.6 mm and 3.5 µm) column using the mobile phase ACN: 0.1% formic acid (50:50 v/v). The internal standard used was Voxilaprevir. Glecaprevir, Pibrentasvir and Voxilaprevir peaks were detected at 2.5 min, 5.2 min and 6.3 min respectively. Linear response was obtained in the range of 0.15 µg/mL-2.25 µg/mL for Glecaprevir and 0.06 µg/mL-0.9 µg/mL for Pibrentasvir. All of the parameters must be validated like selectivity, accuracy, precision, linearity, lower limit of quantification, matrix effect, and recovery reached the acceptance criteria under the following of US FDA guidelines.

Keywords: Glecaprevir; Pibrentasvir; Voxilaprevir; Matrix effect; Recovery

Highlights

(RP-HPLC) Reverse PhaseHigh Performance Liquid Chromatography; (ACN) Acetonitrile; (C) Centigrade; (NS) Non Structural; (UV) Ultra Violet; (CV) Coefficent of Variation; (ISTD) Internal Standard; (LLOQ) Lower Limit of Quantitation; (LOQ) Limit of Quantitation; (HQC) High Quality Control; (MQC) Mid Quality Control; (LQC) Low Quality Control; (RS) Related Substances; (SD) Standard Deviation; (P and A) Precision and Accuracy.

Introduction

Infection with hepatitis C virus (HCV) genotype 3 is associated with higher rates of liver steatosis and achieving sustained virologic response quantifiably reverses its progression in those patients. GT3 has been shown to be an independent predictor of fibrosis progression and is associated with a higher incidence of hepatocellular carcinoma. Thus, effective HCV treatment options are critical for patients with HCV GT3 infection, particularly those with advanced liver disease and/or prior treatment experience. replication (Figure 1). Glecaprevir is chemically known as(3aR,7S,10S,12R,21E,24aR)-7-tert-butyl-N-{(1R,2R)-2¬(-difluoromethyl)-1-[(1-methylcyclopropane-1-sulfonyl) carbamoyl]cyclopropyl}-20,20-difluoro¬5,8-dioxo-2,3,3a ,5,6,7,8,11,12,20,23,24a-dodecahydro-1H,10H-9,12methanocyclopenta[2-8]trioxadiazacyclononadecino[11,12-b] quinoxaline-10¬carboxamide hydrate. Glecaprevir disrupts the intracellular processes of the viral life cycle through inhibiting the NS3/4A protease activity of cleaving downstream junctions of HCV polypeptide and proteolytic processing of mature structural proteins [1-12].

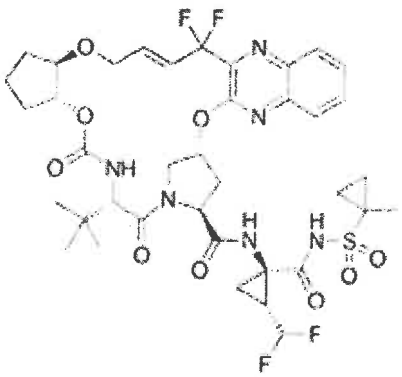

Figure 1: Structure of Glecaprevir.

Pibrentasvir is chemically dimethyl ((2S,2'S,3R,3'R)-((2S,2'S)-(((2R,5R)-1-(3,5-difluoro-4-(4-(4-fluorophenyl) piperidin-1-yl)phenyl)pyrrolidine-2,5-diyl)bis(6-fluoro-1H-benzo[d]imidazole-5,2-diyl))bis(pyrrolidine-2,1-diyl))bis(3-methoxy-1-oxobutane-1,2-diyl))dicarbamate2 (Figure 2). It is a direct acting antiviral agent and Hepatitis C virus (HCV) NS5A inhibitor that targets the viral RNA replication and viron assembly. NS5A is a phosphoprotein that plays an essential role in replication, assembly and maturation of infectious viral proteins. The combination of

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ESTIMATION OF DACLATASVIR IN PHARMACEUTICAL DOSAGE FORM BY ULTRA PERFORMANCE LIQUID CHROMATOGRAPHY

A. Viswanath [1], A. Lakshmanrao [1], Aziz Unnisa [2], B. Anupama * [3] and Kondepati Haritha [3]

Acharya Nagarjuna University [1], Guntur – 522510, Andhra Pradesh, India.
University of Hail [2], Saudi Arabia.
KVSR Siddhartha College of Pharmaceutical Sciences [3], Vijayawada - 520008, Andhra Pradesh, India.

Keywords:

UPLC, Daclatasvir, Orthophosphoric acid, Acetonitrile

Correspondence to Author:
Dr. B. Anupama

Associate Professor and HOD, Department of Pharmaceutical Chemistry, KVSR Siddhartha College of Pharmaceutical Sciences, Poly Clinic Road, Vijayawada Krishna - 520008, Andhra Pradesh, India.

E-mail: anurochi8@gmail.com

ABSTRACT: Daclatasvir is an antiviral drug used in combination with other drugs includes sofosbuvir, ribavirin, and interferon, depending on the virus type to treat cirrhosis caused by hepatitis C (HCV). Several methods have been found for quantification, but those are not cost-effective, and they are time-consuming. The present study developed a simple, precise, accurate and cost-effective UPLC method to determine daclatasvir quantity in tablet dosage forms. A simple and selective UPLC method is described for the determination of Daclatasvir Chromatographic separation was achieved on a Acquity BEH C18 (50 × 3.0mm. 1.7 µm) using a mobile phase consisting 0.1% of Orthophosphoric acid: Acetonitrile in a ratio of 60:40 v/v with detection of 248 nm. Linearity was observed in the range 50-150 µg/ml for Daclatasvir (r^2 = 1.000). The amount of drugs estimated by the proposed method was in good agreement with the label claim. The proposed method was validated as per ICH guidelines and applied for the determination of the cited drug in the dosage form.

INTRODUCTION: Daclatasvir is chemically dimethyl N, N'-([1,1'-biphenyl]-4, 4'-diylbis{1H-imidazole-5,2-diyl-[(2S)-pyrrolidine-2,1-diyl][(2S)-3- methyl- 1- oxobutane-1, 2-diyl]}) dicarbamate. Daclatasvir has molecular weight: 738.89 g/mol and molecular formula: $C_{40}H_{50}N_8O_6$. It is an antiviral drug used in combination with other medicaments to treat hepatitis C (HCV). The other medicines used in combination include interferon, sofosbuvir, and ribavirin, depending on the virus type 1. The dose of daclatasvir present in the formulation was determined by using the Ultra Performance Liquid Chromatography method. UPLC has greater sensitivity, resolution, and speed of analysis.

QUICK RESPONSE CODE

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UPLC operates at high pressure than HPLC, and fine particles, *i.e.*, less than 2.5 µm are used, and mobile phases at high linear velocities decrease the length of the column, reduces solvent consumption, and save time [2].

The UPLC is based on the use of a stationary phase consisting of particles less than 2.5 µm whereas the HPLC column is typically filled with 3-5 µm particles. The principle of this evolution is governed by the Van Deemeter equation, which is an empirical formula that describes the relationship between the linear velocity of flow rate and plate height [3, 4].

$$H = A + B / v + Cv$$

Where; A, B and C are constants, v is the linear velocity, the carrier gas flow rate.

*The A term is independent of velocity and represents "eddy" mixing. It is the smallest when the packed column particles are small and uniform.

Future Journal of Pharmaceutical Sciences

RESEARCH Open Access

Stability-indicating method development and validation for the concurrent determination of darunavir, cobicistat, emtricitabine and tenofovir alafenamide by UPLC in bulk and tablet dosage forms

M. Satya Venkata Sakuntala[1,2*], A. Lakshmana Rao[3] and M. William Carey[4]

Abstract

Background: Tablet dosage forms containing combination of darunavir a protease inhibitor, cobicistat a cytochrome P450 3A inhibitor, emtricitabine and tenofovir alafenamide which were nucleoside reverse transcriptase inhibitors were approved by USFDA on 1st July 2018 to suppress the viral load in HIV patients. It can be used as a complete regimen for the treatment of HIV-1 infection in adults and paediatric patients weighing at least 40 kg. An UPLC method was developed, and separation was done on SB C_8 column of dimensions 50 × 2.1 × 1.8 µ with mobile phase 0.01 N potassium dihydrogen ortho phosphate (p^H-4.8) and acetonitrile in 60:40 ratio, at a flow rate of 0.3 mL/min and an injection volume of 2 µL. The column temperature was maintained at 30 °C, and detection wavelength was 267 nm. The method was validated according to ICH guidelines.

Results: The retention times were 1.031, 1.341, 1.630 and 2.153 min, and they were linear in the concentration range of 1.25–7.5 µg/mL, 18.75–112.5 µg/mL, 25–150 µg/mL and 100–600 µg/mL for tenofovir alafenamide, cobicistat, emtricitabine and darunavir, respectively. The intraday and interday precisions were found to be within acceptable limits. LOD was found to be 0.06 µg/mL, 0.51 µg/mL, 1.31 µg/mL and 3.01 µg/mL, and LOQ was 0.19 µg/mL, 1.54 µg/mL, 3.96 µg/mL and 9.13 µg/mL for tenofovir alafenamide, cobicistat, emtricitabine and darunavir. The correlation coefficients were found to be more than 0.999, and recovery was more than 99.52% indicating the method was accurate. Forced degradation studies reveal that the drugs are unstable under acidic conditions. The method was simple, accurate, precise, stable and can be analysed in less runtime of 4 min.

Conclusions: The flexibility, accuracy and precision of the developed method ensure its applicability in routine analysis of tablet dosage forms.

Keywords: UPLC, Stability indicating, Tenofovir alafenamide, Cobicistat, Emtricitabine, Darunavir

*Correspondence: m.sakuntala1@gmail.com
[1] Department of Pharmacy, Government Polytechnic for Women, Kakinada, Andhra Pradesh 533003, India
Full list of author information is available at the end of the article

STABILITY INDICATING HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF LAMIVUDINE AND DOLUTEGRAVIR IN BULK AND TABLET DOSAGE FORM

Sakuntala Satya Venkata M.[a]*, Lakshmana Rao A.[b] and William Carey M.[c]

(Received 03 April 2020) (Accepted 17 July 2020)

ABSTRACT

A rapid high-performance liquid chromatographic method has been developed and validated for quantification of lamivudine and dolutegravir, used to manage HIV infections. Lamivudine and dolutegravir are separated as symmetrical peaks on the analytical column Inertsil ODS, 150 mm x 4.6 mm, 5.0 µm using 50 % acetonitrile and 50 % triethylamine buffer as mobile phase and detected by photo diode array detector at wave length 250 nm. The total chromatographic runtime is 6.0 min with retention times for lamivudine and dolutegravir at 2.457 and 3.888 min, respectively. The method was validated according to ICH guidelines and linear calibration curves were obtained across a range of 6.01-90.15 µg mL^{-1} and 1.01 -15.15 µg mL^{-1} for lamivudine and dolutegravir, a correlation coefficient of R^2 0.999. Tablets containing lamivudine and dolutegravir were subjected to acid hydrolysis, alkali hydrolysis, oxidising agent, reducing agent, heat and UV light at two variable conditions and the drugs peaks are well resolved. This developed method can be used routinely for the determination of lamivudine and dolutegravir in bulk and tablet dosage form.

Keywords: Lamivudine, dolutegravir, HPLC, stability indicating, ICH guidelines, USFDA

INTRODUCTION

USFDA approved combination of nucleoside reverse transcriptase inhibitor lamivudine and integrase inhibitor dolutegravir for the initial therapy and complete regimen for HIV1 infection in adults in April 2019 and it is marketed under the brand name DOVATO[1].

Lamivudine (Fig.1) is a nucleoside reverse transcriptase inhibitor which acts on HIV1, HIV2 and hepatitis B virus and decreases the chances of developing AIDS. As an inhibitor of reverse transcriptase enzyme, it terminates DNA synthesis. Lamivudine is used to treat hepatitis in lesser dose than for HIV, Chemically, lamivudine is 4-amino-1-[(2*R*, 5*S*)-2-(hydroxyl methyl)-1, 3-oxathiolan-5-yl]-1, 2-dihydro pyrimidin-2-one. Lamivudine is taken along with other antiretrovirals like abacavir and zidovudine. Lamivudine is taken by mouth as liquid or tablet[2, 3].

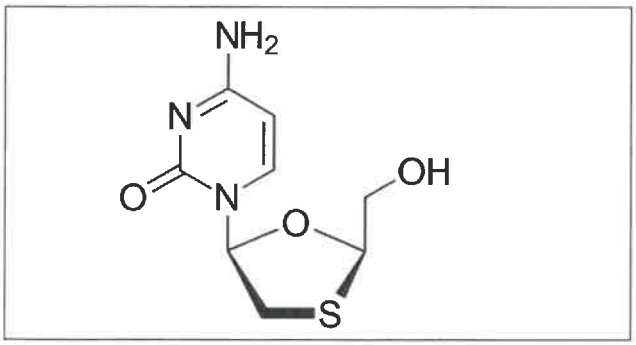

Fig. 1: Structure of lamivudine

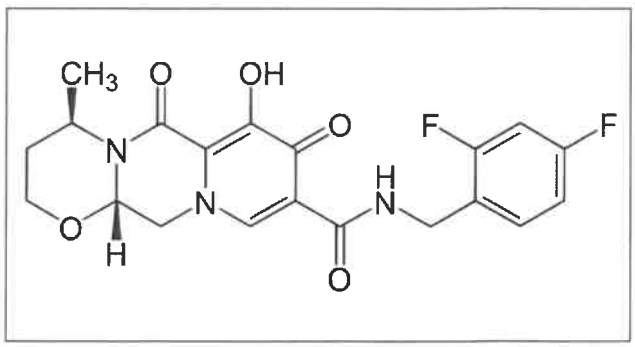

Fig. 2: Structure of dolutegravir

[a]Department of Pharmacy, Government Polytechnic for Women, Kakinada – 533 003, Andhra Pradesh, India
[b]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru – 521 356, Andhra Pradesh, India
[c]Department of Pharmacy, Government Polytechnic, Visakhapatnam - 530 007, Andhra Pradesh, India
*For Correspondence: E-mail: m.sakuntala1@gmail.com

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Research Article

Bio-Analytical Method Development and Validation for Simultaneous Quantification of Glecaprevir and Pibrentasvir in Rat Plasma by Using RP-HPLC

Prasanthi T[1,2*] and Gowri Shankar D[3]

[1]*Research Scholar, AU College of Pharmaceutical Sciences, Visakhapatnam, Andhra Pradesh, India*
[2]*Associate Professor, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*
[3]*Professor, AU College of Pharmaceutical Sciences, Visakhapatnam, Andhra Pradesh, India*

[*]*Address Correspondence to Prasanthi T,*

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Abstract

A novel bio-anlytical method was developed for the simultaneous determination of Glecaprevir and Pibrentasvir in rat plasma by using RP-HPLC method. The chromatographic separation was performed on Xterra RP18, (150 mm × 4.6 mm and 3.5 µm) column using the mobile phase ACN: 0.1% formic acid (50:50 v/v). The internal standard used was Voxilaprevir. Glecaprevir, Pibrentasvir and Voxilaprevir peaks were detected at 2.5 min, 5.2 min and 6.3 min respectively. Linear response was obtained in the range of 0.15 µg/mL-2.25 µg/mL for Glecaprevir and 0.06 µg/mL-0.9 µg/mL for Pibrentasvir. All of the parameters must be validated like selectivity, accuracy, precision, linearity, lower limit of quantification, matrix effect, and recovery reached the acceptance criteria under the following of US FDA guidelines.

Keywords: Glecaprevir; Pibrentasvir; Voxilaprevir; Matrix effect; Recovery

Highlights

(RP-HPLC) Reverse PhaseHigh Performance Liquid Chromatography; (ACN) Acetonitrile; (C) Centigrade; (NS) Non Structural; (UV) Ultra Violet; (CV) Coefficent of Variation; (ISTD) Internal Standard; (LLOQ) Lower Limit of Quantitation; (LOQ) Limit of Quantitation; (HQC) High Quality Control; (MQC) Mid Quality Control; (LQC) Low Quality Control; (RS) Related Substances; (SD) Standard Deviation; (P and A) Precision and Accuracy.

Introduction

Infection with hepatitis C virus (HCV) genotype 3 is associated with higher rates of liver steatosis and achieving sustained virologic response quantifiably reverses its progression in those patients. GT3 has been shown to be an independent predictor of fibrosis progression and is associated with a higher incidence of hepatocellular carcinoma. Thus, effective HCV treatment options are critical for patients with HCV GT3 infection, particularly those with advanced liver disease and/or prior treatment experience.

Glecaprevir is an antiviral agent and Hepatitis C virus NS3/4A protease inhibitor which directly targets the the viral RNA replication (Figure 1). Glecaprevir is chemically known as(3aR,7S,10S,12R,21E,24aR)-7-tert-butyl-N-{(1R,2R)-2¬(-difluoromethyl)-1-[(1-methylcyclopropane-1-sulfonyl) carbamoyl]cyclopropyl}-20,20-difluoro¬5,8-dioxo-2,3,3a ,5,6,7,8,11,12,20,23,24a-dodecahydro-1H,10H-9,12methanocyclopenta[2-8]trioxadiazacyclononadecino[11,12-b] quinoxaline-10¬carboxamide hydrate. Glecaprevir disrupts the intracellular processes of the viral life cycle through inhibiting the NS3/4A protease activity of cleaving downstream junctions of HCV polypeptide and proteolytic processing of mature structural proteins [1-12].

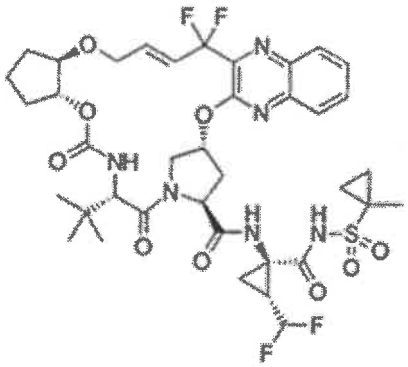

Figure 1: Structure of Glecaprevir.

Pibrentasvir is chemically dimethyl ((2S,2'S,3R,3'R)-((2S,2'S)-(((2R,5R)-1-(3,5-difluoro-4-(4-(4-fluorophenyl) piperidin-1-yl)phenyl)pyrrolidine-2,5-diyl)bis(6-fluoro-1H-benzo[d]imidazole-5,2-diyl))bis(pyrrolidine-2,1-diyl))bis(3-methoxy-1-oxobutane-1,2-diyl))dicarbamate2 (Figure 2). It is a direct acting antiviral agent and Hepatitis C virus (HCV) NS5A inhibitor that targets the viral RNA replication and viron assembly. NS5A is a phosphoprotein that plays an essential role in replication, assembly and maturation of infectious viral proteins. The combination of Glecaprevir and Pibrentasvir seems to be effective option for treatment regardless of which genotype they have, and

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

CALENDER YEAR 2020

S.No.	Title of paper	Name of the author/s	Department	Name of journal	ISSN number
1	Design and Development of Chitosan Polycaprolactone Nanoparticles of Ritonavir	A.Lakshmana Rao	Pharmaceutical chemistry	The Pharma Review.	0973-399X
2	Obsessive Compulsive Disorder And Its Care-Review	Sk.Aminabee	Pharmacology	International Journal Of Research In Pharmacy And Chemistry	2231-2781
3	Obsessive Compulsive Disorder And Its Care-Review	A.Lakshmana Rao	Pharmaceuitical chemisrty	International Journal Of Research In Pharmacy And Chemistry	2231-2781
4	Simultaneous estimation of naltrexone and bupropion in pharmaceutical dosage form by using UV spectroscopy	Sai Datri A	Pharmaceutical analysis	World Journal of Biology Pharmacy and Health Sciences	2582-5542
5	Simultaneous estimation of naltrexone and bupropion in pharmaceutical dosage form by using UV spectroscopy	A.Lakshmana Rao	Pharmaceuitical chemisrty	World Journal of Biology Pharmacy and Health Sciences	2582-5542

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6	Synthesis and Insilico Characterization of Some Novel 3, 4 - Dihydropyrimidin -2-(1h)-Thione Derivatives	B Satya Sree	Pharmaceuitical chemisrty	Journal of Pharmaceutical and Medicinal Chemistry	2395-6615
7	Synthesis and Insilico Characterization of Some Novel 3, 4 - Dihydropyrimidin -2-(1h)-Thione Derivatives	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of Pharmaceutical and Medicinal Chemistry	2395-6615
8	In Vivo Antioxidant Activity of Different Fractions of Indigofera Barberi Against Paracetamol-induced Toxicity in Rats	Sk.Aminabee	Pharmacology	Turkish Journal of Pharmaceutical Sciences	2148-6247
9	In Vivo Antioxidant Activity of Different Fractions of Indigofera Barberi Against Paracetamol-induced Toxicity in Rats	A.Lakshmana Rao	Pharmaceuitical chemisrty	Turkish Journal of Pharmaceutical Sciences	2148-6247
10	Development and Validation of a Stability Indicating RP-HPLC Method for Simultaneous Estimation of Teneligliptin and Metformin	A.Lakshmana Rao	Pharmaceuitical chemisrty	Turkish Journal of Pharmaceutical Sciences	2148-6247

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11	In vitro Anthelmintic Impact of Various Extracts of Pavetta tomentosa Root on Pheretima posthuma and in-silico Molecular Docking Evaluation of some Isolated Phytoconstituents	P. Bharghav Bhushan	Pharmaceuitics	Indian Journal of Pharmaceutical Education and Research	0019-5464
12	In vitro Anthelmintic Impact of Various Extracts of Pavetta tomentosa Root on Pheretima posthuma and in-silico Molecular Docking Evaluation of some Isolated Phytoconstituents	A.Lakshmana Rao	Pharmaceuitical chemisrty	Indian Journal of Pharmaceutical Education and Research	0019-5464
13	Pharmacognostical Study And Preliminary Phytochemical Investigation Of Dechaschistia Crotonifolia Wight & Arn	p. Raveesha	Pharmacognosy	Journal of Global Trends in Pharmaceutical Sciences	2230-7346
14	Pharmacognostical Study And Preliminary Phytochemical Investigation Of Dechaschistia Crotonifolia Wight & Arn	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of Global Trends in Pharmaceutical Sciences	2230-7346
15	Synthesis And Antibacterial Activity Of Mannich Bases Containing Morpholine Moiety	D.Alekya	Pharmachemistry	International Journal of Research in Ayush and Pharmaceutical Sciences.	2456-9909

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16	Synthesis And Antibacterial Activity Of Mannich Bases Containing Morpholine Moiety	A.Lakshmana Rao	Pharmaceuitical chemisrty	International Journal of Research in Ayush and Pharmaceutical Sciences.	2456-9909
17	Formulation And Evaluation Of Ondansetron Hcl Soft Logenzes By Using Natural Sweetner	T.Sravani	Pharmaceuitics	Journal of Interdisciplinary Cycle Research	0022-1945
18	Formulation And Evaluation Of Ondansetron Hcl Soft Logenzes By Using Natural Sweetner	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of Interdisciplinary Cycle Research	0022-1945
19	Simultaneous Estimation Of Metformin Hydrochloride And Glimepiride In Bulk And Tablet Dosage Form By Uv Spectrophotometry	K.Parimala	Pharmaceutical analysis	Journal of interdisciplinary cycle research	0022-1945
20	Simultaneous Estimation Of Metformin Hydrochloride And Glimepiride In Bulk And Tablet Dosage Form By Uv Spectrophotometry	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
21	Stability Indicating RP-HPLC Method For Simultaneous Estimation Of Pitavastatin And Ezetimibe In Pure And Tablet Form	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
22	Pharmaceutical Waste Management	Sk.Aminabee	Pharmacology	Journal of interdisciplinary cycle research	0022-1945

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23	Pharmaceutical Waste Management	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
24	Advance of pharmacology due to intervention of 3D human organs	Sk.Aminabee	Pharmacology	Journal of interdisciplinary cycle research	0022-1945
25	Advance of pharmacology due to intervention of 3D human organs	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
26	Stability-Indicating Rp-Hplc Method For Simultaneous Estimation Of Sofosbuvir, Velpatasvir, And Voxilaprevir In Bulk And Tablet Dosage Forms	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
27	Comparative Study of Anti-arthritic Activity of ethanol Extract of Myxopyrum smilacifolium B. and of Pamburus missionis S	P. Raveesha	Pharmacognosy	Journal of interdisciplinary cycle research	0022-1945
28	Comparative Study of Anti-arthritic Activity of ethanol Extract of Myxopyrum smilacifolium B. and of Pamburus missionis S	A.Lakshmana Rao	Pharmaceuitical chemisrty	Journal of interdisciplinary cycle research	0022-1945
29	Antioxidant Activity of Ethanolic Leaf Extract of *Pamburus missionis* Swingle	P.Raveesha	Pharmacognosy	Journal of Interdisciplinary Cycle Research	0022-1945
30	Antioxidant Activity of Ethanolic Leaf Extract of	A.Lakshmana Rao	Pharmaceutical Chemistry	Journal of Interdisciplinary Cycle Research	0022-1945

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	Pamburus missionis Swingle.				
31	Evaluation of *In-Vitro*&*In-Vivo* Anticoagulant Activity of *Blumea Balsamifera* Leaves.	Sk.Aminabee	Pharmacology	Journal of Interdisciplinary Cycle Research	0022-1945
32	Evaluation of *In-Vitro*&*In-Vivo* Anticoagulant Activity of *Blumea Balsamifera* Leaves.	Dr A Lakshmana Rao	Pharmaceutical Chemistry	Journal of Interdisciplinary Cycle Research	0022-1945
33	Phytochemical and *In-Vitro* Evaluation of Anti-oxidant Activity of *Mansoa alliacea* Leaves	Sk.Aminabee	Pharmacology	Acta Scientific Pharmaceutical Sciences.	2581-5423
34	Phytochemical and *In-Vitro* Evaluation of Anti-oxidant Activity of *Mansoa alliacea* Leaves	Dr A Lakshmana Rao	Pharmaceutical Chemistry	Acta Scientific Pharmaceutical Sciences.	2581-5423
35	Anthelmintic Activity of *Mansoa alliacea* against *Pheretima posthuma*: *In vitro* and *In silico* Approach. *Thai Journal of Pharmaceutical Sciences*.	Sk.Aminabee	Pharmacology	Thai Journal of Pharmaceutical Sciences.	1905-4637
36	Anthelmintic Activity of *Mansoa alliacea* against *Pheretima posthuma*: *In vitro* and *In silico* Approach. *Thai Journal of Pharmaceutical Sciences*.	Dr A Lakshmana Rao	Pharmaceutical Chemistry	Thai Journal of Pharmaceutical Sciences.	1905-4637

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37	*In-silico* Strategies of Some Selected Phytoconstituents from Zingiber officinale as SARS CoV-2 Main Protease (COVID-19) Inhibitos.	Dr A Lakshmana Rao	Pharmaceutical Chemistry	Indian Journal of Pharmaceutical Education and Research	0019-5464
38	*In silico* Identification of Potential Inhibitors from *CInnamon* against Main Protease and Spike Glycoprotein of SARS CoV-2.	Dr A Lakshmana Rao	Pharmaceutical Chemistry	Journal of Biomolecular Structure and Dynamics	1538-0254
39	Isolation of Antibiotic Producing Bacteria from Pond Soil, Gudlavalleru.	A.Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Research in Ayush and Pharmaceutical Sciences.	2456-9909
40	Recent Advances in Cancer Therapy	A. Lakshmana Rao	Pharmaceutical Chemistry	International Journal of Life Science and Pharma Research	2250-0480
41	Recent Advances in Cancer Therapy	Shaik Aminabee	Pharmacology	International Journal of Life Science and Pharma Research	2250-0481
42	In silico Identification of Potential Inhibitors from CInnamon against Main Protease and Spike Glycoprotein of SARS CoV-2	A. Lakshmana Rao	Pharmaceutical Chemistry	Journal of Biomolecular Structure and Dynamics	1538-0254

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Design and Development of Chitosan Polycaprolactone Nanoparticles of Ritonavir

Swapna Velivela[1*], Nikunja Basini Pati[1], Ravindra Babu Baggi[1] & Lakshmana Rao Atmakuri[2]

Abstract: *Polymeric nanoparticles have been considered as promising drug delivery systems for variety of drugs like anticancer agents, biological macromolecules and vaccines. Various polymers have been used in the formulation of nanoparticles for drug delivery research to increase therapeutic benefit, while minimizing the side effects. Nanoparticles mediated targeting plays an important role in inhibiting inflammation, angiogenesis and tumor progression. Especially polymeric nanoparticles have greater deal that provides numerous properties such as simple to synthesize, inexpensive biocompatible, biodegradable, non-toxic, non-immunogenic and water soluble for an effective drug delivery and drug targeting. The main applications of nanotechnology in medicine are materials and devices for diagnosis and for drug delivery.*

The aim of this study is to formulate the Ritonavir loaded nanoparticles of polycaprolactone chitosan, cross linked with Tween 80 for antiretroviral therapy, in order to enhance the bioavailability and to reduce the dose frequency. Formulations of Ritonavir loaded nanoparticle were prepared by double emulsion solvent evaporation and solvent diffusion methods. Fourier transmission infrared spectroscopy studies indicated no chemical interaction between drug and polymer. In vitro release studies were performed by the dialysis membrane method. All the drug loaded batches were followed first order and sustained drug release over a period of 24 hrs.

Introduction

Nanoparticles are colloidal polymeric particles of sizes below 1cm with a therapeutic agent either disposed in a polymeric matrix or encapsulated in polymer[1-2]. The term polymeric particles have been used for this purpose such as poly(lactic acid), poly(glycolic acid), polycaprolactone, polysaccharides, proteins and polypeptides depending on the type of material or carrier used[3]. Polymeric nanoparticles offer a promising solution by encapsulation chemotherapy of drugs and have been shown to reduce toxicity by providing a protective housing for the drug that limits its interaction with healthy cells[4]. As a result the pharmacokinetic properties of the particles stay as long as the drug entrapped within the carrier until the release is desired. The potential benefits of such delivery devices include controlled and long term release rates; prolonged bioactivity, reduced side effects, increase patient compliance due to decreased administration frequency and the ability to codeliver multiple drugs with synergistic effects at the same site[5-7].

Most anti-viral drugs which are in use suffers drawbacks of frequent administration, short half-life, peak plasma concentration fluctuations, high first pass metabolism which leads to low patient compliance. There is always a need of development of controlled and sustained drug delivery systems with site specificity to achieve effective plasma concentration without significant plasma drug concentration fluctuations.

Ritonavir is a protease used as antiretroviral agent for the treatment of HIV-infection alone or in combination with other protease inhibitors[8]. Biological half-life of Ritonavir is 3-5 hours, leads to higher peak plasma concentration fluctuations in the form of conventional dosage form. Moreover it is primarily absorbed from stomach[9]. Preparation and evaluation of nanoparticles Ritonavir was done for improving the drug bioavailability by prolongation of gastric residence time.

[1]Pulla Reddy Institute of Pharmacy, Domadugu (V), Gummadidala (M), Sangareddy District, Telangana., [2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru (P & M), Krishna District, Andhra Pradesh. *Email: swapna.velivela@gmail.com*

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Review Article

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OBSESSIVE COMPULSIVE DISORDER AND ITS CARE-REVIEW

Shaik Aminabee*, Dasari Durga Jayashree and Atmakuri Lakshmana Rao

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

ABSTRACT

Obsessive-compulsive disorder (OCD) features a pattern of unreasonable thoughts and fears (obsessions) that lead you to do repetitive behaviours (compulsions). These obsessions and compulsions interfere with daily activities and cause significant distress. You may try to ignore or stop your obsessions, but that only increases your distress and anxiety. Ultimately, you feel driven to perform compulsive acts to try to ease your stress. Despite efforts to ignore or get rid of bothersome thoughts or urges, they keep coming back. This leads to more ritualistic behaviour, the vicious cycle of OCD. OCD often centres on certain themes. To ease your contamination fears, you may compulsively wash your hands until they're sore and chapped. If you have OCD, you may be ashamed and embarrassed about the condition, but treatment can be effective.

Keywords: Obsessive compulsive disorder, Serotonin, Anti-depressant and Abnormal behaviour.

INTRODUCTION

If anyone who is constantly or repetitively involved in excessive, unreasonably behaviours like cleaning, hand washing or rearranging. Then that person is suffering from obsessive compulsive disorder (OCD). It is a psychiatric & chronic disorder characterized by obsessive thoughts and compulsive actions, such as cleaning, checking, counting, or hoarding. Obsessive compulsive disorder (OCD), one of the anxiety disorders. OCD occurs in a small percentage of populations worldwide in every culture. The individual who suffers from OCD pattern behaviour senseless and distressing but extremely difficult to overcome (Jenike, 2004). Often the person carries out the behaviours to get rid of the obsessive thoughts. But this only provides short-term relief. Not doing the obsessive rituals can cause great anxiety and distress. OCD is related to anxiety and intrusive thoughts (obsessions) that often result in repetitive behaviour (compulsions). Well many of us do suffer from mild form of this where we realize that our behaviours are little abnormal or stupid but these behaviours can be controlled voluntarily. Obsessions are persistent and recurrent thoughts that cause emotional distress, such as disgust or anxiety (Lysaker et al., 2000). Many OCD sufferers realize that their actions are unreasonable, but are unable to gain control through logic or reasoning.

Examples of obsessions include: Fear of contamination or germs, an irrational need for symmetry or order and aggressive thoughts about oneself or others.

Compulsions are mental urges to repeat certain behaviours to reduce or prevent a feared situation. In the most severe cases, this ritualistic repetitive behaviour may fill the day, making it impossible to perform other routines (Kessler et al., 2005). Examples of compulsions include: Excessive hand washing or cleaning and arranging and rearranging objects in a specific way etc.

These behaviours generally are intended to ward off harm to the person with OCD or others. Some people with OCD have regimented rituals while others have rituals that are complex and changing. Performing rituals may give the person with OCD some relief from anxiety, but it is only temporary. The old belief that OCD was the result of life experiences has been weakened by the growing evidence that biological factors are a primary contributor to the disorder. The fact that OCD patients respond well to specific medications that affect the neurotransmitter serotonin suggests he disorder has a neurobiological basis. This OCD can also have seen in teen (Angst et al., 2005). Actually, the

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(RESEARCH ARTICLE)

Simultaneous estimation of naltrexone and bupropion in pharmaceutical dosage form by using UV spectroscopy

Sai datri A *, Lakshmana rao A , Ramnadh B , Valli devi B , Dhana lakshmi CH and Vikas CH

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

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Abstract

A sensitive and validated method has been developed for simultaneous estimation of Naltrexone and Bupropion in pharmaceutical dosage form by using UV Spectroscopy, without prior separation, by four different techniques (Simultaneous Equation, Absorbance Ratio method, Dual Wavelength Method and Derivative Spectroscopic Method). The work was carried out on Shimadzu electron UV1800 double beam UV-Visible spectrophotometer. The absorption spectra of reference and test solutions were carried out in 1 cm matched quartz cell over the range of 200 - 400 nm. The linearity ranges for Naltrexone and Bupropion were 2-10 µg/ml. The results of the analysis have been validated statistically and by recovery studies. The proposed procedures are rapid, simple, require no preliminary separation steps and can be used for routine analysis of both drugs in quality control laboratories.

Keywords: Naltrexone; Bupropion; UV spectroscopy; Validation

1. Introduction

Chemically, Naltrexone (Figure 1) is (1S,5R,13R,17S)-4-(*cyclopropylmethyl*)-10,17-*dihydroxy*-12-oxa-4-aza *pentacycl* [9.6.1.$0^{1,13}$.$0^{5,17}$.$0^{7,18}$]*octadeca*-7(18),8,10-trien-14-one [1]. It is a derivative of noroxymorphone that is the N-cyclopropylmethyl congener of Naloxone. It is a narcotic antagonist that has been proposed for the treatment of heroin addiction. The FDA has approved Naltrexone for the treatment of alcohol dependence.

Chemically, Bupropion (Figure 1) is 2-(*tert-butylamino*)-1-(3-chlorophenyl) *propan*-1-one [2]. It is a norepinephrine/dopamine-reuptake inhibitor. It is used most commonly for the management of Major Depressive Disorder, Seasonal Affective Disorder and as an aid for smoking cessation. Thus, the two drugs have effects on two separate areas of the brain involved in the regulation of food intake: the hypothalamus (appetite regulatory center) and the mesolimbic dopamine circuit (reward system) and combinational intake of these two medicines helps in chronic weight management [3].

Literature survey reveals that some Spectrophotometric [5] and HPLC [4-8] methods have been reported for the estimation of Naltrexone and Bupropion in pharmaceutical formulations.

The aim of this paper was to explore the possibility of using techniques of simultaneous equation method, dual wavelength method, isosbestic point method and derivative spectroscopic method for quantifying Naltrexone and Bupropion simultaneously in their mixture forms. The proposed methods are simple, convenient, precise, accurate, and economical than the reported method and validated as per ICH guidelines [7].

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

* Corresponding author
E-mail address: Sai.dhatri_arige@yahoo.co.in

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* Corresponding author
E-mail address: Sai.dhatri_arige@yahoo.co.in

Original Article

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Synthesis and Insilico Characterization of Some Novel 3,4 -Dihydropyrimidin -2-(1h)-Thione Derivatives

B Satya Sree[1], A Lakshmana Rao[2], B Smiley[3], BC Lakshmanjee[4], G Rajesh[5], K Bhargavi[6]

[1]Associate Professor, [2]Professor and Principal, [3-6]Students, Department of Pharmaceutical Chemistry, Vallabhaneni Venkatadri Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

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Abstract

Various novel 3,4-dihydropyrimidin-2-(1H)-thione derivatives were prepared by using substituted benzaldehydes, ethylacetoacetate and thiourea in the presence of ammonium molybdate and acetic acid at a temperature of 80-90°C to give corresponding titled compounds in good yields. The synthesized compounds were characterized by physical properties and spectral studies (IR, 1H-NMR) and for all the titled compounds physical data like LogP values and biological properties were predicted by using molinspiration soft ware.

Keywords: Substituted benzaldehydes, ethylacetoacetate, thiourea, ammonium molybdate and acetic acid.

Introduction

Heterocyclic systems possessing pyrimidine moiety exhibit a number of interesting biological activities such as antiviral, antimicrobial[1,2] anti-fungal,[3] anti-inflammatory, analgesic[4] diuretic and anticonvulsant activities. It is also evident from the literature that dihydropyrimidinones are equally important in terms of pharmacological activities such as calcium channel blockers[5] antifungal and antihypertensive agent.[6] Racemic dihydropyrimidinone is reported to be an allosteric inhibitor of human kinesin and unlike taxanes, it is nontoxic to neuron cells.[7]

Therefore, it seems promising to synthesize some new substituted 3,4-dihydropyrimidin-2-(1H)-thiones using compounds like urea, ethylacetoacetate and aromatic aldehydes like tolualdehyde, benzaldehyde, etc. We present here our results on the design of newly substituted 3,4-dihydropyrimidin-2-(1H)-thiones emphasizing in particular the presence of aromatic nucleus at the 4th position of 3,4-dihydropyrimidine ring with benzaldehyde, 4-methylbenzaldehyde, 4-hydroxybenzaldehyde, 4-methoxybenzaldehyde and 4-flourobenzaldehyde.

Aim and objectives:

- ✓ The heterocyclic derivatives possess a wide range of biological properties and they act as anthelmintic, antitumor, analgesic, anticancer, antiinflammatory, antibacterial and antifungal activity.
- ✓ Our aim is to synthesize the title compounds viz. 5-ethoxycarbonyl-6-methyl-4-phenyl-3,4-dihydropyrimidin-2(1H)-thione derivatives, by following the scheme mentioned in the experimental part.
- ✓ To characterize all the synthesized compounds by physical (Molecular weight, Molecular formula, Melting point, Recrystallization, Rf value) and spectral data.

Corresponding Author: B. Satya Sree, Associate Professor, Department of Pharmaceutical Chemistry, Vallabhaneni Venkatadri Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

Email: satyasree.bandaru@gmail.com

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Email: satyasree.bandaru@gmail.com

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ORIGINAL ARTICLE

In Vivo Antioxidant Activity of Different Fractions of *Indigofera Barberi* Against Paracetamol-induced Toxicity in Rats

Sıçanlarda Parasetamol ile İndüklenen Toksisiteye Karşı *Indigofera Barberi*'nin Farklı Fraksiyonlarının *İn Vivo* Antioksidan Aktivitesi

Shaik AMINABEE[1]*, Atmakuri Lakshmana RAO[1], Maram Chinna ESWARAIAH[2]

[1]V. V. Institute of Pharmaceutical Sciences, Department of Pharmacology, Gudlavalleru, India
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ABSTRACT

Objectives: To evaluate the *in vivo* antioxidant activity of chloroform extract fractions of *Indigofera barberi* (whole plant) against paracetamol-induced toxicity in rats.

Materials and Methods: For 7 days, rats were treated with different chloroform extract fractions and toxicity was induced with a single dose of paracetamol by intraperitoneal injection. The group of animals pretreated with 100 mg/kg p.o of fraction D of *Indigofera barberi* improved significantly in terms of hepatic superoxide dismutase (SOD), catalase and peroxidase activities, and glutathione levels compared to the control group.

Results: The hepatic SOD, catalase, peroxidase activities, and glutathione levels in the animal groups treated with paracetamol were 33.6±0.09 µ/mg protein, 5.5±0.23 µ/mg protein, 0.131±0.15 µ/mL, and 46.1±5.81 µM, respectively. Hepatic SOD, catalase, peroxidase, and glutathione in the fraction D treated group were 61.8±0.07 µ/mg protein, 10.6±0.16 µ/mg protein, 0.913±0.23 µ/mL, and 87.6±1.4 micro molar, respectively. Therefore, the present study revealed that fraction D of *Indigofera barberi* has significant in vivo antioxidant activity and can be used to protect tissue from oxidative stress.

Conclusion: From the results, fraction D of *Indigofera barberi* at a dose of 100 mg/kg, p.o., improved the SOD, catalase and peroxidase activities, and glutathione levels significantly. Based on this study, we can conclude that fraction D of *Indigofera barberi* possesses *in vivo* antioxidant activity and can be employed in protecting tissue from oxidative stress.

Key words: *Indigofera barberi*, paracetamol, silymarin, radical scavenging

ÖZ

Amaç: Sıçanlarda parasetamol ile indüklenen toksisiteye karşı *Indigofera barberi*'nin (tüm bitki) kloroform ekstre fraksiyonlarının *in vivo* antioksidan aktivitesinin belirlenmesi.

Gereç ve Yöntemler: Yedi gün boyunca sıçanlara farklı kloroform ekstrakları uygulanmıştır ve toksisite intraperitoneal tek doz parasetamol uygulaması ile indüklenmiştir. 100 mg/kg p.o. fraksiyon D ile ön uygulaması alan hayvanlar hepatik süperoksit dismutaz (SOD), katalaz ve peroksidaz aktiviteleri ve glutatyon düzeyleri açısından kontrol grubuna göre belirgin bir şekilde iyileşmişlerdir.

Bulgular: Parasetamol uygulanan grupta hepatik SOD, katalaz, ve peroksidaz aktiviteleri ve glutatyon düzeyleri sırasıyla 33,6±0,09 µ/mg protein, 5,5±0,23 µ/mg protein, 0,131±0,15 µ/mg protein ve 46,1±5,81 µM olarak bulunmuştur. Fraksiyon D uygulanan grupta hepatik SOD, katalaz ve peroksidaz aktiviteleri ve glutatyon düzeyleri sırasıyla 61,8±0,07 U/mg protein, 10,6±0,16 µ/mg protein, 0,913±0,23 µ/mg protein ve 87,6±1,4 µM bulunmuştur. Bu nedenle, bu çalışma *Indigofera barberi*'de elde edilen fraksiyon D'nin belirgin bir *in vivo* antioksidan aktivitesi olduğunu ortaya koymuştur ve dokuyu oksidatif stresten korumak için kullanılabilir.

Sonuç: Bu sonuçlar, 100 mg/kg, p.o. dozda *Indigofera barberi*'den elde edilen fraksiyon D, SOD, atalaz ve peroksidaz aktiviteleri ve glutatyon düzeylerini belirgin bir şekilde düzeltmiştir. Bu çalışmaya dayanarak, *Indigofera barberi*'den elde edilen fraksiyon D'nin *in vivo* antioksidan aktivitesinin olduğu sonucuna varabiliriz ve dokuyu oksidatif stresten korumak için kullanılabileceği söylenebilir.

Anahtar kelimeler: *Indigofera barberi*, parasetamol, silimarin, radikal süpürücü

*Correspondence: E-mail: aminaammi786@gmail.com, Phone: +949158458 ORCID-ID: orcid.org/0000-0001-9218-1997
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Anahtar kelimeler: *Indigofera barberi*, parasetamol, silimarin, radikal süpürücü

*Correspondence: E-mail: aminaammi786@gmail.com, Phone: +949158458 ORCID-ID: orcid.org/0000-0001-9256-0597
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ORIGINAL ARTICLE

Development and Validation of a Stability Indicating RP-HPLC Method for Simultaneous Estimation of Teneligliptin and Metformin

Teneligliptin ve Metformin Eş Zamanlı Tahmininde RP-HPLC Yöntemini Gösteren Stabilitenin Gelişimi ve Doğrulanması

Rajani VETAPALEM[1]*, Rajendra Prasad YEJELLA[2], Lakshmana Rao ATMAKURI[3]

[1]Acharya Nagarjuna University, Department of Biotechnology, Nagarjuna Nagar, India
[2]University College of Pharmaceutical Sciences, Department of Pharmaceutical Chemistry, Andhra University, Visakhapatnam, India
[3]Vallabhaneni Venkatadri Institute of Pharmaceutical Sciences, Department of Pharmaceutical Analysis, Gudlavalleru, India

ABSTRACT

Objectives: The main objective of the present work is to develop a simple, precise, specific and stability method indicating reverse phase high performance liquid chromatography method for simultaneous estimation of teneligliptin and metformin in bulk and tablet dosage form.

Materials and Methods: The analysis was performed with a Kromasil C18 column (250×4.6 mm, 5 µm) at 30°C using buffer: acetonitrile: methanol (65:25:10, v/v/v) as mobile phase. The detection was carried out with a flow rate of 1.0 mL/min at 254 nm.

Results: The retention time of teneligliptin and metformin was 2.842 min and 2.017 min, respectively. The linearity range was 5-30 µg/mL for teneligliptin and 125-750 µg/mL for metformin. The forced degradation studies were performed as per the guidelines of the The International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use under acidic, alkaline, oxidative, thermal, photostability, and neutral conditions.

Conclusion: This method was successfully validated for all the parameters and could detect the the correct amounts of active drug substance in formulations that are available in the market. This developed method in the present study could be successfully employed for the simultaneous estimation of teneligliptin and metformin in bulk and tablet dosage form.

Key words: Teneligliptin, metformin, RP-HPLC, validation, stability studies

ÖZ

Amaç: Bu çalışmanın temel amacı, teneligliptin ve metformini bulk ve tablet dozaj formunda eş zamanlı belirlemek için kolay, kesin, özgün ve kararlı bir ters faz yüksek performanslı sıvı kromatografisi yöntemi geliştirmektir.

Gereç ve Yöntemler: Analiz, hareketli faz olarak tampon: asetonitril: metanol (65:25:10, h/h/h) kullanılarak 30°C'de Kromasil C18 kolonu (250×4,6 mm, 5 µm) kullanılarak gerçekleştirilmiştir. Saptama 1,0 mL/dak akış hızında 254 nm'de gerçekleştirilmiştir.

Bulgular: Teneligliptin ve metformin alıkonma süresi sırasıyla 2,842 dk ve 2,017 dk olarak bulunmuştur. Doğrusallık aralığı, teneligliptin için 5-30 µg/mL ve metformin için 125-750 µg/mL'dir. Zorunlu bozunma çalışmaları asit, alkali, oksidatif, termal, fotostabilite ve nötr koşullar altında Beşeri İlaçlar için Teknik Gereksinimlerin Uyumlaştırılması Uluslararası Konseyi'nin kılavuzlarına göre yapılmıştır.

Sonuç: Bu yöntemdeki tüm parametreler başarıyla doğrulanmıştır ve yöntem piyasadaki formülasyonlardaki etkin maddelerin doğru miktarlarını belirleyebilir bulunmuştur. Bu çalışmada geliştirilen yöntem, teneligliptin ve metforminin hammadde ve tablet dozaj formunda eş zamanlı tahmini için başarıyla kullanılabilir.

Anahtar kelimeler: Teneligliptin, metformin, RP-HPLC, validasyon, stabilite çalışmaları

*Correspondence: E-mail: rajanivetapalem13@gmail.com, Phone: +08674275113 ORCID-ID: orcid.org/0000-0003-0998-3608
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Original Article

In vitro Anthelmintic Impact of Various Extracts of *Pavetta tomentosa* Root on *Pheretima posthuma* and *in-silico* Molecular Docking Evaluation of some Isolated Phytoconstituents

Dintakurthi Sree Naga Bala Krishna Prasanth[1,*], Siva Prasad Panda[2], Atmakuri Lakshmana Rao[3], Nayudu Teja[4], Veenam Bhavya Naga Vani[3], Tera Sandhya[5], Pathange Bharghava Bhushan Rao[4]

[1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, INDIA.
[2]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, INDIA
[3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, INDIA.
[4]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, INDIA.
[5]Department of Pharmacology, Institute of Pharmaceutical technology, Sri Padmavati Manila Visvavidyalayam, Tirupati, Andhra Pradesh, INDIA.

ABSTRACT

Background: The current study assesses the anthelmintic impact of root extracts of *Pavetta tomentosa* on *Pheretima posthuma* compiled by molecular docking analysis of phytocompounds steemed from the plant with the β-Tubulin (PDB ID: 1SA0). **Methods:** In this study, *P. tomentosa* root was subjected to extraction using methanol and water. *In vitro,* anthelmintic activity was assessed by utilizing the *Pheretima posthuma* and *in silico* molecular docking was executed making use of Autodock 4.0. **Results:** The outcomes revealed that the methanolic extract has the most significant dose-dependent anthelmintic activity at various doses, followed by aqueous extracts of root. Amongst all the substances, β-eudesmol revealed the most effective docking rating of -6.53, which is nearer to Albendazole, i.e., -6.79, ensuring that β-eudesmol has a strong binding fondness in between protein and ligand. **Conclusion:** From the examinations, a conclusion can be drawn that the anthelmintic activity of *P. tomentosa* root in both *in vitro* and *insilico* assays. The information sustains β-eudesmol to be a useful anthelmintic compound beneficial to future clinical examinations.

Key words: *In-silico*, Autodock 4.0, *Pavetta tomentosa,* β-eudesmol, Albendazole, ADME/T.

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Correspondence:
Dr. Dintakurthi Sree Naga Bala Krishna Prasanth
Associate Professor, Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram -522 502, Guntur, Andhra Pradesh, INDIA.
Phone: +91 7382027437
E-mail: dsnbkprasanth@kluniversity.in

INTRODUCTION

Considering that the beginning of the human world, alternative medicine with healing has been made use of in the therapy of numerous disorders.[1] According to the WHO, eighty percentile of the populace of a few Asian countries rely on conventional medicine in their day-to-day elements of healthcare.[2] About twenty-five percentile of the arbitrary drugs consist of plant-derived components and also about 120 active constituents are presently made use of in pharmaceutical products.[3]

The last fifty years of research study has offered a couple of medications made use of to treat human helminthiases infection; nevertheless, in lasting usage, lots of parasites are revealing resistance to these medications. The factor given for the reduced activity can be either due to the heritable changes (epigenetic or genetic) lack of ability of anthelmintic versus a populace of parasites or decrease in time to which medical therapy uses its impact. The usage of the plant can play an essential function in antihelmintic drug-target recognition.[4,5]

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Original Article

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[2]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, INDIA
[3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, INDIA.
[4]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, INDIA.
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Correspondence:
Dr. Dintakurthi Sree Naga Bala Krishna Prasanth
Associate Professor, Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram -522 502, Guntur, Andhra Pradesh, INDIA.
Phone: +91 7382027437
E-mail: dsnbkprasanth@kluniversity.in

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PHARMACOGNOSTICAL STUDY AND PRELIMINARY PHYTOCHEMICAL INVESTIGATION OF *DECHASCHISTIA CROTONIFOLIA WIGHT & ARN.*

Raveesha Peeriga *, Atmakuri Lakshmana Rao, G. Ooha Deepika, G. Divya, Ch. Monika, G. Bhargavi

V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

*Corresponding author E-mail: **drprsha@gmail.com**

ARTICLE INFO

Key Words

Dechaschistia crotonifolia Wight & Arn., flavonoids, Libriform, Stellate Trichomes.

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ABSTRACT

Dechaschistia crotonifolia Wight & Arn. (Ebaenaceae) is commonly grown in the deciduous forests of penincular India. The name *Dechaschistia* is derived from Greek word "deka" meaning ten and "schistos" meaning cleft as it consists of 10 celled locucidal capsule Genus. The current study is to evaluate pharmacognostical aspects and preliminary analysis of chemical constituents along with physical parameters findings of stem and root of *Dechaschistia Crotonifolia Wight & Arn.* to establish the standardization of this particular plant. Pharmacognostical examination was carried out in terms of macroscopical and microscopical aspects. Preliminary phytochemical investigation was carried over for the presence of primary and secondary metabolites and physical parameters were also evaluated viz., Ash values, extractive values, foreign organic matter, crude fibre content etc., The structural features of stem and root of *Dechaschistia crotonifolia Wight & Arn.* were figured out. The preliminary phytochemical examination revealed the presence of flavonoids, steroids and other inorganic compounds. The physical parameters were examined like ash values (6.4%), Acid insoluble ash (1.5%), water soluble ash (3.2%), moisture content (8.1%) and crude fibre content (3.4%). The pharmacognostical findings of *Dechaschistia Crotonifolia Wight & Arn.* helps to pursue the research in the way of ethanobotanical aspects and phytochemical study helps to ensure the quality and minimizes the adulteration the crude drug.

INTRODUCTION

Plant materials remain an important component in combating serious diseases in the world; for the therapeutic approach to several pathologies. Interest in medicinal plants has been overwhelming in the recent times especially as an important source of medication/health care. By 2000, World Health Organization had assessed that 80% of inhabitants of the world were estimated who were only relies on traditional medicines for the needs of primary health care and it also presumed that the major portion of traditional Healing involves by utilizing the extracts or active constituents of plants [1]. The Trinorcadalenes, parviflorals A and B (1 and 2), and four bis-trinorcadalenes, parviflorals C–F (3–6), together with the known trinorcadalenes, syriacusins, scopoletin and stigmasterol were isolated from roots of Decaschistia parviflora . Their structures were established by spectroscopic techniques and further their structures were confirmed by a single-crystal X-ray crystallographic analysis [2].

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Research Article

SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF MANNICH BASES CONTAINING MORPHOLINE MOIETY

D.Alekhya*, A.Lakshmana Rao, D.Prasanth, D.V.S.Girija Sowmya, Ch.Vijaya Lakshmi, Ch. Raja

*Department of Pharmaceutical Chemistry, V.V.Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh.

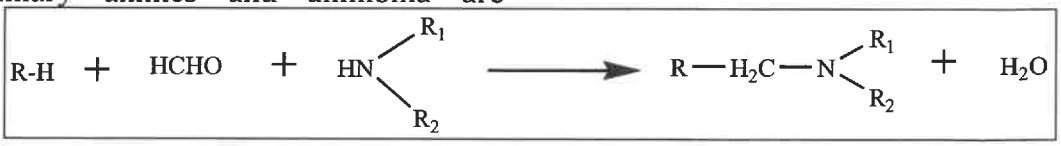
Keywords: 4-nitro acetophenone, substituted benzaldehydes, morpholine, mannich reaction, in vitro antibacterial activity.

ABSTRACT

A variety of morpholine derivatives as mannich bases were prepared through mannich reaction by reacting 4-nitro acetophenone as compound containing active hydrogen, substituted benzaldehyde and morpholine as secondary amine compound. All the synthesized compounds structures were characterized by physical analysis data and spectral analysis data (IR and ^{1}H-NMR spectral analysis). The newly synthesized compounds were evaluated for their antibacterial activity against *Staphylococcus aureus, Bacillus subtilis, Escherichia coli and Pseudomonas aeruginosa* in comparision with standard drug Streptomycin. However the antibacterial activity of the synthesized compounds against the tested organisms was found to possess good to moderate activity.

INTRODUCTION

The mannich reaction is an example of nucleophilic addition of an amine to a carbonyl group followed by dehydration to the schiff base. The mannich reaction is also considered as a condensation reaction. In the mannich reaction, primary or secondary amines or ammonia, are employed for the activation of formaldehyde. The mannich reaction is a three component condensation reaction in which a compound containing an active hydrogen atom is allowed to react with formaldehyde and an amine derivative. Secondary amines rather than primary amines and ammonia are employed; the resulting product (mannich base) is an amine compound having the N atom linked to the R substrate through a methylene group. The mannich reaction can be presented by the following reaction. The essential feature of the reaction is the replacement of the active hydrogen atom by an aminomethyl or substituted aminomethyl group. The R-H moiety symbolizes the active hydrogen component which includes ketones, aldehydes, acids, esters, phenols, acetylenes, α-picolines, nitroalkanes and quinolines.



Mannich bases have gained importance due to their application in antibacterial activity[1,2] and other applications are in agro chemicals such as plant growth regulators[3]. Moreover N-bridged heterocyclic derivatives show important antibacterial activity[4]. The aminoalkylation of aromatic substrates by the Mannich reaction is of considerable importance for the synthesis and modification of biologically active compounds[5]. Mannich bases have several biological activities such as antimicrobial[6] and anticancer[7]. Morpholine derivatives were

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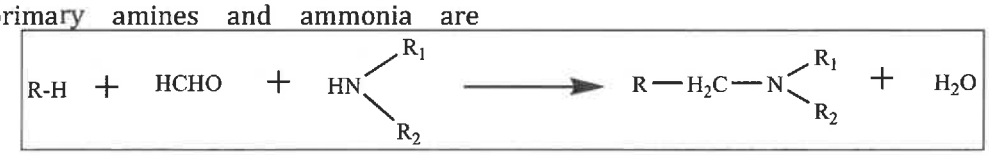

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T. Sravani*, A. Lakshmana Rao, T. Kundana, T. Monika,
V.B.S. Mounika, V. Lokesh Kumar, CH. Joshi

1Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Abstract:

In the present investigation an attempt was made to formulate the medicated lozenges of ondansetron hydrochloride. Ondansetron hydrochloride was used to treat chemotherapy induced nausea and vomiting. Although several formulations were available in the market, still there is a need of more variant dosage forms which acts more effectively. The benefits of the present work are to increase oral bioavailability of the drug by increasing the retention time of dosage form. The lozenges were prepared by heating and congealing method by employing poly ethylene glycol 1500 as matrix base, stevia (natural sweetner), xanthan gum (polymer), sodium carboxy methyl cellulose (polymer), hydroxy propyl methyl cellulose K100M (polymer) along with other excipients. The prepared medicated lozenges were characterized for drug content uniformity, hardness, weight variation, thickness, friability, *in-vitro* disintegration and dissolution by pharmaceutical standard methods. Accelerated stability studies were conducted as per ICH guidelines, it was found that there wasn't any substantial interaction between the drug and excipients. Formulation was tested for drug excipient interaction by subjecting to IR spectral analysis. Accelerated stability studies were carried out as per ICH guidelines for some selected formulations, which indicated that these formulations were stable at accelerated storage conditions.

Keywords: Lozenges, Ondansetron HCl, Antiemetic, Stevia, Chemotherapy.

Address for correspondence:
Ms. T. Sravani, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.
E-mail: sravanibpharm2011@gmail.com,
Phone number: 9705434807

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

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Address for correspondence:
Ms. T. Sravani, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.
E-mail: sravanibpharm2011@gmail.com,
Phone number: 9705434807

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

SIMULTANEOUS ESTIMATION OF METFORMIN HYDROCHLORIDE AND GLIMEPIRIDE IN BULK AND TABLET DOSAGE FORM BY UV SPECTROPHOTOMETRY

K. Parimala[1]*, A. Lakshmana Rao[2], K. Navya[3], K. Sai prasanna[4], K.. Jony Susanna[5] & K. Sravani[6]

[1]Assistant Professor, [2]Professor and Principal, [3-6]Student, Department of Pharmaceutical Analysis

V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

*Corresponding Author

E-mail: kolliparimala@gmail.com

Abstract:

A simple, accurate, rapid and precise UV Spectrophotometric method has been developed using 0.1N sodium hydroxide as a solvent for the simultaneous estimation of Metformin Hydrochloride (MET) and Glimepiride (GMP) in pharmaceutical dosage form. Metformin hydrochloride exhibits absorption maximum at 231 nm and Glimepiride shows absorption maximum at 227 nm. The Linearity was observed in the concentration range of 2-10 µg/ml for MET and GMP. The precision of method was determined by performing intra-day and inter-day study. The accuracy of method was confirmed by recovery studies. The analytical method was validated for various parameters as per ICH guidelines. The proposed method was found to be simple and can be used for the routine analysis for estimation of MET and GMP in bulk and tablet dosage forms.

Key words: Metformin Hydrochloride, Glimepiride, UV Spectrophotometry, Estimation, Dosage form

INTRODUCTION

Metformin hydrochloride (Fig. 1) is chemically N,N-dimethyl-imidodicarbonimidic diamide, monohydrochloride. It is an oral anti hyperglycemic agent, indicated for the treatment of type-2 diabetes, polycystic ovarian syndrome. Metformin decreases blood glucose levels by decreasing hepatic glucose production, decreasing intestinal absorption of glucose, and improving insulin sensitivity by increasing peripheral glucose uptake and utilization. These effects are mediated by the initial activation by Metformin of AMP-activated protein kinase (AMPK), a liver enzyme that plays an important role in insulin signaling, whole body energy balance, and the metabolism of glucose and fats. Activation of AMPK is required for Metformin's inhibitory effect on the production of glucose by liver cells.

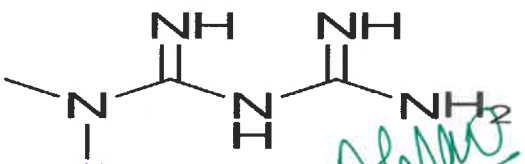

Fig. 1: Molecular Structure of Metformin

SIMULTANEOUS ESTIMATION OF METFORMIN HYDROCHLORIDE AND GLIMEPIRIDE IN BULK AND TABLET DOSAGE FORM BY UV SPECTROPHOTOMETRY

K. Parimala[1]*, A. Lakshmana Rao[2], K. Navya[3], K. Sai prasanna[4], K.. Jony Susanna[5] & K. Sravani[6]

[1]Assistant Professor, [2]Professor and Principal, [3-6]Student, Department of Pharmaceutical Analysis

V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

*Corresponding Author

E-mail: kolliparimala@gmail.com

Abstract:

A simple, accurate, rapid and precise UV Spectrophotometric method has been developed using 0.1N sodium hydroxide as a solvent for the simultaneous estimation of Metformin Hydrochloride (MET) and Glimepiride (GMP) in pharmaceutical dosage form. Metformin hydrochloride exhibits absorption maximum at 231 nm and Glimepiride shows absorption maximum at 227 nm. The Linearity was observed in the concentration range of 2-10 µg/ml for MET and GMP. The precision of method was determined by performing intra-day and inter-day study. The accuracy of method was confirmed by recovery studies. The analytical method was validated for various parameters as per ICH guidelines. The proposed method was found to be simple and can be used for the routine analysis for estimation of MET and GMP in bulk and tablet dosage forms.

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INTRODUCTION

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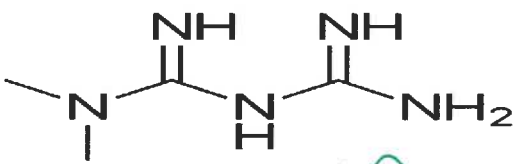

Fig. 1: Molecular Structure of Metformin

Stability Indicating RP-HPLC Method for Simultaneous Estimation of Pitavastatin and Ezetimibe in Pure and Tablet Form.

Sharmila Donepudi[1]*, Sai Vani M S Pachigolla[2], Lakshmana Rao Atmakuri[3]

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P – 521356.

Corresponding Author:

Dr. Sharmila Donepudi,

Associate Professor,

Department of Pharmaceutical Analysis,

V. V. Institute of Pharmaceutical Analysis,

Gudlavalleru- 521356

E-mail: drdsanalysis@gmail.com

Contact no: 8106737153.

Abstract:

Hyperlipidemia is one of the clinical conditions mainly associated with coronary heart disease.Use of Statins in combination with Ezetimibe proven to give better results in treatment of said conditions. The present work aims to develop a simple accurate and sensitive stability indicating method for estimation of Pitavastatin and Ezetimibe in pharmaceutical dosage form.The separation was achieved by using X-Bridge Phenyl (150×3.5µ, 4.6mm) column with a mobile phase consisting of 0.1% Formic acid and Methanol (30:70). The separation was monitored for 8min at 250nm using 1ml/min flow rate.The developed method was validated as per ICH Q2 (R1) guidelines. The method was linear over a concentration rangeof 1 to 15ppm and 5 to 75ppmfor Pitavastatin and Ezetimibe respectively and correlation coefficient was found to be 0.999 for the drugs.HPLC method developed for estimation of selected drugs in pure and have shown satisfactory, accurate and reproducible results (without any interference of recipients) as well, it is deduced that the

PHARMACEUTICAL WASTE MANAGEMENT

Sk. Aminabee[1], A. Lakshmana Rao[2], Alimunnisa[3], Shabana Begum[4], V.Bhavya Naga Vani[5], Abdul Shakira[6], Joshi[7].

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[3, 4, 5] Department Of Pharmaceutical Analysis, V.V.Institute Of Pharmaceutical Sciences, Gudlavalleru.

[6,7]Department of Pharmacy, V.V.Institute of Pharmaceutical Sciences, Guldavalleru.

ABSRACT: Pharmaceutical waste is any waste that contains medicinal drugs that are expired, unused, contaminated damaged or no longer needed and need to be disposed appropriately. Pharmaceutical waste management is essential in order to protect the humans and environment from the hazardous compounds. We need to find out the sources of these wastes and proper implementation of disposal procedures is also essential. Various disposal procedures are available for different pharmaceuticals and implement proper methods of disposal for it complete removal. Proper regulation of household Pharmaceutical waste is also quite essential. All multidisciplinary stake holders, government, NGO's, physician, pharmacist, patient, and public should work together to reduce burden of unused and expired medicine on environment.

KEY WORDS: Pharmaceuticals, disposal, methods, expired, house hold, contamination, environment and humans.

I. INTRODUCTION:

Pharmaceutical waste is potentially generated thorough a wide variety of activities is a health care facility including expired, unused, split and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed appropriately. The category includes discarded items such as bottles or boxes with residues, syringes, gloves, masks, and drug vials [1].

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Advance of pharmacology due to intervention of 3D human organs

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[6,7]Department of Pharmacy, V.V.Institute Of Pharmaceutical Sciences, Gudlavalleru.

Abstract

3D organ models have gained attention in preclinical testing systems and in the alternative to animal testing. 3D printing is new, rapid expanding in health care system and many other areas. The development of human organ models is still in its minor state. Although have major drawbacks such as expensive and controversy over predictive value of various human conditions. The number of animals used in research has increased with the advancement and expansion of research and development in medical sciences. The tenderness, grief and death experienced by the animals during experiments have been a debating issue for a long time. Besides the major concern of ethics, there are few more disadvantages of animal experimentation like requirement of skilled manpower, time consuming protocols and high cost. Apart from all alternatives available here we are focusing on 3D Printing Technology which can be found more promising in near future than others because of its incredible contribution. The aim of this review to focus usage of 3D Printing Technology in various medical technology field as alternative of animal testing, which is expanding enormously and expected to solve various ailments in near future.

Key Words: 3D organs, preclinical testing, animal models.

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Key Words: 3D organs, preclinical testing, animal models.

Stability Indicating RP-HPLC Method for Simultaneous Estimation of Velpatasvir, Sofosbuvir and Voxilaprevir in Tablet Dosage Form

Sharmila Donepudi*, BharghaviPindi, Lakshmana RaoAtmakuri

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences,Gudlavalleru-521356.

Corresponding Author:

Dr. Sharmila Donepudi,

Associate Professor,

Department of Pharmaceutical Analysis,

V. V. Institute of Pharmaceutical Analysis,

Gudlavalleru- 521356

E-mail: drdsanalysis@gmail.com

Contact no: 8106737153.

Comparative Study of Anti-arthritic Activity of ethanol Extract of *Myxopyrum smilacifolium B.* and of *Pamburus missionis S.*

Raveesha P[1*], Chandra Sekhar K. B[2], Lakshmana Rao A[1]
[1*]Associate Professor, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru Post, A.P, India.
[1]Professor, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru Post, A.P, India.
[2]Professor, Krishna University, Krishna District, A.P., India.

Abstract:

Ethanolic extract of *Myxopyrum smilacifolium Blume* and *Pamburus missionis Swingle* were made investigated for anti-arthritic activity by using CFA induced arthritis model. The study was carried out for 28 days where the animals were treated with 200 and 400 mg/kg ethanolic extract of leaves of *Pamburus missionis and Myxopyrum smilacifolium* after inducing arthritis in rats by Freund's adjuvant. Further on 28th day the rats were subjected for the evaluation of inflammatory parameters like paw volume, paw thickness and Knee diameter. Blood was retracted from each animal of retro-orbital venous plexus of rats and it is collected into vial containing EDTA which is subjected for biochemical parameters. Treatment with ethanolic extract of Myxopyrum smilacifolium showed significant ($P<0.05$) report at a dose of 400mg/kg body weight showed most potent and significant activity than *Pamburus missionis* and it is evidenced by analyzing the inflammatory parameter and biochemical parameters. Hence the current study revealed that ethanolic extract of Myxopyrum smilacifolium possesses more prominent antiarthritic activity than *Pamburus missionis*.

Keywords *Pamburus missionis, Myxopyrum smilacifolium, anti-arthritic,Complete Freunds Adjuvant*

Introduction

Myxopyrum smilacifolium Blume is a woody twining shrub belongs to the family Oleaceae, grows tropical and subtropical regions of Eastern Asia. It was used traditionally for the treatment of rheumatism etc., *Pamburus missionis Swingle.* is a shrub belonging to the family Rutaceae, grows in southern India, traditionally used for the treatment of rheumatism and fractures. The current study was to investigate the anti-arthritic activity of ethanolic extracts of *Myxopyrum smilacifolium* B. and *Pamburus missionis S.*

Material and Methods

Plant material

The leaves of both *Myxopyrum smilacifolium Blume* and *Pamburus missionis Swingle* were procured from botanical garden, Kerala and Talakona hills, Tirupati respectively. Both the plants were authenticated by V. Chelladurai, Former Research officer. Central Council of Research in Ayurveda and Siddha, Government Siddha medical College, Tamil Nadu. India and Prof. K. Madhava Shetty, Department of Botany, Sri Venkateswara University, Tirupati. Andhra Pradesh. India.

Preparation of extract

Myxopyrum smilacifolium Blume and *Pamburus missionis Swingle* leaves were shade dried and extracted by soxhlet apparatus using ethanol for 72hours. Further the extract was concentrated by rotary evaporator.

Evaluation of anti-arthritic activity

Animal

Healthy albino rats (150–200 g) were used for the study and all the animals were acclimatized under standard husbandry conditions, i.e., room temperature 22 ± 2 ^{0}C, relative humidity 45-55% and light dark cycle 12:12 hours. The animals were fed with commercial pellet rat feed and water ad *libitum*. All the animal experiments were strictly compiled with ethical standards of animal handling and approved by Institutional Animal Ethics Commitee.

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Abstract

The medicinal plants are an important source for fighting various ailments. The objective of this work is to evaluate the ethanolic leaf extract of plant *Pamburus missionis*. The leaves were dried and extracted by hot percolation process by using ethanol. Quantitative estimation for ethanolic leaf extract was carried out for various constituents like alkaloids, tannins, glycoside, flavonoids and Terpenoids. The evaluation of the invitro antioxidant activity is subjected by three different methods viz., 1,1 – di phenyl-2-picryl hydrazyl (DPPH) Model, Nitric Oxide (NO) Model and Hydrogen peroxide (H_2O_2) scavenging activity and it shown ethanolic leaf extract of Pamburus missionis ELPM is the most active extract with an IC50 inhibitory concentration value equal to 13.020, 8.78, 5.99 µg/ml. These results can be attributed to the importance, in this plant *Pamburus missionis*, due to presence of flavonoids, very good natural antioxidants.

1. Introduction

Pamburus missionis Swingle [1,2,3] is a small thorny shurb commonly called as kattunaranthi in tamil belonging to the family Rutaceae. Earlier investigations were reported that it contains imperatorin, coumarins, diterpenes, flavones and xanthotoxis, isopimpinellin, scopoletin and luvangetin[2,3]. Imbalance between reactive oxygen species (ROS) and antioxidant defences results in oxidative stress. Oxidative stress deregulates cellular functions and leads to pathological conditions like ageing, arthritis, asthma, diabetes, neurodegenerative diseases, Alzheimer's disease, Parkinson's dementia etc [4].

There are many investigations which have studied the effect of the plants and their antioxidant ingredients, their complications and achieved good results showing that effects of plants with high levels of antioxidants in the management of diabetes mellitus. The present study is focussed to investigate invitro antioxidant activity of ethanolic leaf extract of *Pamburus missionis Swingle.*

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Evaluation of in-Vitro & in-Vivo Anticoagulant Activity of Blumea Balsamifera Leaves

Sk. Aminabee[1*], A. Lakshmana Rao[2], T. Praveena[3], N. Teja[4], A. Lalitha[5]

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Abstract:

The main components of sambong (*Blumea balsamifera*) are listed in this article. The whole plant and its crude extracts, as well as its isolated constituents, display numerous biological activities, such as antitumor, hepatoprotective, superoxide radicalscavenging, antioxidant, antimicrobial and anti-inflammation, anti-plasmodial, anti-tyrosinase, platelet aggregation, enhancing percutaneous penetration, wound healing, anti-obesity, along with disease and insect resistant activities. Although many experimental and biological studies have been carried out, some traditional uses such as rheumatism healing still need to be verified by scientific pharmacological studies, and further studies including phytochemical standardization and bioactivity authentication would be beneficial.

Keywords: Traditional Chinese Medicines; *Blumea balsamifera*; sambong; herbal authentication; photochemistry; biological activities.

INTRODUCTION:

Nowadays, herbal medicines are widely consumed and their sales have been rising significantly all over the world. According to the reports of the World Health Organization (WHO), to treat diseases over 80% of the populations in developing countries mainly rely on herbs, which are considered to be safer and more effective than synthetic drugs[1-3].

The *Blumea balsamifera* plant is also known as *sambong,* the leaves of this plant have been used a medicinal purpose in Asian countries like India. The *Blumea balsamifera* is belongs to *Genus Blumea.* The plant is grows in forest edges and under forests. The *balsamifera* is called as *"Ainaxiang"* in China.

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Volume 4 Issue 10 October 2020

Research Article

Phytochemical and *In-Vitro* Evaluation of Anti-oxidant Activity of *Mansoa alliacea* Leaves

SK Ameenabee[1], A Lakshmana Rao[2], P Suguna Rani[3], T Sandhya[4], N Teja[5]*, G Ashu[5], V Bhavya Naga Vani[6], CH Purna Durganjali[6] and N Pavani[7]

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*Corresponding Author: N Teja, Department of Pharmaceutics, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India.

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Published: September 10, 2020

Abstract

Mansoa alliacea Lam. (Family: *Bignoniaceae*) is a native plant from Amazonian basin in South America. Plant derivatives are used as an anti-inflammatory, anti-oxidant, antiseptic and anti-bacterial. The study was aimed to determine the pharmacognostic and phytochemicals present in *Mansoa alliacea.* Micro and Organoleptic characteristics of fresh and dried leaf samples had been examined. Physicochemical chemical variables have been done by using WHO suggested variables, preliminary phytochemical of leaf sample had been performed to identify the presence of alkaloids, flavonoids, tannins and phenols, and quinones using the ethanolic extract of the leaves of *M. alliacea.*

Keywords: *M. alliacea;* Alkaloids; Flavonoids; Tannins

Introduction

According to the World Health Organization [1], about 65% - 80% of the population in developing countries use medicinal plants to treat their health benefits. *Mansoa alliaceae* belongs to the Bignoniaceae family, which is used extensively by many of the indigenous peoples of Amazonia. It is commonly referred to as garlic and Ajossacha [2]. So far, phytochemical studies have shown that plants alkaloids, flavonoids, steroids, tannins and phenols are structurally diverse chemicals. Of modern herbal medicine in S, the plant has also become a popular treatment. America where arthritis, rheumatists, body aches and pain and muscle aches, injuries and pain are widely used. Blooms and flowers are made up of anti

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Research Article

Phytochemical and *In-Vitro* Evaluation of Anti-oxidant Activity of *Mansoa alliacea* Leaves

SK Ameenabee[1], A Lakshmana Rao[2], P Suguna Rani[3], T Sandhya[4], N Teja[5]*, G Ashu[5], V Bhavya Naga Vani[6], CH Purna Durganjali[6] and N Pavani[7]

[1]*Associate Professor, Department of Pharmacology, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India*

[2]*Professor and Principal, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India*

[3]*Department of Pharmacology, Sri Venkateswara University of Pharmaceutical Sciences, Tirupathi, India*

[4]*Department of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavathi Mahila Viswavidhyalayam, Tirupathi, India*

[5]*Department of Pharmaceutics, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India*

[6]*Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India*

[7]*Department of Pharmacy, V.V. Institute of Pharmaceutical Sciences, Guldavalleru, India*

*Corresponding Author: N Teja, Department of Pharmaceutics, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, India.

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Abstract

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Original Article

Thai Journal of Pharmaceutical Sciences

Anthelmintic activity of *Mansoa alliacea* against *Pheretima posthuma*: *In vitro* and *In silico* approach

D. S. N. B. K. Prasanth[1], S. K. Aminabee[2], Atmakuri Lakshmana Rao[3], Nayudu Teja[5], Koti Bhargavi[5], Chigurupati Monika[5], Boppudi Pujitha[5], Tera Sandhya[4], Agastya Lalitha[6], Siva Prasad Panda[4]

[1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [2]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, India, [3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, India, [4]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [5]Department of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavati Manila Visvavidyalayam, Tirupati, Andhra Pradesh, India, [6]Department of Pharmacology, Sri Padmavathi School of Pharmacy, Tirupati, Andhra Pradesh, India

Corresponding Author:
Dr. D. S. N. B. K. Prasanth, Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur - 522 502, Andhra Pradesh, India. Phone: +91-7382027437.
E-mail: dsnbkprasanth@gmail.com

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ABSTRACT

Objectives: *Mansoa alliacea* has been utilized to remedy many afflictions of humans. Literary works illustrate that it possesses numerous biological activities. Our analysis work aims to distinguish phyto-derived anthelmintic substances from *M. alliacea* against the enzyme β-tubulin and to consider the cause of its function in the molecular basis on *Invitro* and *Insilico* methods. **Materials and Methods:** In this study, *Manosa alliacea* was subjected to extraction using various solvents based on polarity and the extracts were analyzed by GC-MS. Then using Pheretima posthuma, *in-vitro* studies were done, and *insilico* studies have been conducted using PyRx tool. Subsequently, DruLiTo software was used to study drug-like predictions. **Results:** Tests showed that methanolic extract has the most important dose-dependent anthelmintic efficacy at various levels. By insilico studies, it shows that the four phytochemicals of *M. alliacea* are very likely against the β-tubulin. Utilizing contemporary strategies, these phyto-compounds from a natural origin might establish a reliable medication or support lead identification. **Conclusion:** Utilizing contemporary strategies, these phyto-compounds from a natural origin might establish a reliable medication or support lead identification. Identified hit compounds could be further taken for *in vitro* studies to examine their effectiveness versus helminths.

Keywords: Absorption; Distribution; Metabolism; Excretion and Toxicity, AutoDock, *Mansoa alliacea*, PASS, *Pheretima posthuma*, β-Tubulin

INTRODUCTION

Considering that the beginning of the human world, alternative medicine with healing has actually been made use of in the therapy of numerous disorders.[1] According to the WHO, 80 percentile of the populace of few Asian countries rely on conventional medicine in their day-to-day elements of healthcare.[2] About 25% of the prescribed drugs consist of plant-derived components, and also about 121 active substances are presently made use of in pharmaceutical products.[3]

The past 50 years of research study have offered a couple of medications made use of to treat human helminthiases infection; nevertheless, in lasting usage, lots of parasites are revealing resistance to these medications. The factor given for

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[1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [2]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, India, [3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh, India, [4]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India, [5]Department of Pharmacology, Institute of Pharmaceutical Technology, Sri Padmavati Manila Visvavidyalayam, Tirupati, Andhra Pradesh, India, [6]Department of Pharmacology, Sri Padmavathi School of Pharmacy, Tirupati, Andhra Pradesh, India

Corresponding Author:
Dr. D. S. N. B. K. Prasanth, Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur - 522 502, Andhra Pradesh, India. Phone: +91-7382027437.
E-mail: dsnbkprasanth@gmail.com

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Original Article

In-silico Strategies of Some Selected Phytoconstituents from *Zingiber officinale* as SARS CoV-2 Main Protease (COVID-19) Inhibitors

DSNBK Prasanth[1], Siva Prasad Panda[1,2], Atmakuri Lakshmana Rao[3], Guntupalli Chakravarti[1], Nayudu Teja[4], Veenam Bhavya Naga Vani[3], Tera Sandhya[5]

[1]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, INDIA.
[2]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, INDIA.
[3]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.
[4]Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.
[5]Department of Pharmacology, Institute of Pharmaceutical technology, Sri Padmavati Manila Visvavidyalayam, Tirupati, Andhra Pradesh, INDIA.

ABSTRACT

Background: *Zingiber officinale* (Zingiberaceae) has been utilized to remedy many afflictions of humans. Literary works illustrate that it possesses numerous biological activities. **Methods:** Today, research study intended to recognize the Phyto-derived anti-viral substances from *Zingiber officinale* against COVID-19 main protease enzyme and to understand the molecular basis of its activity. Methods: In the present study, 42 molecules obtained from *Z. officinale*, which are retrieved from the Pubmed database, are studied via docking study. Docking study was performed using Autodock vina and PyRx software. Afterwards, admet SAR, as well as Dru Li to servers, were made use of for drug-likeness prophecy. **Results:** Our study shows that the nine phytochemicals of *Z. officinale* are very likely against the main protease enzyme of COVID-19. Utilizing contemporary strategies, these phyto-compounds might use to establish a reliable medication from a natural origin. **Conclusion:** The substances identified potential as possible anti-virals. However, even more, *in-vitro* studies are needed to examine their effectiveness versus COVID-19.

Key words: *Zingiber officinale*, ADMET, PyRx, Physico-chemical, PASS analysis.

INTRODUCTION

WHO has currently stated a typical emergency situation and also pandemic for the coronavirus (COVID-19) that has proactively propagating around the entire world. The virus SARS-CoV-2 can easily trigger signs and symptoms such as high temperature, coughing, pneumonia, queasiness, as well as exhaustion.[1] The epidemiological history of the infection was actually believed to derive from a seafood market in Wuhan, China. Having said that, the exact origin of the preliminary transmission to human beings is actually still unidentified. Presently, there is actually > 100 total genome patterns recognized in the NCBI GenBank, coming from over ten nations. The variant in between these series is actually much less than 1%.The SARS-CoV-2 has been identified as β-coronavirus causes severe respiratory tract infection in humans and utilize angiotensin-converting enzyme 2 (ACE2) receptors to infect humans.[3] Chinese experts separated SARS-CoV-2 and also sequenced the genome SARS-CoV2 on January 7, 2020.[4] The crystallized kind of COVID-19 primary protease (M_{pro}) was actually displayed through a Chinese scientist Liu et cetera (2020) that it is actually a possible medication aim at target protein for the inhibition of

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Correspondence:
Dr. D S N B K Prasanth
Associate Professor, Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram -522 502, Guntur, Andhra Pradesh, INDIA.
Phone: +91 7382027437
E-mail: dsnbkprasanth@kluniversity.in

www.ijper.org

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In silico identification of potential inhibitors from *Cinnamon* against main protease and spike glycoprotein of SARS CoV-2

D. S. N. B. K. Prasanth[a], Manikanta Murahari[b], Vivek Chandramohan[c], Siva Prasad Panda[d], Lakshmana Rao Atmakuri[e] and Chakravarthi Guntupalli[a]

[a]Pharmacognosy Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India; [b]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences, Bangalore, India; [c]Department of Biotechnology, Siddaganga Institute of Technology, Tumakuru, India; [d]Pharmacology Research Division, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India; [e]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, India

Communicated by Ramaswamy H. Sarma

ABSTRACT

Cinnamon has been utilized to remedy a lot of afflictions of humans. Literary works illustrate that it possesses numerous biological activities. Our research study is intended to recognize the phyto-derived antiviral substances from *Cinnamon* against COVID-19 main protease enzyme and to understand the *in silico* molecular basis of its activity. In the present study, 48 isolates compounds from *Cinnamon* retrieved from the PubMed database, are subjected to docking analysis. Docking study was performed using Autodock vina and PyRx software. Afterwards, admetSAR, as well as DruLiTo servers, were used to investigate drug-likeness prophecy. Our study shows that the nine phytochemicals of *Cinnamon* are very likely against the main protease enzyme of COVID-19. Further MD simulations could identify Tenufolin (TEN) and Pavetannin C1 (PAV) as hit compounds. Utilizing contemporary strategies, these phyto-compounds from a natural origin might establish a reliable medication or support lead identification. Identified hit compounds can be further taken for *in vitro* and *in vivo* studies to examine their effectiveness versus COVID-19.

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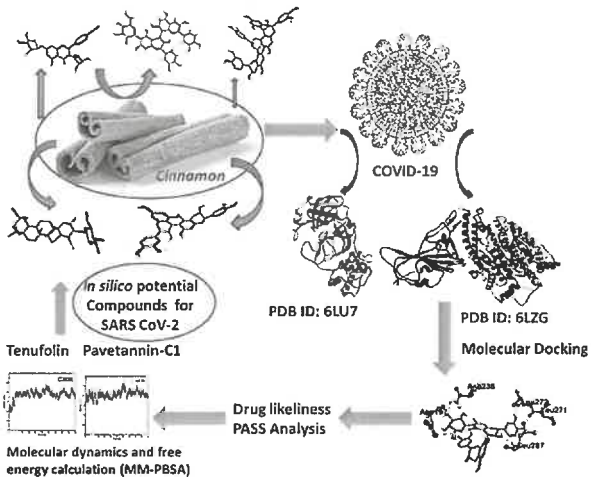
Cinnamon; SARS CoV-2; main protease; spike glycoprotein; autodock



1. Introduction

Several representatives of the Coronaviridae family circulate in the human community and typically induce moderate respiratory illness (Corman et al., 2019). In comparison, severe acute respiratory coronavirus syndrome (SARS-CoV) and Middle East respiratory coronavirus syndrome (MERS-CoV) are introduced from animals to humans and lead to serious respiratory diseases in affected persons, SARS and MERS,

CONTACT D. S. N. B. K. Prasanth dsnbkprasanth@kluniversity.in Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India

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Research Article

ISOLATION OF ANTIBIOTIC PRODUCING BACTERIA FROM POND SOIL, GUDLAVALLERU

Sharmila Donepudi*, Bhanu Prasad Neelam, Aishwarya Palakollu, Suneetha Nalla, Krinaymae Pagolu, Lakshmana Rao Atmakuri

Department of Analysis, V. V. Institute of pharmaceutical Sciences, Gudlavalleru, Andhra Predesh, India.

Keywords: Crowded plate technique, *Actinobacteria*, primary screening, antimicrobial activity.

ABSTRACT

Soil being a major reservoir for microorganisms it is a source of interest for isolation of antibiotic producing organisms. The emergence of antibiotic resistance and need for better, broad spectrum antibiotics is always in high demand. In the present study, antibiotic producing bacteria were isolated from a local soil sample. Total ten soil samples were collected from local pond aseptically and subjected to serial dilution. Crowded plate technique was employed for the isolation of the colony. Total five isolated were isolated which exhibited zone of inhibition around the colony. The isolated colonies were subjected to morphological, microscopical and biochemical characterization. All five colonies were found to be gram positive, non-sporulating organisms and found they belong to the *Actinobacteria* class. The isolated colonies were subjected to screening for antimicrobial activity against *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus subtilis* and *Yeast* by perpendicular streak method. The primary screening results conclude that except one colony all have good antimicrobial activity. One colony found to be highly potential activity which had inhibition towards gram positive, gram negative, sporulating and fungal activity. This study may contribute in providing information on the antibiotic producing microorganisms in soil. Further characterization, purification, and structural elucidation are recommended to know the novelty, quality and commercial value of these antibiotics.

INTRODUCTION

Micro-organisms and their activities are crucially essential to for all intents and purposes all procedures on Earth. They play a major role in human life. One such application is antibiotic production. Antibiotics are chemotherapeutic agents, which are powerful tool in the clinical management of diseases. Of all antibiotics available in nature only few tend to useful based on their toxicity. In addition, the infectious bacteria tend to develop resistance for antibiotics in use. This make an urge to discover new antibiotics which have clinical application[1-3].

Soil being a major reservoir for microorganisms it is a source of interest for isolation of antibiotic producing organisms. Antibiotics are low molecular-weight (non-protein) molecules produced as secondary metabolites, mainly by microorganisms that live in the soil. While many antibiotics are known to exist, efforts to discover new antibiotics still continue. Hence, species such as Streptomyces, Bacillus and Penicillium have been researched constantly for their antibiotic production capability. Bacillus species, the predominant soil bacteria because of their resistant endospore formation and production of vital antibiotics[4]. The major antibiotics reported till date are from actinomycetes. With large number of genes encoding they offer a wide scope for exploring

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RECENT ADVANCES IN CANCER THERAPY

SHAIK AMINABEE[1]*, ATMAKURI LAKSHMANA RAO[1],ALIMUNNISA[1], SHABANA BEGUM[1], V. BHAVYA NAGA VANI[1]

[1]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, GudlavalleruIndia

ABSTRACT

As per studies in 2015, about 90.5 million people had cancer. About 14.1 million new cases occur a year (not including skin cancer other than melanoma). It caused about 8.8 million deaths (15.7% of deaths). The most common types of cancer in males are lung cancer, prostate cancer, colorectal cancer and stomach cancer. The major cancer treatments are surgery and Radiotherapy which is being replaced by the other therapies like Virotherpay, Robot assisted therapy, Cancer therapy involved targeting proteins DNA double strand break repair, Liquid biopsies, Antiangiogenics, Targeted specific alterations.

Keywords: Cancer therapy, Chemotherapy, targeted therapy, virotherapy, antiangiogenics.

INTRODUCTION

Cancer is an important health problem in developed countries where is the second cause of death mainly associated with ageing of the population and lifestyle. Early diagnosis, universal access to health care and developments in these therapies has resulted in a significant improvement of cancer survival, being estimated that up to two thirds of cancer will be eventually cured with striking differences among tumors. Recent advances in cancer therapy are given below:

1. Surgery, radiotherpay and endocrine therapy are old bur effective anticancer therapies

Surgery is most effective in treatment of localized primary tumor and associated regional lymphatics. When used as a single treatment surgery cures more patients than any other individual form of cancer therapy because surgery operates by zero-order kinetics, in which 100% of excised cells are killed. Both processes are complementary. Surgery is playing an increasing role in specific clinical situation such as colorectal liver metastasis.

2. Molecular Alterations Targetting Specific

For almost a century, systemic therapy of cancer has been dominated by the use of cytotoxic chemotherapeutics. Most of these drugs are DNA-damaging agents that are designed to kill or inhibit rapidly dividing cells. They are often administered in single doses or short courses of therapy at the highest doses possible without any life-threatening levels of toxicity, called "Maximum Tolerated Dose" (MTD). The high doses of these MTD chemotherapy schedules require an extended treatment-free period to permit recovery of normal host cells[1].

3. Targeting the non-tumor cell: Antiangiogenic strategies

Angiogenesis, that is the construction of new vessels from the pre-existing vasculature, is a crucial event not only in physiological but also pathological conditions. In particular, tumor expansion is dependent on angiogenesis because tumor cells demand oxygen and nutrients to overcome hypoxia and starvation. Following tumor progression, cancer cells metastasis to the distant organs through this angiogenic vasculature[2].

4. Virotherapy

Virotherapy is another concept involving the use of oncolytic viruses that grow selectively in tumor cells to treat cancer. First, viruses, unlike drugs, respond to absent molecular targets such as the lack of interferon (IFN) or tumor supressor pathways[3].

5. Cancer therapy targeting proteins involved in DNA double-strand break repair

Poly-adenosine-diphosphate-ribose (PAR) polymerase (PARP) is a key player in this process. PARP transfers PAR chains covalently to itself and to acceptor proteins in the vicinity of the lesion upon detection

SP-32

RECENT ADVANCES IN CANCER THERAPY

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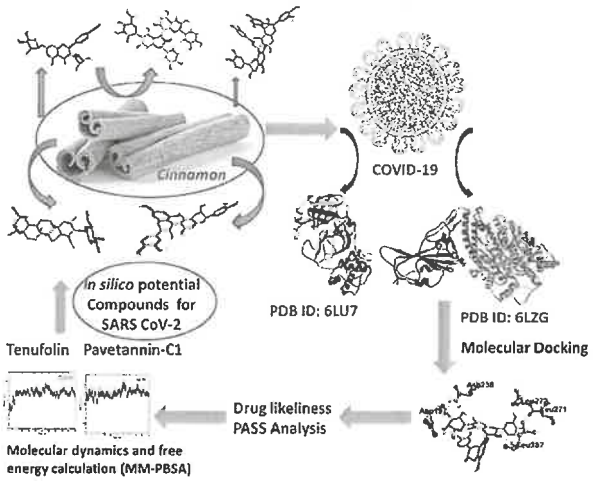
KEYWORDS
Cinnamon; SARS CoV-2; main protease; spike glycoprotein; autodock



1. Introduction

Several representatives of the Coronaviridae family circulate in the human community and typically induce moderate respiratory illness (Corman et al., 2019). In comparison, severe acute respiratory coronavirus syndrome (SARS-CoV) and Middle East respiratory coronavirus syndrome (MERS-CoV) are introduced from animals to humans and lead to serious respiratory diseases in affected persons, SARS and MERS,

CONTACT D. S. N. B. K. Prasanth dsnbkprasanth@kluniversity.in Department of Pharmacognosy, K L College of Pharmacy, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India

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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

CALENDER YEAR 2019

S.No.	Title of paper	Name of the author/s	Department	Name of journal	ISSN number
1	Analytical Method Development and Validation for the Estimation of Cinnarizine by RP-HPLC in Bulk and Pharmaceutical Dosage Forms	A Lakshmana Rao	Pharmaceutical chemistry	Asian Journal of Pharmaceutical and Health Sciences	2231- 2331
2	Analytical Method Development and Validation for the Estimation of Cinnarizine by RP-HPLC in Bulk and Pharmaceutical Dosage Forms	T Prasanthi	Pharmaceutical analysis	Asian Journal of Pharmaceutical and Health Sciences	2231- 2331
3	Development and Validation of a Stability Indicating RP-HPLC-UV Method for the Simultaneous Determination of Epalrestat and Pregabalin in Combined Pharmaceutical Formulation	A.Lakshmana Rao	Pharmaceutical chemistry	Chromatography and Separation Techniques Journal	2231-2781
4	Development and Validation of Stability Indicating RP-HPLC Method for Simultaneous Estimation of Ibuprofen and Carisoprodol in Pharmaceutical Formulation	A.Lakshmana Rao	Pharmaceutical chemistry	Open Journal of Analytical and Bioanalytical Chemistry	2689-7628

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5	A Novel Stability Indicating Rp-Hplc Method For Simultaneous Estimation Of Anti-Viral Class Of Elbasvir And Grazoprevir In Bulk And Pharmaceutical Dosage Form	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Pharmaceutical Sciences And Research	0975-8232
6	Method Development and Validation for the Estimation of Dothiepin Hydrochloride by Using RP-HPLC in PURE and Tablet Dosage Form	T Prasanthi	Pharmaceutical Analysis	Indian Journal of Pharmaceutical Education and Research	0019-5464
7	Method Development and Validation for the Estimation of Dothiepin Hydrochloride by Using RP-HPLC in PURE and Tablet Dosage Form	A Lakshmana Rao	Pharmaceutical chemistry	Indian Journal of Pharmaceutical Education and Research I	0019-5464
8	Development And Validation Of Stability Indicating Hplc Method For The Determination Of Ulipristal Acetate In Pharmaceutical Dosage Form	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
9	Stability Indicating RP-HPLC Method for Simultaneous Estimation of Metformin and Ertugliflozin	A Lakshmana Rao	Pharmaceutical chemistry	Journal of Pharmaceutical and Medicinal Chemistry	2455-8346
10	Evaluation of Analgesic Activity of Ficus palmata	Sk.Aminabee	Pharmacology	Iranian Journal of Pharmaceutical Sciences	1735-2444
11	Evaluation of Analgesic Activity of Ficus palmata	A Lakshmana Rao	Pharmaceutical chemistry	Iranian Journal of Pharmaceutical Sciences	1735-2444

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12	Stability-indicating high performance liquid chromatographic method for simultaneous assay of pibrentasvir and glecaprevir: Method development, validation and application to tablet dosage forms	A Lakshmana Rao	Pharmaceutical chemistry	Journal of Research in Pharmacy	2630-6344
13	Preparation And Evaluation Of Lamivudine Nanoparticles	A Lakshmana Rao	Pharmaceutical chemistry	International Journal Of Research In Pharmacy And Chemistry	2231-2781
14	Simultaneous Determination of Canagliflozin and Metformin in Human Plasma by LC–MS/MS Assay and its Application to a Human Pharmacokinetic Study	A Lakshmana Rao	Pharmaceutical chemistry	Indian Journal of Pharmaceutical Education and Research	0019-5464
15	Evaluation of Anthelmintic Activity of Delonix Regia.	Sk.Aminabee	Pharmacology	The Pharma Review	0973-399X
16	Evaluation of Anthelmintic Activity of Delonix Regia.	A Lakshmana Rao	Pharmaceutical chemistry	The Pharma Review	0973-399X
17	Synthesis and Hypoglycemic and Anti-inflammatory Activity Screening of Novel Substituted 5-[Morpholino(Phenyl)Methyl]-Thiazolidine-2,4-Diones and Their Molecular Docking Studies	.Srikanth Kumanchi	Pharmaceutical chemistry	Turkish Journal of Pharmaceutical Sciences	2148-6247
18	Synthesis and Hypoglycemic and Anti-inflammatory Activity Screening of Novel Substituted 5-[Morpholino(Phenyl	A Lakshmana Rao	Pharmaceutical chemistry	Turkish Journal of Pharmaceutical Sciences	2148-6247

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	)Methyl]-Thiazolidine-2,4-Diones and Their Molecular Docking Studies				
19	Formulation And Invitro Evaluation Of Lamivudine Niosomes	T. Sravani	Pharma cuetics	Indo American Journal Of Pharmaceutical Sciences	2349-7750
20	Formulation And Invitro Evaluation Of Lamivudine Niosomes	T. Balakrishna	Pharma cuetics	Indo American Journal Of Pharmaceutical Sciences	2349-7750
21	Formulation And Invitro Evaluation Of Lamivudine Niosomes	A Lakshmana Rao	Pharmaceutical chemistry	Indo American Journal Of Pharmaceutical Sciences	2349-7750
22	Laboratory Models for Cardiotonic Drugs Screening	A. Sai Datri	Pharmaceutical analysis	Scholars Academic Journal of Pharmacy	2347-9531
23	Laboratory Models for Cardiotonic Drugs Screening	A Lakshmana Rao	Pharmaceutical chemistry	Scholars Academic Journal of Pharmacy	2347-9531
24	Formulation & Evaluation of Simvastatin Sustained Release Tablets by Using Different Polymers	V.L.Vinod Kumar	Pharmaceutics	Scholars Academic Journal of Pharmacy	2347-9531
25	Formulation & Evaluation of Simvastatin Sustained Release Tablets by Using Different Polymers	A Lakshmana Rao	Pharmaceutical chemistry	Scholars Academic Journal of Pharmacy	2347-9531
26	Formulation & Evaluation of Simvastatin Sustained Release Tablets by Using Different Polymers	A. Sai Datri	Pharmaceutical analysis	Scholars Academic Journal of Pharmacy	2347-9531
27	Review On Transdermal Drug Delivery System	A. Sai Datri	Pharmaceutical analysis	World Journal Of Pharmacy And Pharmaceutical Sciences	2278 – 4357

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28	Review On Transdermal Drug Delivery System	A Lakshmana Rao	Pharmaceutical chemistry	World Journal Of Pharmacy And Pharmaceutical Sciences	2278 – 4357
29	Review On Transdermal Drug Delivery System	V.L.Vinod Kumar	Pharmaceutics	World Journal Of Pharmacy And Pharmaceutical Sciences	2278 – 4357
30	Rp-Hplc Method Development And Validation For Simultaneous Estimation Of Linagliptin And Empagliflozin	A Lakshmana Rao	Pharmaceutical chemistry	Indian Drugs	0019-462X
31	Rp-Hplc Method Development And Validation For Simultaneous Estimation Of Linagliptin And Empagliflozin	T Prasanthi	Pharmaceutical Analysis	Indian Drugs	0019-462X
32	Stability Indicating RP-HPLC Method for Estimationof Pantoprazole and Ondansetron in Pharmaceutical Dosage Form	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Pharma Research and Health Sciences	2348-6465
33	Stability Indicating Rp-Hplc Method Development And Validation For Simultaneous Estimation Of Metformin And Glipizide	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
34	Estimation Of Paroxetine Hydrochloride From Its Tablet Formulation By UV Spectrophotometry	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
35	Morpho-Anatomical Features on Blumea Mollis (D. Don) Merr. (Asteraceae) Leaves	A Lakshmana Rao	Pharmaceutical chemistry	Acta Scientific Medical Sciences	2582-0931

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E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

36	Pharmacognostic Study Of Mansoa Alliacea Leaf.	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
37	Design, Synthesis And Molecular Docking Studies Of Novel N[1]Substituted-2-(Furan-3-Yl)-1h-Benzimidazole Derivatives	K. Srikanth Kumar	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
38	Design, Synthesis And Molecular Docking Studies Of Novel N[1]Substituted-2-(Furan-3-Yl)-1h-Benzimidazole Derivatives	A Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in AYUSH and Pharmaceutical Sciences	2456-9909
39	Bioanalytical Method Development and Validation for Simultaneous Determination of Chlorthalidone and Cilnidipine Drugs in Human Plasma by RP-HPLC	A.Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in Pharmacy and Chemistry	2231-2781
40	Development and Validation of Stability Indicating RP-HPLC Method for Simultaneous Estimation of Dapagliflozin and Saxagliptin in Pure and Pharmaceutical Dosage Form	A.Lakshmana Rao	Pharmaceutical chemistry	The Pharma Review	2231-2782

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E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

41	Bioanalytical Method Development and Validation for Simultaneous Determination of Prazosin and Polythiazide Drugs in Spiked Human Plasma by RP-HPLC	A.Lakshmana Rao	Pharmaceutical chemistry	International Journal of Pharmaceutical, Chemical and Biological Sciences	0974-360X
42	Analytical Method for the Simultaneous Estimation of Sitagliptin and Simvastatin using RP-HPLC	A.Lakshmana Rao	Pharmaceutical chemistry	Journal of Pharmaceutical & Medicinal Chemistry	2455-8346
43	Method Development and Validation for Estimation of Dalfampirridine in Pure and Tablet Dosage Form	T.Prasanthi	Pharmaceutical Analysis	Journal of Pharmaceutical & Medicinal Chemistry	2455-8346
44	Method Development and Validation for Estimation of Dalfampirridine in Pure and Tablet Dosage Form	A.Lakshmana Rao	Pharmaceutical chemistry	Journal of Pharmaceutical & Medicinal Chemistry	2455-8346
45	Development and Validation of HPTLC Method for the Analysis of Tolperisone hydrochloride in Pharmaceutical Dosage Form	A.Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in Ayush and Pharmaceutical Sciences	2456-9909

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Analytical method development and validation for the estimation of Cinnarizine by RP-HPLC in bulk and pharmaceutical dosage forms

A. Lakshmana Rao*, T. Prasanthi, Ch. Meenakshi, J. Banu, J. Mrunalini, M.C.S. Teja and V. Abhishek
Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Keywords:

Cinnarizine, RP-HPLC, Linearity, Dosage form.

***Corresponding author:**

Email : dralrao@gmail.com
Phone : +91 9848779133

ABSTRACT

A simple, sensitive, accurate and precise RP-HPLC method was developed for the determination of Cinnarizine in bulk and pharmaceutical dosage forms. The method was developed by using ODS C18 column (250 × 4.6 mm, 5 µ) and the mobile phase composed of acetonitrile: buffer (0.1% *ortho*-phosphoric acid) in the ratio of 80:20v/v. The buffer pH was adjusted to 3. The retention time for Cinnarizine was found to be 4.427 min. Linearity range for Cinnarizine was found to be 10-60 µg/mL and the regression equation was found to be y = 130638x + 2529.6. % RSD for intra- and inter-day precision was found to be 0.52% and 0.29%. Average mean recovery was found to be 99.06%. LOD and LOQ values obtained for Cinnarizine were found to be 1.27 and 3.25 µg/mL respectively. The results are analyzed statistically and are found to be satisfactory. Hence this method can be successfully employed for analysis of Cinnarizine in tablet dosage form.

INTRODUCTION

Cinnarizine (Fig. 1) is a specific competitive H_1 receptor antagonist [1]. It inhibits contractions of vascular smooth muscles by blocking L-type and T-type voltage gated calcium channels preferably in the arterial smooth muscle. It is chemically 1-(diphenylmethyl)-4-(3-phenylprop-2-en-1-yl) piparazene [2,3]. Cinnarizine has also been implicated in binding to dopamine D_2 receptors, histamine H_1 receptors, and muscarinic acetylcholine receptors. Cinnarizine is used to control the vestibular symptoms of both peripheral and central origin and of labyrinth disorders including vertigo, dizziness, nystagmus, tinnitus, nausea and vomiting and prophylaxis of motion sickness. Cinnarizine also used for adjunct therapy for symptoms of peripheral arterial disease, prevention and treatment of kinesis.

A survey of literature found that several HPLC methods [4-12] were reported for estimation of Cinnarizine in combined dosage forms but limited methods were reported for individual estimation of Cinnarizine [13] by HPLC. However the reported methods required long run time, hence there is an attempt has been made to develop a simple, rapid and accurate RP-HPLC method for estimation of Cinnarizine in tablet dosage forms.

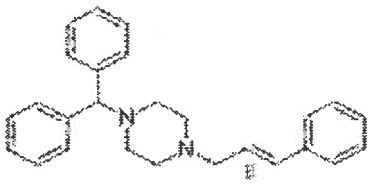

Fig. 1: Structure of Cinnarizine

MATERIALS AND METHODS

Instrument

Agilent 1260 infinity binary pump HPLC with open lab software was used for chromatographic studies.

Chemicals

Cinnarizine was purchased from Yarrow Chemicals, Mumbai, India. HPLC grade acetonitrile, ortho phosphoric acid, triethylamine were purchased from E. Merck (India) Ltd. Cinnarizine tablets were purchased from local market. Triple distilled water was used throughout experiment.

Preparation of Mobile phase

Buffer preparation

1 mL of *ortho*-phosphoric acid was transferred to 1000 mL volumetric flask and made upto volume with water. Adjusted the pH to 3.0 using triethylamine and the solution was filtered and sonicated for 5 min.

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A. Lakshmana Rao*, T. Prasanthi, Ch. Meenakshi, J. Banu, J. Mrunalini, M.C.S. Teja and V. Abhishek

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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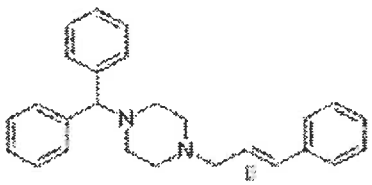

Fig. 1: Structure of Cinnarizine

MATERIALS AND METHODS

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1 mL of *ortho*-phosphoric acid was transferred to 1000 mL volumetric flask and made upto volume with water. Adjusted the pH to 3.0 using triethylamine and the solution was filtered and sonicated for 5 min.

Research Article

Development and Validation of a Stability Indicating RP-HPLC-UV Method for the Simultaneous Determination of Epalrestat and Pregabalin in Combined Pharmaceutical Formulation

Lakshmana Rao A* and Naga Navya E

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, India

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Corresponding author:
A Lakshmana Rao,
Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Tel: +91-9848779133;
Email: dralrao@gmail.com

ABSTRACT

An accurate, rapid, selective and specific stability indicating RP-HPLC-UV method was developed for the simultaneous determination of Epalrestat and Pregabalin in combined pharmaceutical formulation. Chromatographic separation was achieved on Discovery ODS C18 column (250 × 4.6 mm, 5 µm) with UV detection at 241 nm. The mobile phase consisting of 0.1% Ortho Phosphoric Acid (OPA) and acetonitrile in a ratio of 50:50, v/v and at a flow rate of 1.0 mL/min. The method was linear over the concentration range for Epalrestat 37.5-225 µg/mL and for Pregabalin 18.75-112.5 µg/mL. The retention times for Epalrestat and Pregabalin were found to be 2.166 min and 3.020 min respectively. The mean percentage recoveries of Epalrestat and Pregabalin were found to be 100.32% and 100.29% respectively. The method was validated and was successfully employed for the routine quantitative analysis of pharmaceutical formulations containing Epalrestat and Pregabalin in combined tablet dosage form.

INTRODUCTION

Epalrestat (Figure 1), chemically 2-[(5Z)-5-[(E)-2-methyl-3-phenylprop-2-enylidene]-4-oxo-2-sulfanylidene-1,3-thiazolidin-3-yl]acetic acid is an aldose reductase inhibitor used for the treatment of diabetic neuropathy [1,2]. It reduces the accumulation of intracellular sorbitol which is believed to be the cause of diabetic neuropathy [3].

Pregabalin (Figure 2), chemically (3S)-3-(aminomethyl)-5-methylhexanoic acid is an anticonvulsant drug used for neuropathic pain, as an adjunct therapy for partial seizures and in generalized anxiety disorder [4,5]. It binds to the alpha2-delta subunit of the voltage-gated calcium channel in the central nervous system [6].

In literature review there are a few analytical methods were reported for estimation of Epalrestat and Pregabalin alone or in combination with other drugs in pharmaceutical dosage forms. But only few methods are available for the simultaneous estimation of Eparlestat and Pregabalin by using RP-HPLC [7-12]. The main objective of the present work describes a simple, rapid, precise and accurate reversed phase stability indicating HPLC method for the simultaneous determination of Epalrestat and Pregabalin in combined pharmaceutical dosage forms as per ICH guidelines [13,14].

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A Lakshmana Rao* and P Vijetha

Department of Pharmaceutical Analysis, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

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***Corresponding author:** A Lakshmana Rao, Professor and Principal, Department of Pharmaceutical Analysis, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India,
Tel: +91-9848779133; E-mail: dralrao@gmail.com

Keywords: Ibuprofen; Carisoprodol; HPLC; Validation

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Research Article

Development and Validation of Stability Indicating RP-HPLC Method for Simultaneous Estimation of Ibuprofen and Carisoprodol in Pharmaceutical Formulation

Abstract

A novel, rapid, precise and accurate stability indicating RP-HPLC method was developed and validated for the simultaneous estimation of Ibuprofen and Carisoprodol in combined pharmaceutical formulation. Chromatographic separation was achieved on Kromasil C18 column (250×4.6mm, 5µm) with UV detection at 260nm. The mobile phase consisting of 0.1% Ortho Phosphoric Acid (OPA) and acetonitrile in a ratio of 40:60v/v and adjusted the flow of mobile phase to 1.0mL/min. The method was showing linear response in the concentration range over 100-600µg/mL for Ibuprofen and 43.75-262.5µg/mL for Carisoprodol. The peaks for Ibuprofen and Carisoprodol were detected 2.256 min and 3.141 min respectively. The mean percentage recoveries of Ibuprofen and Carisoprodol were found to be 99% and 99.18% respectively. The method was validated and was successfully employed for the routine quantitative analysis of pharmaceutical formulations containing Ibuprofen and Carisoprodol in combined tablet dosage form.

Introduction

Ibuprofen (Figure 1) is a nonsteroidal anti-inflammatory agent with analgesic and antipyretic properties [1]. Chemically it is 2-[4-(2-methylpropyl)phenyl]propanoic acid [2]. Ibuprofen is a non-selective inhibitor of cyclooxygenase, an enzyme invovled in prostaglandin synthesis via the arachidonic acid pathway [3].

Carisoprodol (Figure 2) is a centrally acting skeletal muscle relaxant [4]. Chemically it is 2-[(carbamoyloxy)methyl]-2-methylpentyl N-(propan-2-yl)carbamate [5]. It is used as an adjunct in the symptomatic treatment of musculoskeletal conditions associated with painful muscle spasm [6].

In literature review no analytical HPLC methods were reported for simultaneous estimation of Ibuprofen and Carisoprodol in combined pharmaceutical dosage form. Hence, the main objective of the present work describes a simple, rapid, precise and accurate stability indicating RP-HPLC method for the simultaneous estimation of Ibuprofen and Carisoprodol in combined pharmaceutical dosage form as per ICH guidelines [7,8].

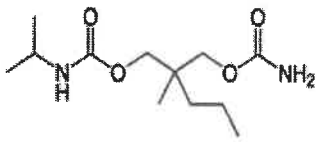

Figure 2: Structure of Carisoprodol

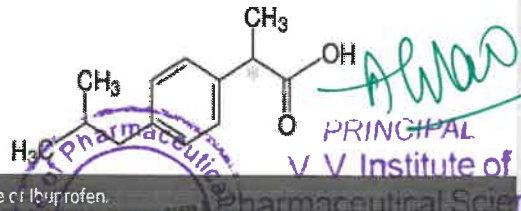

Figure 1: Structure of Ibuprofen

Materials and Methods

Materials

Pure samples (API) of Ibuprofen and Carisoprodol were procured from Spectrum Pharma Research Solutions, Hyderabad, India. Combination of Ibuprofen and Carisoprodol tablets were obtained from local pharmacy store. Acetonitrile,

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A NOVEL STABILITY INDICATING RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF ANTI-VIRAL CLASS OF ELBASVIR AND GRAZOPREVIR IN BULK AND PHARMACEUTICAL DOSAGE FORM

P. Venkateswara Rao *[1], A. Lakshmana Rao [2] and S. V. U. M Prasad [3]

Department of Pharmaceutical Analysis [1], Vikas College of Pharmacy, Vissannapeta - 521215, Andhra Pradesh, India.
V. V. Institute of Pharmaceutical Sciences [2], Gudlavalleru - 521356, Andhra Pradesh, India.
School of Pharmacy [3], JNTUK, Kakinada - 533003, Andhra Pradesh, India.

Keywords:

Elbasvir, Grazoprevir, Method development, RP-HPLC, Validation, Degradation

Correspondence to Author:
P. Venkateswara Rao

Ph.D. Research Scholar, JNTU, Kakinada, Department of Pharmaceutical Analysis, Vikas College of Pharmacy, Vissannapeta - 521215, Andhra Pradesh, India.

E-mail: venkats0425@gmail.com

ABSTRACT: Objective: To develop accurate, precise stability indicating a method for simultaneous estimation of Elbasvir and Grazoprevir in bulk and pharmaceutical dosage form. **Materials and Methods:** Simple, rapid, precise, sensitive and reproducible validated stability-indicating Reverse-Phase High-Performance Liquid Chromatography (RP-HPLC) method for the quantitative analysis of Elbasvir and Grazoprevir in the pharmaceutical dosage form. Chromatographic separation was carried out on waters Alliance-2695, by using Luna C18 (150 mm × 4.6 mm, 5 µm) column and the mobile phase containing OPA buffer (0.1%) and acetonitrile in the ratio of 50:50 v/v. The flow rate was 1.0 ml/min; detection was carried out at 258 nm using a photodiode array detector at ambient temperature. **Results:** The number of theoretical plates and tailing factor for Elbasvir and Grazoprevir were obtained to be NLT 2000 and should not more than 2 respectively. The linearity of the method was excellent over the concentration range 1.53-22.95 µg/ml and 3.05-45.75 µg/ml for Elbasvir and Grazoprevir respectively. The correlation coefficient was 0.999%. The relative standard deviation of peak areas of all measurements was less than 2.0. The proposed method was validated according to ICH guidelines. **Conclusion:** The method was found to be a simple, economical, suitable, precise, accurate and robust method for quantitative analysis of Elbasvir and Grazoprevir in combination and its stability.

INTRODUCTION: Major issue concerned to global health found worldwide nowadays is hepatitis C. More than 150 million people worldwide are infected with the hepatitis C virus (HCV), the leading cause of liver disease and liver transplantations [1], about 3 million deaths occur worldwide each year due to hepatitis C virus (HCV) related cases.

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According to the centers for disease control and prevention estimates of the people infected, Grazoprevir (an NS3/4 protease inhibitor) and Elbasvir (an NS5A inhibitor) are being developed by Merck [2]. The combination is being studied as a once-daily, single-tablet regimen, with or without ribavirin. The two drugs are active against multiple genotypes of hepatitis C [3, 4].

Elbasvir is a drug approved by the FDA for the treatment of hepatitis C. It was developed by Merck and completed phase III trials, used in combination with the NS3/4A protease inhibitor Grazoprevir [5, 6]. The IUPAC name for Elbasvir is Dimethyl N, N'- ([(6S) -6H -indolo [1, 2-c] [1, 3]

Original Article

Method Development and Validation for the Estimation of Dothiepin Hydrochloride by using RP-HPLC in PURE and Tablet Dosage Form

Prasanthi Thayi[1*], Lakshman Rao Atmakuri[2], Nandini Mandada[3], Hemanth Mandava[3], Bhuvaneswari Mandru[3], Chaitanya Manne[3]

[1]Department of Pharmaceutical Analysis, Associate Professor, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
[2]Department of Pharmaceutical Analysis, Professor and Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
[3]Student, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.

ABSTRACT

Aim: A simple, sensitive, accurate and precise RP-HPLC method was developed for the determination of Dothiepin HCl (DTH) in pure and tablet dosage form. **Methods:** The method was developed by using Phenomenex C_{18} (250 X 4.6 mm, 5 µm) and the mobile phase composed of buffer (0.1M sodium acetate): acetonitrile in the ratio of 50:50 v/v. The buffer pH was adjusted to 2.8. The retention time for Dothiepin HCl was found to be 3.44 min. Linearity range for Dothiepin HCl was found to be 10-60 µg/mL and the regression equation was found to be y = 14691x-12844. % RSD for intra- and inter-day precision was found to be 0.27% and 0.84%. Average mean recovery was found to be 99.94%. LOD and LOQ values obtained for Dothiepin HCl were found to be 0.825 µg/mL and 2.498 µg/mL respectively. **Conclusion:** The results are analysed statistically and are found to be satisfactory. Hence this method can be successfully employed for analysis of Dothiepin HCl in tablet dosage form.

Key words: Dothiepin HCl, RP-HPLC, Linearity, Dosage form, Precision.

INTRODUCTION

Dothiepin HCl (Figure 1) formerly known as Dosulepin, is a tricyclic antidepressant drug prescribed for the treatment of depression of and associated anxiety/panic disorders. It is chemically (3E)-3-(6*H*-benzo[c] [1] benzothiepin-11-ylidene)-N, N-dimethylpropan-1-amine; hydrochloride.[1-2] It is also useful in chronic pain disorders and insomnia. It acts as a Serotonin–Norepinephrine Reuptake Inhibitor (SNRI) and also has other activities including antihistamine, antiadrenergic, antiserotonergic, anticholinergic and sodium channel -blocking effects. Dothiepin HCl inhibits the reuptake of biogenic amines, increasing available neurotransmitter levels at the synaptic cleft. The use of Dothiepin is only recommended in patients who are intolerant or unresponsive to alternative antidepressant therapies.[3-4]

A survey of literature[5-15] found that few HPLC methods were reported for estimation of Dothiepin HCl in pharmaceutical dosage forms. However the reported methods required long run time, hence there is an attempt has been made to develop a simple, rapid and accurate RP-HPLC method for estimation of Dothiepin HCl in tablet dosage form.

MATERIALS AND METHODS

Instrument

Agilent 1260 infinity binary pump HPLC with open lab software was used for chromatographic studies.

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Correspondence:
Ms. Prasanthi Thayi,
Department of Pharmaceutical Analysis, Associate Professor, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
Phone: 8374259526
E-mail: prasanthi8585@gmail.com

www.ijper.org

Original Article

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Prasanthi Thayi[1*], Lakshman Rao Atmakuri[2], Nandini Mandada[3], Hemanth Mandava[3], Bhuvaneswari Mandru[3], Chaitanya Manne[3]

[1]Department of Pharmaceutical Analysis, Associate Professor, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
[2]Department of Pharmaceutical Analysis, Professor and Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
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Correspondence:
Ms. Prasanthi Thayi,
Department of Pharmaceutical Analysis, Associate Professor, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District, Andhra Pradesh, INDIA.
Phone: 8374259526
E-mail: prasanthi8585@gmail.com

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Research Article

DEVELOPMENT AND VALIDATION OF STABILITY INDICATING HPLC METHOD FOR THE DETERMINATION OF ULIPRISTAL ACETATE IN PHARMACEUTICAL DOSAGE FORM

A. Lakshmana Rao*, Alimunnisa, D. Sai Tejaswini, G. L. Vagdevi Jaya Lakshmi, V. Bhavya Naga Vani

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Keywords: Ulipristal Acetate, HPLC, Validation, Dosage Form.

ABSTRACT

A simple, novel, precise and accurate stability indicating RP-HPLC method was developed and validated for the estimation of Ulipristal Acetate in pharmaceutical dosage form. A Phenoxneome C18 (150 mm x 4.6 mm, 5 µm) column was used as stationary phase with mobile phase consisting of 0.1% ortho phosphoric acid and acetonitrile in the ratio of 50:50 v/v (pH was adjusted to 4.0 with triethyl amine). The flow rate was maintained at 1.0 mL/min and effluents were monitored at 223 nm. The retention time was 1.895 min. The linearity of the method was observed in the concentration range of 20-100 µg/mL with correlation coefficient of 0.999. The method developed was validated for linearity, precision, accuracy, system suitability and forced degradation studies like acidic, alkaline, oxidative and neutral stress conditions were performed as per ICH guidelines. The results obtained in the study were within the acceptable limits and hence this method can be used for the estimation of Ulipristal Acetate in pharmaceutical dosage form.

INTRODUCTION

Ulipristal Acetate (Figure 1) is the selective progesterone receptor modulator (SPRM) for the treatment of uterine fibroids and also used as medication for emergency birth control [1]. Chemically it is [(8S,11R,13S,14S,17R)-17-acetyl-11-[4-(dimethylamino)phenyl]-13-methyl-3-oxo-1,2,6,7,8,11,12,14,15,16-decahydrocyclopenta [a]phenanthren-17-yl] acetate. Ulipristal Acetate prevents progesterone from binding to the receptor, leading to blockage of gene transcription inhibiting synthesis of proteins necessary to begin and maintain pregnancy and also acts by inhibiting the ovulation. [2-4]

Literature survey revealed that few HPLC methods [5-6] were reported for the estimation of Ulipristal Acetate in pharmaceutical formulations. Hence a new, sensitive and efficient HPLC method was developed and validated as per ICH guidelines [7-8] for the estimation of Ulipristal Acetate in bulk and pharmaceutical dosage form.

MATERIALS AND METHODS

Instrumentation

To develop a high pressure liquid chromatographic method for quantitative estimation of Ulipristal Acetate using Agilent Technologies 1260 infinity binary HPLC instrument on a Phenoxneome C18 (150 mm x 4.6 mm, 5 µm) analytical column was used. The instrument is equipped with a pump, sampler and PDA detector. A 20 µL rheodyne injector port was used for injecting the samples. Data was analyzed by using EZ Chrome Open Lab software.

Chemicals and solvents

The reference sample of Ulipristal Acetate was obtained from Shree Icon Pharmaceutical Laboratories, Vijayawada, India. Commercially available Ulipristal Acetate tablets claimed to contain 5 mg of Ulipristal Acetate was purchased from local market. Methanol (HPLC grade), acetonitrile (HPLC grade), ortho phosphoric acid (AR grade) and triethyl amine (AR grade) were purchased from Merck (India) Ltd, Mumbai, India.

Original Article

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Stability Indicating RP-HPLC Method for Simultaneous Estimation of Metformin and Ertugliflozin

A Lakshmana Rao[1], U Krishnaveni[2]

[1]Professor and Principal, [2]Student, Department of Pharmaceutical Analysis, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

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A Lakshmana Rao, U Krishnaveni. Stability Indicating RP-HPLC Method for Simultaneous Estimation of Metformin and Ertugliflozin. J Pharmaceut Med Chem. 2019;5(2):65-73.

Abstract

A simple, rapid, precise and accurate stability indicating reverse phase high performance liquid chromatography (HPLC) method was developed for the simultaneous estimation of Metformin and Ertugliflozin. Isocratic separation was achieved on Denali C18 (150 x 4.6 mm, 5 µm) column with mobile phase comprising of 0.01 N KH_2PO_4: acetonitrile (60:40 V/V), pH adjusted 5.4 with 0.01% ortho phosphoric acid. The flow rate was maintained at 1 mL/min and analytes were screened with UV detector at 224 nm. The method was validated according to ICH guidelines with respect to linearity, accuracy, precision and specificity. The drugs were exposed to various stress conditions like, acid, alkali, oxidation, thermal, UV and neutral and the stressed samples were analysed by the proposed method. No co-eluting, interfering peaks from excipients, impurities were observed during stress conditions and all the degraded peaks are well resolved from parent peaks.

Keywords: Metformin; Ertugliflozin; Validation; HPLC.

Introduction

Metformin is an oral antidiabetic drug in the biguanide class. It is the first-line drug of choice for the treatment of type 2 diabetes mellitus[1]. Chemically it is 1,1-dimethylbiguanide (Fig. 1).[2] Metformin decreases hepatic glucose production, decreases intestinal absorption of glucose and improves insulin sensitivity by increasing peripheral glucose uptake and utilization.[3]

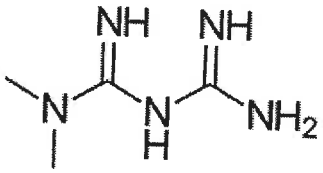

Fig. 1: Chemical structure of Metformin

Ertugliflozin is potent and selective inhibitors of the sodium-dependent glucose co transporters (SGLT).[4] Chemically it is (1S, 2S, 3S, 4R, 5S)-5-{4-chloro-3-[(4-ethoxyphenyl)methyl]phenyl}-1-(hydroxymethyl)-6,8-dioxabicyclo [3.2.1] octane-2,3,4-triol (Fig. 2).[5] SGLT2 is the predominant transporter responsible for the resorption of glucose back into circulation from glomerular filtrate. Ertugliflozin inhibits the reabsorption of glucose mediated by this specific transporter, which increases the renal excretion of glucose and helps decrease glucose levels in circulation.[6] Ertugliflozin, in combination with Metformin hydrochloride, is indicated to improve glycemic control in patients with diabetes type 2 diabetes mellitus.[7]

Literature survey revealed that few HPLC methods were reported for simultaneous estimation of Metformin and Ertugliflozin in combined pharmaceutical dosage form.[8] The

Corresponding Author: A Lakshmana Rao, Professor and Principal, VV Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

E-mail: dralrao@gmail.com

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Original Article

Evaluation of Analgesic Activity of Ficus Palmata

Skaik Aminabee*, A. Lakshmana Rao, K. Sowmya, D. Nymisha, K. Kusuma Naga Lakshmi, K.V.N.S. Manikanta, P. Praveen Kumar

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India

Abstract

Ficus palmata (FI) is an important and widely used medicinal plant. It is principally used as an item of diet in the treatment of constipation and diseases of the lungs and bladder. The sap is used in the treatment of warts. Ficus palmata plant is used in various disease e.g. gastrointestinal, hypoglycemic, antitumor, anti-ulcer, anti-diabetic, lipid lowering and antifungal activities. This study evaluates both the central and peripheral analgesic effect of the different extracts of Ficus palmata in the experimental animals. Methods: Acute toxicity test was done following the Organization of Economic Co-operation and Development guidelines. Ficus palmata extracts (250 mg/kg, 500 mg/kg) body weight was evaluated for central analgesic activity by the hot plate method, tail immersion method and formalin test models using tramodol (20 mg/kg b.w.) as the standard drug. Results: In all the models, chloroform extract showed significant inhibition as well as the elongation of time at a dose of 500 mg/kg body weight. A linear dose response relationship was also observed which was comparable with that of the standard drug tramodol ($p<0.01$, $p<0.05$). Conclusion: The study showed significant central and peripheral analgesic activity of Ficus palmata which may be attributed to the inhibition of prostaglandin synthesis, phospholipase A2, and tumor necrosis factor alpha. Ficus plamata as a commercial source of analgesic drug should be subjected to further research.

Keywords: Ficus palmata, Analgesic activity, Hot plate method, Tail immersion method, Formalin test.

Corresponding Author: Shaik Aminabee, Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India
Tel: +9908037622
E-Mail: aminaammi786@gmail.com
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1. Introduction

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Corresponding Author: Shaik Aminabee, Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India
Tel: +9908037622
E-Mail: aminaammi786@gmail.com
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Stability-indicating high performance liquid chromatographic method for simultaneous assay of pibrentasvir and glecaprevir: Method development, validation and application to tablet dosage forms

Satya Venkata Sakuntala MAMIDI [1]*, **Lakshmana Rao ATMAKURI** [2], **William Carey MAMIDIPALLI** [3]

[1] Department of Pharmacy, Government Polytechnic for Women, Kakinada, and Research Scholar, JNTUniversity Kakinada, India – 533003.

[2] Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India – 521356.

[3] Department of Pharmacy, Government Polytechnic, Visakhapatnam, Andhra Pradesh, India – 530007.

* Corresponding Author. E-mail: m.sakuntala1@gmail.com (S.V.S.M.); Tel. +91-995-128 71 48.

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ABSTRACT: Pibrentasvir and glecaprevir combination therapy acts by inhibiting RNA replication and viron assembly in hepatitis C virus. The aim and objective of the present investigation is to develop and validate a stability indicating RP-HPLC method for simultaneous quantification of pibrentasvir and glecaprevir in bulk and tablets. Pibrentasvir and glecaprevir were separated and analyzed on Agilent Eclipse column (4.6 mm × 150 mm, 5 µm). The mobile phase consisted of 0.1% orthophosphoric acid and methanol (30:70, v/v), that was isocratically delivered at a flow rate of 1.0 mL/min. Retention times were 1.857 min for glecaprevir and 2.681 min for pibrentasvir. Good regression coefficients were obtained in range of 50-250 µg/mL for glecaprevir and 20–100 µg/mL for pibrentasvir. The results of validation parameters like selectivity, precision, accuracy and robustness are satisfactory. Tablet sample containing pibrentasvir and glecaprevir was subjected to degradation with 0.1N HCl, 0.1N NaOH, 30% hydrogen peroxide, thermal and photo conditions. The resulting degradants produced during the applied degradation conditions were well resolved from the peaks of pibrentasvir and glecaprevir. The utility of the proposed method was demonstrated by application to tablets containing pibrentasvir and glecaprevir combination. No interference from additives was observed. Therefore the method can be adapted in routine analysis of pibrentasvir and glecaprevir in quality control laboratories. The method can also be used for purity and degradation assessment of pibrentasvir and glecaprevir in tablets.

KEYWORDS: Antiviral drugs; pibrentasvir; glecaprevir; stability indicating; liquid chromatography.

1. INTRODUCTION

Hepatitis C virus is an RNA virus which causes progressive damage to the liver. As a result, liver cirrhosis and hepatocellular carcinoma might occur. Approximately 64 to 103 million people are infected chronically with hepatitis C virus [1]. As per WHO (World Health Organization), 350000 to 500000 people die each year because of this virus associated liver diseases. Though this virus was found worldwide, majorly affected regions included North Africa, Central Asia and East Asia [2, 3]. After better studying the properties of RNA, proteins and life cycle of hepatitis C virus, effective antiviral treatments were developed. The duration of therapy with antiviral and probability of response to antiviral depends on the number and genotype of RNA in hepatitis C virus [4].

The approval of pibrentasvir and glecaprevir combination was given by Food and Drug Administration in 2017 August [5]. This is used in healing the adult patients with chronic hepatitis C virus genotypes 1 to 6 (with no/mild cirrhosis), with kidney disease, those patients on dialysis, patients infected with hepatitis C virus genotype 1 who were already treated either with an NS5A inhibitor or an NS3/4A protease inhibitor, but not both in the past [6-8]. The enzymes, nonstructural protease 3A (NS3A), 4A (NS4A) and 5A (NS5A) are

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Research Article

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PREPARATION AND EVALUATION OF LAMIVUDINE NANOPARTICLES

V. Swapna[1]*, K. Siva Divya[1], NB. Pati[1],

B. Ravindra Babu[1] and A. Lakshmana Rao[2]

[1]Pulla Reddy Institute of Pharmacy, Domadugu (V), Gummadidala (M), Sangareddy District, Telangana, India.

[2]V.V. Institute of Pharmaceutical Sciences, Gudlavalleru (P & M), Krishna District, Andhra Pradesh, India.

ABSTRACT

Nanoparticles represent a promising drug delivery system of controlled and targeted drug release. They are specially designed to release the drug in the vicinity of targeted tissue. Polymeric nanoparticles have been considered as promising drug delivery systems for variety of drugs like anticancer agents, biological macromolecules and vaccines. Various polymers have been used in the formulation of nanoparticles for drug delivery research to increase therapeutic benefit, while minimizing the side effects. Nanoparticles mediated targeting plays an important role in inhibiting inflammation, angiogenesis and tumor progression. Especially polymeric nanoparticles have greater deal that provides numerous properties such as simple to synthesize, inexpensive, biocompatible, biodegradable, non-toxic, non-immunogenic and water soluble for an effective drug delivery and drug targeting. The main applications of nanotechnology in medicine are materials and devices for diagnosis and for drug delivery. The aim of this study is to formulate the Lamivudine loaded nanoparticles of chitosan, cross linked with Tween 80 for antiretroviral therapy, in order to enhance the bioavailability and to reduce the dose frequency. Formulations of Lamivudine loaded nanoparticle were prepared by double emulsion solvent evaporation and solvent diffusion methods. Fourier transmission infrared spectroscopy studies indicated no chemical interaction between drug and polymer. *In vitro* release studies were performed by the dialysis membrane method. All the drug loaded batches were followed first order and sustained drug release over a period of 20 hrs.

Keywords: Lamivudine, Nanoparticles, Double emulsion solvent evaporation and Solvent diffusion.

INTRODUCTION

Nanoparticles are defined as particulate dispersions or solid particles with size in range of 10-1000 nm in which drug is dissolved, entrapped, encapsulated or attached to a nanoparticle matrix[1]. Polymeric nanoparticles with a size in the nanometer range protect drugs against *in vitro* and *in vivo* degradation. It releases the drug in a controlled manner and also offers the possibility of drug targeting[2-3]. The use of polymeric drug nanoparticles is a universal approach to increase the therapeutic performance of poorly soluble drugs in any route of administration. There are many methods were there to prepare nanoparticles includes emulsification-solvent diffusion, solvent diffusion, emulsion evaporation, nanoprecipitation method, salting out method, polymerization method, emulsion polymerization[4-8]. The major goals in designing nanoparticles as a delivery system are to control particle size, surface properties and release of pharmacologically active agents in order to achieve the site-specific action of drug at therapeutically optimal rate and dose regimen[9-10].

Lamivudine is a synthetic nucleoside analogue which acts as a reverse transcriptase inhibitor. Lamivudine is used for the treatment of Chronic Hepatitis and Human immunodeficiency Virus (HIV) infections with a half-life of nearly 5-7 hours. Conventional

Original Article

Simultaneous Determination of Canagliflozin and Metformin in Human Plasma by LC–MS/MS Assay and its Application to a Human Pharmacokinetic Study

Muralikrishna Ramisetti[1], Lakshmana Rao Atmakuri[2,*], Basaveswara Rao Mandava Venkata[3], Vinayender Adireddy[4]

[1]Faculty of Pharmacy, Krishna University, Machilipatnam, Andhra Pradesh, INDIA.
[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, INDIA.
[3]Department of Chemistry, Krishna University, Machilipatnam, Andhra Pradesh, INDIA.
[4]PCR Laboratories, Ramanthapur, Hyderabad, Telangana, INDIA.

ABSTRACT

Objective: The main objective of this work was to develop a simple, rapid and sensitive liquid chromatography/tandem mass spectrometry (LC–MS/MS) method for the simultaneous quantification of Canagliflozin and Metformin. **Methods:** Deuterated compounds of respective drugs were used an internal standard. Sample extraction was carried out using a simple Protein Precipitation (PP) technique. A C_{18} column with an isocratic mobile phase composed of 5mM ammonium acetate with 0.01% formic acid and methanol were used for chromatographic separation. **Results:** The method was validated in the linearity range of 10.00–6028.00 ng/mL for Canagliflozin and 10.00–3027.00 ng/mL for Metformin. The precision and accuracy results over five concentration levels in five different batches were well within the acceptance limits. A variety of stability tests were executed in plasma and in neat samples are comply with the FDA guidelines. **Conclusion:** The proposed assay method is simple, rapid and sensitive for the simultaneous determination of Canagliflozin and Metformin in human plasma. This method was successfully used to quantitate the *in vivo* plasma concentrations obtained from a pharmacokinetic study.

Key words: Canagliflozin, Metformin, Human Plasma, LC–MS/MS, Method Validation, Pharmacokinetics.

INTRODUCTION

Type 2 Diabetes (T2DM) is a complex metabolic disorder characterized by impaired insulin secretion and impaired insulin action.[1] Chronic hyperglycaemia and uncontrolled glucose levels results T2DM progression and enhanced risk of complications and mortality. To achieve optimal glucose, control it is often necessary to rely on combination therapy of multiple drugs or insulin.[2]

Canagliflozin, a Sodium–glucose co–transporter 2 (SGLT2) inhibitor used to manage T2DM. By inhibiting SGLT2, Canagliflozin reduces reabsorption of filtered glucose and lowers the renal threshold for glucose (RT_G) and thereby increases urinary glucose excretion.[3] It is used as an adjunct to diet and exercise.[3-5] Metformin is one of the most commonly prescribed drug worldwide for T2DM therapy. Metformin lowers both basal and Postprandial Plasma Glucose (PPG) and improving the glucose uptake and utilization. Metformin has additional benefits like weight reduction, lowering lipid levels and prevention of some vascular complications.[6–8]

Metformin is a first-line therapy for patients with T2DM. Though, many patients do not achieve effective glycemic control with Met-

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Correspondence:
Dr. A. Lakshmana Rao,
Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru- 521 356, Andhra Pradesh, INDIA.
Phone: +91-9848779133
E-mail: dralrao@gmail.com

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Evaluation of Anthelmintic Activity of *Delonix Regia*

Aminabee SK*, Lakshmana Rao A, Sai Sowmya J, Bhavya Naga Vani V, Teja N & Lakshmi Prasanna P

Abstract: *Development of anthelmintic resistance and high cost of conventional anthelmintic drugs lead to evaluation of medicinal plant as an alternative source of anthelminitics. Delonix regia also known as flame of forest, distributed throughout Madagascar,, India, Africa and Australia. The present study was aimed to investigate the anthelmintic activity of crude chloroform extract of the leaves of Delonix regia on Indian earth worm (Pheretima posthuma). Three concentrations (25, 50, 100 mg/ml) of plant extract were studied in anthelmintic activity which involved the estimation of time of paralysis and time of death of the worms. Albendazole in same concentration as that of extract was included as standard reference and normal saline water with 1% CMC as control. The time of paralysis and time of death were studied and activity was compared with the Albendazole suspension as reference standard. The results show that the plant has the potential to be used as anthelmintic.*

Introduction

Helminthes infections are among the most common infections in people, affecting a large proportion of the world population[1]. Different type of helminths infects the human and animals out of which intestinal round worms *(Ascardia sp.)* are most common[2]. Helminthiasis has been found to result in poor birth outcome, poor cognitive development, poor school and work performance. Soil transmitted helminthiasis are responsible for parasitic infections in as much as quarter of the human population worldwide. The gastro intestinal helminthes become resistant to currently available anthelminthic drugs therefore there is a foremost problem in treatment of helminthes diseases. Helminthiasis may cause chronic illness through malnutrition[3] including vitamin deficiencies, stunted growth, anaemia and protein energy malnutrition.

Delonix regia is a flowering plant belongs to the family *Fabaceae*. It also called as Bojer ex Hook, Poinciana regia, Royal Poincaina[4], Gul mohar, Flame tree[5] and it is a large ornamental tree with fern like bipinnately compound leaves and attractive red peacock flower and native to Madagascar. The flowers and leaves contain most of the active constituents. The leaves of *D. regia* have antiinflammatory[6], antimalarial[7], antifungal[8], anticytotoxic activities[9]. Kameferol and saponin contents of the leaves responsible for the anti ulcer and cytotoxic activities[10] while aqueous extracts of flowers has been used as phytotoxicant to control the weeds viz. *Ischne nippponensis* and *Centella asiatica* in Taiwan[11]. Novel Kunitz like alpha amylase inhibitor has been isolated from the seeds, which have potential to control insect pest[12]. So, it is important to look for alternative strategies against parasites which have led to screening of medicinal plants for their anthelmintic activity.

Materials and Methods

Plant Materials

Fresh *Delonix regia* leaves were collected from the surrounding area of Gudlavalleru and Gudivada region. These plants were identified and authenticated by the Department of Botany Hindu College, Machilipatnam, A.P.

Drugs and Chemicals

Albendazole suspension was used as standard anthelmintic during the experimental protocol, chloroform, CMC were also used in experimental protocol. The entire chemicals used are laboratory and analytical grade.

Preparation of Plant Extract

The fresh leaves were sorted, cleaned and air dried at room temperature. The dried leaves were cut into small pieces and powdered. The powder sample was collected and stored in air and water proof container protected from direct sunlight and

Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh.
Email: draminask@gmail.com

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Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh.
Email: draminask@gmail.com

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ORIGINAL ARTICLE

Synthesis and Hypoglycemic and Anti-inflammatory Activity Screening of Novel Substituted 5-[Morpholino(Phenyl)Methyl]-Thiazolidine-2,4-Diones and Their Molecular Docking Studies

Yeni Sübstitüe 5-[Morfolino(Fenil)Metil]-Tiazolidin-2,4-Dionların Sentezi ve Hipoglisemik ve Antienflamatuvar Aktivitelerinin Taranması ile Moleküler Doking Çalışmaları

Srikanth Kumar KARUMANCHI[1], Lakshmana Rao ATMAKURI[1]*, V Basaveswara Rao MANDAVA[2], Srikala RAJALA[3]

[1]V. V. Institute of Pharmaceutical Sciences, Department of Pharmaceutical Chemistry, Gudlavalleru, Andhra Pradesh, India
[2]Krishna University, Department of Chemistry, Machilipatnam, Andhra Pradesh, India
[3]Sree Vidyanikethan College of Pharmacy, Department of Pharmaceutical Chemistry, Tirupati, Andhra Pradesh, India

ABSTRACT

Objectives: The aim was the synthesis of novel substituted 5-[morpholino(phenyl)methyl]-thiazolidine-2,4-diones and screening for their *in vivo* hypoglycemic activity and *in vitro* anti-inflammatory activity, as well as molecular docking studies to find out active potential lead molecules.

Materials and Methods: Substituted aromatic aldehydes, thiazolidine-2,4-dione, and morpholine on Mannich reaction gave the title compounds. They were characterized by physical and spectral methods. In vivo hypoglycemic activity was examined in alloxan induced Wistar albino rats by tail tipping method. In vitro anti-inflammatory activity was tested by human red blood cell (HRBC) membrane stabilization and protein denaturation. Using AutoDock, molecular docking studies were carried out to find out the best fit ligands.

Results: Series of substituted 5-[morpholino(phenyl)methyl]-thiazolidine-2,4-diones were synthesized and chemically they were confirmed by spectral techniques. Acute toxic studies of *in vivo* hypoglycemic activity results revealed that compounds 4c, 4h, and 4n exhibited good activity at 35 mg/kg body weight. Chronic toxic study results indicated that compounds 4h and 4n exhibited good activity at 70 mg/kg body weight. Anti-inflammatory activity results indicated the highest inhibition was shown by compounds 4k and 4f at 500 µg/mL in HRBC membrane stabilization. In protein denaturation, the highest inhibition was shown by compound 4k at 500 µg/mL. In molecular docking studies, compounds 4h and 4n exhibited higher binding affinity at PPARγ receptor protein and compound 4k exhibited higher binding affinity at COX-1 and COX-2 actives sites.

Conclusion: Microwave irradiation produced high yield in short reaction times. The presence of electron releasing groups at the para position of the phenyl ring may give the ability to produce hypoglycemic activity and the presence of electron withdrawing groups at the para position of the phenyl ring causes anti-inflammatory activity. The results showed that some compounds exhibited good hypoglycemic and anti-inflammatory activities. Compounds 4h and 4n exhibited higher binding affinity at PPARγ receptor protein and compound 4k exhibited higher binding affinity at COX isoenzymes' active sites in molecular docking studies.

Key words: Thiazolidinediones bearing morpholine, Mannich reaction, *in vivo* hypoglycemic activity, *in vitro* anti-inflammatory activity, docking studies

ÖZ

Amaç: Bu çalışmanın amacı, yeni sübstitüe 5-[morfolino(fenil)metil]-tiyazolidin-2,4-dionların sentezi ve *in vivo* hipoglisemik ve *in vitro* anti-enflamatuvar aktivitelerinin taranması ile olası aktif moleküller için moleküler doking çalışmalarının yapılmasıdır.

Gereç ve Yöntemler: Bileşikler; sübstitüe aromatik aldehidler, tiyazolidin-2,4-dion ve morfolinin mannich reaksiyonu sonucu elde edilmiş, elde edilen bileşikler fiziksel ve spektral yöntemlerle karakterize edilmiştir. *İn vivo* hipoglisemik aktivite, alloxan ile indüklenen Wistar albino farelerde "tail

*Correspondence: E-mail: dralrao@gmail.com, Phone: +09848779133 ORCID: orcid.org/0000-0001-5601-037X
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FORMULATION AND *INVITRO* EVALUATION OF LAMIVUDINE NIOSOMES

T. Sravani[1], T. Balakrishna[2], A. Lakshmana Rao[3], S. Srinivasa Rao[4], M. Mallika[5], T. Navya Sri[6]

[1, 3, 4, 5, 6] Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, 521356, India, A.P.

[2] Department of Pharmaceutics, Chebrolu Hanumaiah Institute of Pharmaceutical Sciences, Chowdavaram, Guntur, 522019, India, A.P.

Abstract:

The aim of present study is an attempt to formulate and evaluate controlled release niosomal formulations by using Lamivudine drug for potentially treating HIV and AIDS related condition. Lamivudine is an antiretroviral drug for the treatment of acquired immune deficiency syndrome (AIDS) & Hepatitis. The present study involves the preparation and characterization of Lamivudine entrapped niosomes and finding the drug carrier qualities of the niosomes. The formulation L1-L6 which were prepared by varying the concentration surfactant (Tween 20 & span 20) by ether injection method. The optimized formulation of lamivudine is prepared by ether injection method was subjected to characterization studies for different evaluation parameters such as vesicle size, % entrapment efficiency, drug content, in vitro release and the stability studies was carried out at different temperature. The present study demonstrates the controlled drug release after encapsulation of Lamivudine into niosomal preparation.

Key Words: *Lamivudine, Niosomes, controlled release, anti-retroviral, Immunodeficiency syndrome, Hepatitis, Tween 20, Span 20.*

Corresponding author:
Ms. T. Sravani,
Assistant Professor,
Department of Pharmaceutics,
V. V. Institute of Pharmaceutical Sciences,
Gudlavalleru, 521356, India, A.P.
Sravaniatmuri123@gmail.com,
9705434807

QR code

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V. V. Institute of
Pharmaceutical Sciences
Sashadri Rao Knowledge Village
GUDLAVALLERU - 521 356

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Sravaniatmuri123@gmail.com,
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Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

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Pharmaceutical Analysis

Laboratory Models for Cardiotonic Drugs Screening

A. Sai Datri*, A. Lakshmana Rao

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, AP, India

*Corresponding author: A. Sai Datri

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Abstract Review Article

The human heart is an organ that pumps blood throughout the body via the circulatory system, supplying oxygen and nutrients to the tissues and removing carbon dioxide and other wastes. Thus, to maintain a healthy heart is a crucial factor for overall health and well-being. But because of today's food habits and stress conditions can eventually lead to various heart ailments. These conditions can be cured with cardiotonic agents. Before introducing drugs into market, that drug has to check for its safety and efficacy. For studying the drug activity, both in vitro and in vivo screening models have been developed in the past years. These Systems measures the ability of the test drugs to prevent or cure heart problems in laboratory conditions and on experimental animals. This review reveals some of such animal model to check the activity of cardiotonic drugs.

Keywords: Heart, circulatory, ailments, cardiotonic agents.

INTRODUCTION

The heart (Fig. 1) is a muscular organ in humans, which pumps blood through the blood vessels of the circulatory system [1]. Blood provides the body with oxygen and nutrients, as well as assists in the removal of metabolic wastes [2]. In humans, the heart is located between the lungs, in the middle compartment of the chest [2]. The heart pumps blood with a rhythm determined by a group of pacemaking cells in the sinoatrial node. These generate a current that causes contraction of the heart, traveling through the atrioventricular node and along the conduction system of the heart. If any malfunction of this conducting system causes heart diseases.

Heart diseases [4-6] can be primarily grouped into three major disorders: cardiac failure, ischemia and cardiac arrhythmia. Cardiac failure can be described as the inability of the heart to pump blood effectively at a rate that meets the needs of the metabolizing tissues. This occurs when the muscles that perform contraction and force the blood out of heart are performing weakly. Thus cardiac failures primarily arise from the reduced contractility of heart muscles, especially the ventricles. Reduced contraction of heart leads to reduced heart output but new blood keeps coming in resulting in the increase in heart blood volume. The heart feels congested. Hence the term congestive heart failure. Congested heart leads to lowered blood pressure and poor renal blood flow. This results in the development of edema in the lower extremities and the lung (pulmonary edema) as well as renal failure.

For the treatment of these heart problems, cardiotonic drugs[7] are used. They can treat the heart problems by increase the strength of the muscle contractions, which facilitates the pumping of more blood from the heart.

Cardiac action potential – the electrophysiology of heart [2-9]

The cardiac action potential is a brief change in voltage (membrane potential) across the cell membrane of heart cells [1]. This is caused by the movement of charged atoms (called ions) between the inside and outside of the cell, through proteins called ion channels. The cardiac action potential differs from action potentials found in other types of electrically excitable cells, such as nerves. Action potentials also vary within the heart; this is due to the presence of different ion channels in different cells. The action potential (Fig. 2) in typical cardiomyocytes is composed of 5 phases (0-4), beginning and ending with phase 4.

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Pharmaceutical Analysis

Laboratory Models for Cardiotonic Drugs Screening

A. Sai Datri*, A. Lakshmana Rao

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, AP, India

***Corresponding author:** A. Sai Datri
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Abstract — **Review Article**

The human heart is an organ that pumps blood throughout the body via the circulatory system, supplying oxygen and nutrients to the tissues and removing carbon dioxide and other wastes. Thus, to maintain a healthy heart is a crucial factor for overall health and well-being. But because of today's food habits and stress conditions can eventually lead to various heart ailments. These conditions can be cured with cardiotonic agents. Before introducing drugs into market, that drug has to check for its safety and efficacy. For studying the drug activity, both in vitro and in vivo screening models have been developed in the past years. These Systems measures the ability of the test drugs to prevent or cure heart problems in laboratory conditions and on experimental animals. This review reveals some of such animal model to check the activity of cardiotonic drugs.

Keywords: Heart, circulatory, ailments, cardiotonic agents.

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Pharmaceutics

Formulation & Evaluation of Simvastatin Sustained Release Tablets by Using Different Polymers

Lakshman Vinod Kumar V[1*], Lakshmana Rao A[2], Sai Datri Arige[3], Padmini O[4], S.S. Tejaswini O[5], V. Rajesh P[6], Vamsi P[7]

[1,3]Assistant Professor, [2]Professor & Principal, [4-7]Students, Dept. of Pharmaceutics,
V. V. Institute of Pharmaceutical Sciences, Andhra Pradesh India

***Corresponding author:** Lakshman Vinod Kumar V
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Abstract Review Article

Purpose: The main objective of present research investigation is to formulate sustained release tablets of Simvastatin using different polymers. Simvastatin, an anti-hyperlipidemic agent belong BCS class-II agent. ***Methods:*** The SR tablets of Simvastatin were prepared employing different concentrations of HPMCK15M, xanthan gum and carbopol and tablets are prepared by using direct compression method. ***Results and discussion:*** Total six formulations are designed and evaluated for hardness, friability, thickness, % drug content and In-vitro drug release. From the results it was concluded that all the formulations are found to be within the pharmacopeia limits and in-vitro dissolution profiles of all formulation are subjected to different kinetic models, the statistical parameters like slope intercept and regression coefficient were calculated. ***Conclusion:*** It was concluded that the polymeric combination of HPMCK15M with xanthan gum in the ratio 1:1 was able to retarded the release of Simvastatin from the tablets to the24th hour and showed an ideal release pattern necessary for sustained release tablet.

Keywords: Simvastatin, Sustained release tablet, HPMCK15M, Xanthan gum and Carbopol.

INTRODUCTION

Traditional drug delivery system[1] has been characterized by immediate release and repeated dosing of the drug which might lead to the risk of dose fluctuation, this arises the need of a formulation with control release that maintain a near-constant or uniform blood level. The desire to maintain a near-constant or uniform blood level of a drug often translates into better patient compliance, as well as enhanced clinical efficacy of the drug for its intended use.

Drawbacks of Conventional Dosage Forms

- Poor patient compliance, increased chances of missing the dose of a drug with short half-life for which frequent administration is necessary.
- The unavoidable fluctuations of drug concentration may lead to under medication or over medication.
- A typical peak-valley plasma concentration time profile is obtained which makes attainment of steady-state condition difficult.
- The fluctuations in drug levels may lead to precipitation of adverse effects especially of a drug with small Therapeutic Index (TI) whenever over medication occur.

Sustained release concept

Sustained release, sustained action, prolong action, controlled release, extended action, depot are terms used to identify drug delivery systems that are designed to achieve prolong therapeutic effect by continuously releasing medication over an extended period of time after administration of single dose. In the case of orally administer this period is measured in hours while in the case of injectables this period varies from days to months[2,3].

Advantages of sustained release dosage forms:[4]

- Control of drug therapy is achieved.
- Rate and extent of drug absorption can be is modified
- Frequency of drug administration is reduced.
- Patient compliance can be improved.

Disadvantages of sustained release dosage forms [5,6]

- It not permits prompt termination of therapy.
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Volume 8, Issue 5, 505-524 Review Article SJIF Impact Factor 7.421 ISSN 2278 – 4357

REVIEW ON TRANSDERMAL DRUG DELIVERY SYSTEM

Sai Datri Arige[1]*, Lakshmana Rao A.[2] and Vinod Kumar V. L.[3]

[1,3]Assistant Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

[2]Professor and Principal, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

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***Corresponding Author**
Prof. Sai Datri Arige
Assistant Professor, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

ABSTRACT

Transdermal drug delivery systems are defined as self contained, discrete dosage forms which, when applied to unbroken skin, deliver the drug through the skin, at a controlled rate to systemic circulation. The transdermal route of administration is recognized as one of the potential route for the local and systemic delivery of drugs. Transdermal patches follow diffusion mechanism for delivery of drugs. Through a diffusion process, the drug enters the bloodstream directly though the skin. Since there is high concentration on the patch and low concentration in the blood, the drug will keep diffusing into the blood, the drug will keep diffusing into the blood for a long period of time, maintaining the constant concentration of drug in the blood flow. TDDS offer many advantages, such as elimination of first pass metabolism, sustained drug delivery, reduced frequency of administration, reduced side effects and improved patient compliance. For the adequate delivery of drug through the transdermal patches can be affected by the different factors. Evolution of transdermal patch is use to ensure its quality, size, time of onset & duration, adhesive property, thickness, weight of patch, moisture of content, uniformity, permeation & toxicological studies.

KEYWORDS: Transdermal drug delivery system, Transdermal patches, Diffusion, Evolution, TDDS.

INTRODUCTION

Transdermal[1] therapeutic system provides controlled continuous delivery of drugs through the skin to the systemic circulation. This type of drug delivery offers many advantages

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RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF LINAGLIPTIN AND EMPAGLIFLOZIN

ABSTRACT

A simple, accurate and precise RP-HPLC method was developed for the simultaneous estimation of the linagliptin and empagliflozin in tablet dosage form. Chromatogram was run through Kromasil 250 x 4.6 mM, 5mM column, mobile phase containing 0.1% *o*-phosphoric acid buffer and acetonitrile in the ratio of 60:40%V/V was pumped through column at a flow rate of 1 mL/min. The optimized wavelength was 230 nm. Retention times of linagliptin and empagliflozin were found to be 2.759 min and 2.139 min. %RSD of the Linagliptin and Empagliflozin were found to be 0.5 and 0.6 respectively. Percentage assay was obtained as 99.91% and 100.15% for linagliptin and empagliflozin, respectively. LOD, LOQ values obtained for linagliptin and empagliflozin were 0.23 µg/ml and 0.44 µg/mL and 0.70 µg/mL and 1.34 µg/mL, respectively. Thus, the current study showed that the developed RP-HPLC method is sensitive and selective for the estimation of linagliptin and empagliflozin in combined dosage form.

Key Words: Linagliptin, Empagliflozin, RP-HPLC, Dosage form, LOD, LOQ.

INTRODUCTION

Linagliptin is chemically 8-[(3*R*)-3-aminopiperidin-1-yl]-7-(but-2-yn-1-yl)-3-methyl-1-[(4-methylquinazolin-2-yl) methyl]-2,3,6,7-tetrahydro-1*H*-purine-2,6-dione. It is a competitive and reversible di-peptidyl peptidase (DPP)-4 enzyme inhibitor that slows the breakdown of insulinotropic hormone glucagon-like peptide (GLP)-1 for better glycemic control in diabetic patients[1]. GLP and glucose-dependent insulinotropic polypeptide (GIP) are incretin hormones that increase the production and release of insulin from pancreatic beta cells and decrease the release of glucagon from pancreatic alpha cells. This results in a overall decrease in glucose production in the liver and increase of insulin in a glucose-dependent manner[2].

Empagliflozin is chemically (2*S*,3*R*,4*R*,5*S*,6*R*)-2-[4-chloro-3-({4-[(3*S*)-oxolan-3-yloxy]phenyl}methyl)phenyl]-6-(hydroxymethyl)oxane-3,4,5-triol. It is a sodium glucose co-transporter-2 (SGLT-2) inhibitor, indicated as an adjunct to diet and exercise to improve glycemic control in adult patients with type-2 diabetes[3-4]. SGLT-2 co-transporters are responsible for re-absorption of glucose from the glomerular filtrate in the kidney[5]. The glucuretic effect resulting from SGLT-2 inhibition reduces renal absorption and lowers the renal threshold for glucose, therefore resulting in increased glucose excretion. Additionally, it contributes to reduced hyperglycemia and also assists weight loss and blood pressure reduction[6].

The survey of literature reveals that few analytical methods[7-18] have been reported for estimation of linagliptin and empagliflozin individually[7,8] and in combined dosage form[9,10]. The reported methods suffer from drawbacks like long run times and more organic phase. Hence, the main objective of the present work was to develop and validate a specific, sensitive, accurate, rapid and precise RP-HPLC method for quantitative determination of linagliptin and empagliflozin in bulk drug and pharmaceutical dosage forms.

MATERIALS AND METHODS

Instrument

WATERS HPLC 2695 SYSTEM with Auto Injector and PDA Detector

Chemicals and Reagents

Linagliptin and empagliflozin pure drugs (API) are procured from Spectram Labs, Hyderabad, Combination of linagliptin and empagliflozin tablets (Glyxambi) are procured from local market. Distilled water, acetonitrile, methanol, *o*-phosphoric acid were purchased from Rankem Chemicals Ltd., Mumbai, India.

Preparation of solutions

Buffer (0.1 % OPA)

1 mL of concentrated *o*-phosphoric acid was dissolved in 1000 ml volumetric flask diluted with distilled water up to the mark. pH wasadjusted to 2.5 by using triethyl amine.

Standard preparation:

Accurately weighed 12.5 mg and 25 mg of linagliptin and empagliflozin working standards were transferred

specific, reproducible, accurate and robust which can be used for simultaneous estimation of linagliptin and empagliflozin in bulk drug and combined dosage form for routine analysis.

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[a]Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru - 521 356, Andhra Pradesh, India

Lakshmana Rao A.[a*], Prasanthi T[a]. and Anusha E. L[a].

For Correspondence: E-mail: dralrao@gmail.com

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PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF LINAGLIPTIN AND EMPAGLIFLOZIN

ABSTRACT

A simple, accurate and precise RP-HPLC method was developed for the simultaneous estimation of the linagliptin and empagliflozin in tablet dosage form. Chromatogram was run through Kromasil 250 x 4.6 mM, 5mM column, mobile phase containing 0.1% *o*-phosphoric acid buffer and acetonitrile in the ratio of 60:40%V/V was pumped through column at a flow rate of 1 mL/min. The optimized wavelength was 230 nm. Retention times of linagliptin and empagliflozin were found to be 2.759 min and 2.139 min. %RSD of the Linagliptin and Empagliflozin were found to be 0.5 and 0.6 respectively. Percentage assay was obtained as 99.91% and 100.15% for linagliptin and empagliflozin, respectively. LOD, LOQ values obtained for linagliptin and empagliflozin were 0.23 µg/ml and 0.44 µg/mL and 0.70 µg/mL and 1.34 µg/mL, respectively. Thus, the current study showed that the developed RP-HPLC method is sensitive and selective for the estimation of linagliptin and empagliflozin in combined dosage form.

Key Words: Linagliptin, Empagliflozin, RP-HPLC, Dosage form, LOD, LOQ.

INTRODUCTION

Linagliptin is chemically 8-[(3*R*)-3-aminopiperidin-1-yl]-7-(but-2-yn-1-yl)-3-methyl-1-[(4-methylquinazolin-2-yl) methyl]-2,3,6,7-tetrahydro-1*H*-purine-2,6-dione. It is a competitive and reversible di-peptidyl peptidase (DPP)-4 enzyme inhibitor that slows the breakdown of insulinotropic hormone glucagon-like peptide (GLP)-1 for better glycemic control in diabetic patients[1]. GLP and glucose-dependent insulinotropic polypeptide (GIP) are incretin hormones that increase the production and release of insulin from pancreatic beta cells and decrease the release of glucagon from pancreatic alpha cells. This results in a overall decrease in glucose production in the liver and increase of insulin in a glucose-dependent manner[2].

Empagliflozin is chemically (2*S*,3*R*,4*R*,5*S*,6*R*)-2-[4-chloro-3-({4-[(3*S*)-oxolan-3-yloxy]phenyl}methyl)phenyl]-6-(hydroxymethyl)oxane-3,4,5-triol. It is a sodium glucose co-transporter-2 (SGLT-2) inhibitor, indicated as an adjunct to diet and exercise to improve glycemic control in adult patients with type-2 diabetes[3-4]. SGLT-2 co-transporters are responsible for re-absorption of glucose from the glomerular filtrate in the kidney[5]. The glucuretic effect resulting from SGLT-2 inhibition reduces renal absorption and lowers the renal threshold for glucose, therefore resulting in increased glucose excretion. Additionally, it contributes to reduced hyperglycemia and also assists weight loss and blood pressure reduction[6].

The survey of literature reveals that few analytical methods[7-18] have been reported for estimation of linagliptin and empagliflozin individually[7,8] and in combined dosage form[9,10]. The reported methods suffer from drawbacks like long run times and more organic phase. Hence, the main objective of the present work was to develop and validate a specific, sensitive, accurate, rapid and precise RP-HPLC method for quantitative determination of linagliptin and empagliflozin in bulk drug and pharmaceutical dosage forms.

MATERIALS AND METHODS

Instrument

WATERS HPLC 2695 SYSTEM with Auto Injector and PDA Detector

Chemicals and Reagents

Linagliptin and empagliflozin pure drugs (API) are procured from Spectram Labs, Hyderabad, Combination of linagliptin and empagliflozin tablets (Glyxambi) are procured from local market. Distilled water, acetonitrile, methanol, *o*-phosphoric acid were purchased from Rankem Chemicals Ltd., Mumbai, India.

Preparation of solutions

Buffer (0.1 % OPA)

1 mL of concentrated *o*-phosphoric acid was dissolved in 1000 ml volumetric flask diluted with distilled water up to the mark. pH wasadjusted to 2.5 by using triethyl amine.

Standard preparation:

Accurately weighed 12.5 mg and 25 mg of linagliptin and empagliflozin working standards were transferred

specific, reproducible, accurate and robust which can be used for simultaneous estimation of linagliptin and empagliflozin in bulk drug and combined dosage form for routine analysis.

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[a]Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru - 521 356, Andhra Pradesh, India

Lakshmana Rao A.[a*], Prasanthi T[a]. and Anusha E. L[a].

For Correspondence: E-mail: dralrao@gmail.com

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Original Article

Stability Indicating RP-HPLC Method for Estimation of Pantoprazole and Ondansetron in Pharmaceutical Dosage Form

D Sharmila*, Md Mahaboobunnisa, A Lakshmana Rao

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru -521356, India.

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ABSTRACT

Introduction: A simple, sensitive, precise, and accurate reverse phase high-performance liquid chromatography (RP-HPLC) method was developed and validated for simultaneous estimation of pantoprazole and ondansetron. The combination of pantoprazole and ondansetron is used for the treatment of nausea and vomiting. **Materials and methods:** The chromatographic separation was achieved isocratically on Discovery (250 x 4.6mm, 5µ) using 0.01% potassium dihydrogen phosphate buffer (pH 5.4): acetonitrile (60:40) as mobile phase, at a flow rate 1.0mL/min. The detection was monitored at 260nm. **Results and Discussion:** The separation was achieved within 6minutes, with retention times 2.281 and 2.840minutes for pantoprazole and ondansetron, respectively. %RSD of the pantoprazole and ondansetron were and found to be 1.0 and 0.8, respectively. %Assay was obtained as 99.26% and 99.09% for pantoprazole and ondansetron, respectively. LOD, LOQ values are obtained from regression equations of pantoprazole and ondansetron were 0.10µg/mL, 0.07µg/mL and 0.32µg/mL, 0.21µg/mL respectively. Regression equation of pantoprazole is y = 6589x + 20552, and y = 16218x + 5357 for ondansetron. The analytes were subjected to degradation studies using acid, alkali, oxidative, thermal, and photodegradation. **Conclusion:** The results obtained prove that the method is reproducible and selective for the determination of pantoprazole and ondansetron. The method was validated as per ICH guidelines in terms of accuracy, precision, linearity,, and specificity.

Keywords: Pantoprazole, Ondansetron, Degradation studies, RP-HPLC, Isocratic.

1. INTRODUCTION

Pantoprazole (figure 1a) is a proton pump inhibitor drug that inhibits gastric acid secretion. It acts by controlling the final step in gastric acid production by forming a covalent bond to two sites of the (H^+, K^+) ATPase enzyme system at the secretary surface of the gastric parietal cell. This action is dose-relatedd and leads to inhibition of both basal and stimulated gastric acid secretion irrespective of the stimulus [1, 2]. Chemically Pantoprazole is 6-(Difluromethoxy)-2-[(3,4-dimethoxypyridin-2-yl)Methylsulfinyl]-1H-

Corresponding author *
Sharmila Donepudi,
Associate Professor,
Department of Pharmaceutical Analysis,
V. V. Institute of Pharmaceutical Sciences,
Gudlavalleru, Krishna (Dist.), A. P.-521356
Contact no: 8106737153
E-mail: sharmiladonepudi@gmail.com

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Research Article

STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF METFORMIN AND GLIPIZIDE

A. Lakshmana Rao*, M. Malathi Priyanka

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Keywords: Metformin, Glipizide, HPLC, Validation.

ABSTRACT

A novel, precise and accurate stability indicating RP-HPLC method was developed and validated for the simultaneous estimation of Metformin and Glipizide in combined pharmaceutical dosage form. Chromatographic separation was achieved on Microsorb-MV C18 column (250 × 4.6 mm, 5 µm) with UV detection at 257 nm. The mobile phase consists of acetate buffer (pH 4.0) and acetonitrile in the ratio of 60:40 v/v and at a flow rate of 1.0 mL/min. The method was linear over the concentration range of 60-140 µg/mL for Metformin and 10-50 µg/mL for Glipizide. The retention times for Metformin and Glipizide were found to be 2.434 min and 5.710 min respectively. The mean percentage recoveries of Metformin and Glipizide were found to be 100.42% and 100.39% respectively. The method was validated and was successfully employed for the routine quantitative analysis of pharmaceutical formulations containing Metformin and Glipizide in combined pharmaceutical formulation.

INTRODUCTION

Metformin (Fig. 1) is biguanide anti hyperglycemic agent used for treating non-insulin-dependent diabetes mellitus[1]. Chemically it is 1,1-dimethylbiguanide. Metformin decreases hepatic glucose production, decreases intestinal absorption of glucose and improves insulin sensitivity by increasing peripheral glucose uptake and utilization[2,3].

Glipizide (Fig. 2) is a second-generation sulfonylurea, is used to lower blood glucose in patients with diabetes mellitus type II[4]. Chemically it is N-[2-(4-[(cyclohexylcarbamoyl) amino] sulfonyl) phenyl) ethyl]-5-methylpyrazine-2-carboxamide. Glipizide bind to ATP-sensitive potassium channel receptors on the pancreatic cell surface, reducing potassium conductance and causing depolarization of the membrane. Depolarization stimulates calcium ion influx through voltage-sensitive calcium channels, raising intracellular concentrations of calcium ions, which induces the secretion, or exocytosis, of insulin[5,6].

Literature survey revealed that few HPLC methods[7-11] were reported for simultaneous estimation of Metformin and Glipizide in combined pharmaceutical dosage form. But no stability indicating HPLC method was reported. Hence the objective of this method is to develop and validate a simple, rapid, precise and accurate stability indicating RP-HPLC method in accordance with ICH guidelines[12,13] for the simultaneous estimation of Metformin and Glipizide in combined pharmaceutical dosage form.

MATERIALS AND METHODS

Materials

Metformin and Glipizide pure drugs were obtained from Yarrow Chemicals, Mumbai, India. Combination of Metformin and Glipizide tablets (Glynase-MF Tablets) were obtained from local pharmacy store. Acetonitrile, glacial acetic acid, triethylamine and distilled water were obtained from Rankem Chemicals Ltd., Mumbai, India.

Instrumentation

The analysis of drugs was carried out on Agilent 1260 infinity binary pump HPLC system on Microsorb-MV C18 column (250 × 4.6 mm, 5 µm).

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International Journal of Research in AYUSH and Pharmaceutical Sciences

Research Article

ESTIMATION OF PAROXETINE HYDROCHLORIDE FROM ITS TABLET FORMULATION BY UV SPECTROPHOTOMETRY

A. Lakshmana Rao*, A.B. Hima Bindu, G. Jyothi Stella, Y. Prema Latha and K. Kiranmai

Department of Pharmaceutical Analysis, V.V.Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Keywords: Paroxetine, Calibration, Validation, Estimation.

ABSTRACT

A simple, precise and accurate UV Spectrophotometric method was developed for the estimation of Paroxetine hydrochloride. The developed method obeyed Beer-Lambert's law in the concentration range of 5-30 µg/ml with a correlation coefficient of 0.995. The recovery study was carried out at three different levels and was found to be satisfactory. The percent amount of drug estimated by this method is 100%, found to be in good agreement with label claim of marketed tablet formulation. The validation parameters like linearity, precision, accuracy, robustness and ruggedness were studied and were found to be within limits. The proposed method can be adopted for routine quality control analysis of estimation of Paroxetine hydrochloride in pharmaceutical formulation.

INTRODUCTION

Paroxetine hydrochloride is a potent and selective serotonin reuptake inhibitor[1,2]. Chemically Paroxetine hydrochloride is (-)-*trans*-4R-(4'-fluorophenyl)-3*S*-[(3',4'-methylenedioxyphenoxy) methyl] piperidine hydrochloride hemihydrate (Fig. 1)[3]. Paroxetine hydrochloride is indicated for the treatment of depression, obsessive-compulsive disorder, panic disorder and social phobia[4]. Paroxetine acts by potentiation of serotonergic activity in the central nervous system resulting from inhibition of neuronal reuptake of serotonin (5-hydroxy-tryptamine, 5-HT)[5].

Literature survey reveals that very few UV Spectrophotometric methods were reported for the determination of Paroxetine hydrochloride[6]. The present study report a simple, rapid, precise and accurate UV Spectrophotometric method for the estimation of Paroxetine hydrochloride in bulk drug and in tablet dosage form and the developed method was validated as per ICH guidelines[7].

MATERIALS AND METHODS

Chemicals and Reagents

Pharmaceutical grade Paroxetine hydrochloride was obtained as gift sample from Spectrum Pharma Research Solutions, Hyderabad, India. Paroxetine hydrochloride (PARADISE XR 12.5) tablets were purchased from local market. Methanol (AR grade) was purchased from E.Merck (India) Ltd., Mumbai, India and was used as solvent. Fresh purified distilled water was used throughout the experiment.

Instruments

UV Spectrophotometer: Shimadzu-UV1800 Double Beam UV-Visible Spectrophotometer

Weighing balance: Shimadzu-BL220H Digital Weighing Balance

Preparation of standard stock solution

10 mg of Paroxetine hydrochloride was accurately weighed, transferred to 10 ml volumetric flask and dissolved in 7 ml of methanol. Sonicated the solution for few minutes and dissolved the drug completely. Then it was filtered through 0.45 µ filter and the volume was made up to 10 ml with methanol to get a concentration of 1 mg/ml stock solution. Further pipetted 1.0 ml of the above stock solution into a 10 ml volumetric flask and diluted up to the mark with diluent to obtain the concentrations of 100 µg/ml. Different aliquots were taken from standard stock solution and diluted with methanol separately to prepare series of concentrations from 5-30 µg/ml.

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Research Article

Morpho-Anatomical Features on *Blumea Mollis* (D. Don) Merr. (Asteraceae) Leaves

Dsnbk Prasanth[1]*, V Bhavya naga vani[2], N Teja[2], P Sri Raga Vidhya[2], G Bhargavi[2] and A Lakshmana Rao[3]

[1]Associate professor, Department of Pharmacognosy, V V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

[2]Students, Department of Pharmacognosy, V V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

[3]Professor and Principal, Department of Pharmaceutical Anaysis, V V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

***Corresponding Author:** DSNBK Prasanth, Associate professor, Department of Pharmacognosy, V V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Abstract

Background: *Blumea mollis* belonging to Asteraceae family is a significant therapeutic herb which has been in therapy utilized to treat several pathological marque since ages. It can be commonly referred as Suvattru mullangi in telugu. Though it is an essential herb, till date, no pharmacognostical information had been available on its leaves. Numerous adulterations are located in the market.

Objective: The current research was carried out to analyze the Pharmacognostic details for the rapid recognition and authentication of the herb. Materials and methods: The macroscopic and microscopic features with i quantitative microscopy of *Blumea mollis* leaves were performed utilising distinctive chemicals and reagents.

Results: The plant leaves show single layered, wavy walled cells in upper epidermis. Powder study of leaves shows epidermal cells, pigment cells, anomocytic stomata, covering trichomes and lignifie xylem vessles.

Conclusion: The macroscopic and microscopic characteristics of *Blumea mollis* leaves serves as a tool for low cost, rapid identification and authentication of this plant.

Keywords: Blumea mollis; anomocytic stomata; phytochemical analysis; physicochemical parameters.

Introduction

The usage of natural products or natural product-based medication is strengthening worldwide, particularly in the expanding parts of the world, despite the fact that synthetic medicines are readily available and reliable in healing several illnesses, there are people that still choose using traditional folk medicines because of the fewer hazardous outcome. Around 25% of the prescribed medicines on the globe will be of basically plant source [1]. In the developing countries like India, around 80% people depend on traditional plant-based medicines for their prime health care desires [2].

Modern prevalent desire for plant-derived medicines demonstrates its acknowledgement of the validity of numerous traditional promises about the values of natural products in healthcare [3]. For quality control of conventional medications, phytochemical inspections are mostly employed. Therefore, it creates an excellent value to look at chemical constituents and examine pharmacological activity about this herb because of its therapeutic applications, which is very helpful in the field of medicine as new emerging drug [4]. According to the WHO, medicinal plants are the best sources to obtain a variety of new herbal drug.

Blumea mollis (Asteraceae) is a genus of flowering plants widely distributed in Western and Southern plains of India ascending to 2000 ft in the Himalayas [5]. *Blumea* mollis is an agreeably fragrant annual herb with 30- to 60-cm height and generally seen in the flatlands of India, outer Himalaya, Ceylon (veraltet) and Myanmar. It is an annual erect herb, up to 60cm tall; brenchlets ribbed, pubescent. Leaves obovate, 3.5-9.5 X 1-3.5cm, base attenuate,

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Research Article

PHARMACOGNOSTIC STUDY OF *MANSOA ALLIACEA* LEAF

A. Lakshmana Rao*, D.S.N.B.K. Prasanth, J. Sai Sowmya, N. Teja, B. Pujitha, A. Sai Manikumar, G. Ooha Deepika, K. Bhargavi

*[1]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Keywords: *Mansoa alliacea,* Pharmacognostic evaluation, Organoleptic evaluation.

ABSTRACT

Mansoa alliacea Lam. (Family: Bignoniaceae) is a native plant from Amazonian basin in South America. Plant derivatives are used as anti-inflammatory, antioxidant, antiseptic and antibacterial agents. The study was aimed to determine the pharmacognostic and phytochemicals present in *Mansoa alliacea.* Micro and organoleptic characteristics of fresh and dried leaf samples had been examined. Physicochemical variables had been done by using WHO suggested variables; preliminary phytochemical of leaf sample had been performed to identify the presence of alkaloids, flavonoids, tannins and phenols, and quinones using the ethanolic extract of the leaves of *M. alliacea.*

INTRODUCTION

According to the World Health Organization[1], approximately 65-80% of the population living in developing countries reports to the use of medicinal plants to address their health care benefits. *Mansoa alliacea* belongs to the family Bignoniaceae is widely used by many of the indigenous peoples of the Amazon, with almost all parts of the plant being used. It is commonly called as garlic vine and Ajossacha[2]. So far, phytochemical studies have revealed some structurally diverse chemicals from the plant alkaloids, flavonoids, steroids, tannins and phenols. The plant has also become a popular treatment in modern herbal medicine in S. America. It is widely used for treating arthritis, rheumatism, body aches, pain and muscle aches and injuries. The leaves and flowers contain the known anti-inflammatory, antioxidant[3] and antibacterial plant steroids, beta-sitosterol, stigmasterol, daucosterol and fucosterol[4]. The genus Mansoa (Bignoniaceae) a source of organosulfur compounds[5]. *M.Alliacea* used for the treatment of reproductive organ infections, renal ailments, dizziness, epilepsy, sickle cell disease, depression, metabolic disorders, skin grievance, leprosy, impetigo, helminthic infections, athlete's foot, tumours[6]. In this study, we make an effort for standardization of *M. alliacea* leaf to analyze the morphological, anatomical, physicochemical and preliminary analysis of leaf was performed.

MATERIALS AND METHODS

Collection of plant materials

The fresh leaves were collected, authenticated and identified by the Department of Botany, Hindu College, Machilipatnam, Andhra Pradesh.

Pharmacognostic evaluation, organoleptic evaluation

Organoleptic characteristics of *Mansoa alliacea* leaf was evaluated by noticing colour, smell, taste, shape, and size as outlined by WHO quality control techniques for herbal medicine[7].

Microscopic evaluation, preparation of sections

Free handed sections of the leaf were cut into thin sections manually with the sharp cutting edge of the blade. After that it is transferred on the slide, cleared by heating with chloral hydrate, stained by way of phloroglucinol and concentrated HCL and mounted in glycerine. The lignified tissues had been identified by using distinct staining approaches[8].

Physicochemical analysis

Physicochemical parameters had been established based on the methods described in WHO quality control methods for herbal materials.

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Research Article

DESIGN, SYNTHESIS AND MOLECULAR DOCKING STUDIES OF NOVEL N-SUBSTITUTED-2-(FURAN-3-YL)-1*H*-BENZIMIDAZOLE DERIVATIVES

K. Srikanth Kumar[1]*, A. Lakshmana Rao[1], S. Ravichandra[2], A.N.V.S. Divya[1], Ch. Archana[1], A. Lavanya[1], A.V.D.S. Mani Kumar[1]

*[1]Department of Pharmaceutical Chemistry, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru,
[2]Department of Pharmaceutical Chemistry, Hindu College of Pharmacy, Guntur, India.

Keywords:
Benzimidazole derivatives, synthesis, characterization, molecular docking, β-tubulin.

ABSTRACT

Benzimidazole pharmacophore possess broad class of curative properties like anthelmintic, antiulcer, antihypertensive, anticancer, etc. In view of this reason benzimidazole derivatives synthesis gained vital significance in recent years. In this investigation, a series of novel substituted benzimidazole derivatives having furan appendage at 2nd position and alkyl/aryl appendage at 1st position were synthesized by using appropriate procedures. All the compounds synthesized were characterized by physically (R_f values, Melting point, Molecular weight, Molecular formula) and were characterized by spectral data (^{1}H-NMR, ^{13}C-NMR, IR and Mass spectra). All the synthesized compounds were screened for molecular docking studies on human gamma-tubulin protein to find out the binding interaction at the target active site. Molecular docking studies at human gamma-tubulin protein states that the compound 4b showed good binding affinity (-8.98 kcal/mol) in comparison to the reference compound Albendazole (-8.47 kcal/mol).

INTRODUCTION

In the current drug discovery research, heterocyclic ring containing drug molecules gained much more importance. Heterocyclic compounds take over various fields such as organic chemistry, medicinal chemistry, biochemistry, agricultural sciences. Heterocyclic compounds chemistry played a fundamental role in the metabolism of most of all living cells[1]. Among different classes of heterocyclic compounds, benzimidazole is the key scaffold which can be found in many active pharmaceutical ingredients. The benzimidazoles contain a phenyl ring fused to an imidazole ring, as indicated in the structure for benzimidazole. Currently used antiulcer drugs- Omeprazole, Lansoprazole, Pantoprazole, Rabeprazole; anthelmintic drugs- Albendazole, Mebendazole, Thiabendazole possessing benzimidazole moiety were mentioned (Fig. 1).

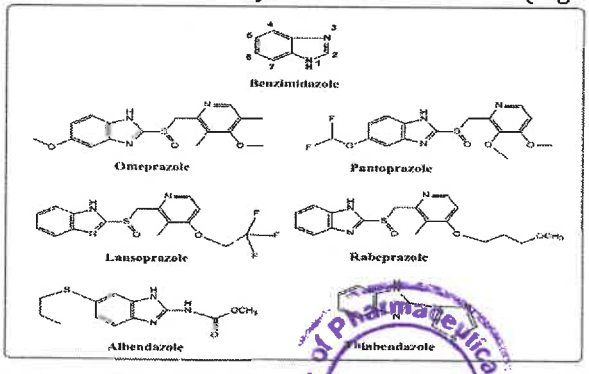

Fig. 1: Commonly used benzimidazole pharmacophore containing drugs

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Research Article

DESIGN, SYNTHESIS AND MOLECULAR DOCKING STUDIES OF NOVEL N-SUBSTITUTED-2-(FURAN-3-YL)-1*H*-BENZIMIDAZOLE DERIVATIVES

K. Srikanth Kumar[1]*, A. Lakshmana Rao[1], S. Ravichandra[2], A.N.V.S. Divya[1], Ch. Archana[1], A. Lavanya[1], A.V.D.S. Mani Kumar[1]

*[1]Department of Pharmaceutical Chemistry, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, [2]Department of Pharmaceutical Chemistry, Hindu College of Pharmacy, Guntur, India.

Keywords:
Benzimidazole derivatives, synthesis, characterization, molecular docking, β-tubulin.

ABSTRACT

Benzimidazole pharmacophore possess broad class of curative properties like anthelmintic, antiulcer, antihypertensive, anticancer, etc. In view of this reason benzimidazole derivatives synthesis gained vital significance in recent years. In this investigation, a series of novel substituted benzimidazole derivatives having furan appendage at 2nd position and alkyl/aryl appendage at 1st position were synthesized by using appropriate procedures. All the compounds synthesized were characterized by physically (R_f values, Melting point, Molecular weight, Molecular formula) and were characterized by spectral data (^{1}H-NMR, ^{13}C-NMR, IR and Mass spectra). All the synthesized compounds were screened for molecular docking studies on human gamma-tubulin protein to find out the binding interaction at the target active site. Molecular docking studies at human gamma-tubulin protein states that the compound 4b showed good binding affinity (-8.98 kcal/mol) in comparison to the reference compound Albendazole (-8.47 kcal/mol).

INTRODUCTION

In the current drug discovery research, heterocyclic ring containing drug molecules gained much more importance. Heterocyclic compounds take over various fields such as organic chemistry, medicinal chemistry, biochemistry, agricultural sciences. Heterocyclic compounds chemistry played a fundamental role in the metabolism of most of all living cells[1]. Among different classes of heterocyclic compounds, benzimidazole is the key scaffold which can be found in many active pharmaceutical ingredients. The benzimidazoles contain a phenyl ring fused to an imidazole ring, as indicated in the structure for benzimidazole. Currently used antiulcer drugs- Omeprazole, Lansoprazole, Pantoprazole, Rabeprazole; anthelmintic drugs- Albendazole, Mebendazole, Thiabendazole possessing benzimidazole moiety were mentioned (Fig. 1).

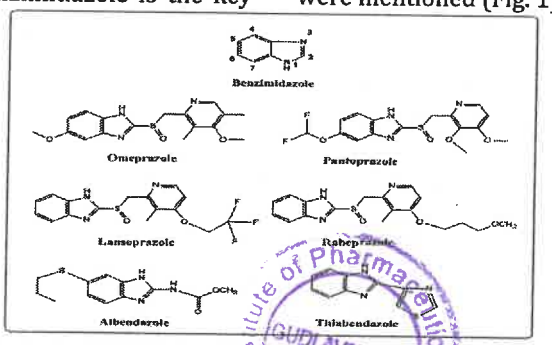

Fig. 1: Commonly used benzimidazole pharmacophore containing drugs

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Research Article

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BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF CHLORTHALIDONE AND CILNIDIPINE DRUGS IN HUMAN PLASMA BY RP-HPLC

M. Mukkanti Eswarudu[1], A. Lakshmana Rao[2*] and K. Vijay[3]

[1]Department of Pharmacy, Jawaharlal Nehru Technological University, Kakinada - 533003, Andhra Pradesh, India.

[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India.

[3]University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur- 522510, Andhra Pradesh, India.

ABSTRACT

A simple, rapid, sensitive, precise and accurate high performance liquid chromatography method was developed for simultaneous determination of Chlorthalidone and Cilnidipine in human plasma using Azilsartan as internal standard (ISTD). The analytes were extracted from 500 µL aliquots of human plasma sample by direct protein precipitation technique using acetonitrile. Evaluation of content of the drugs were done by employing a mixture of acetonitrile and 0.1% orthophosporic acid (OPA) buffer in the ratio of 35:65 v/v as the mobile phase with a flow rate of 1ml/mL and injection volume of 10µL. Chromatographic separation was accomplished using Inertsil C18, (150×4.6 mm; 5µm) analytical column and the effluents were monitored at 248 nm with photo diode array (PDA) detector. The total run time was 8 min with retention time of Chlorthalidone, Cilnidipine and Azilsartan 3.516 min, 3.518 min and 2.308 min respectively. Linearity was established at a concentration range of 0.05-5.00 µg/mL for Chlorthalidone and 0.025-2.5 µg/mL for Cilnidipine. The method was validated as per the US-FDA guidelines and the results were within the acceptance criteria. And proposed method was successfully applied for the simultaneous determination of Chlorthalidone and Cilnidipine in human plasma.

Keywords: Chlorthalidone, Cilnidipine, Protein precipitation, Human plasma and RP-HPLC.

INTRODUCTION

Selective and sensitive analytical methods for the quantitative evaluation of drugs and their metabolites (analytes) are critical for the successful evaluation of preclinical, biopharmaceutical and clinical pharmacological studies. Bioanalytical method validation includes all of the procedures which demonstrate that a particular method used for

dihydro-1*H*-isoindol-1-yl)benzene-1-sulfonamide [Fig. 1]. The molecular formula is $C_{14}H_{11}ClN_2O_4S$ and molecular weight is 338.766 g/mol. It inhibits sodium ion transport across the renal tubular epithelium in the cortical diluting segment of the ascending limb of the loop of henle. By increasing the delivery of sodium to the distal renal tubule, Chlorthalidone indirectly increases potassium

Development and Validation of Stability Indicating RP-HPLC Method for Simultaneous Estimation of Dapagliflozin and Saxagliptin in Pure and Pharmaceutical Dosage Form

V. Rajani[1*], Y. Rajendra Prasad[2] & A. Lakshmana Rao[3]

Abstract: *Combination of Dapagliflozin and Saxagliptin has been successfully used for the treatment of diabetes mellitus. The objective of the present study was to establish a simple, precise, specific and stability indicating RP-HPLC method for the simultaneous estimation of Dapagliflozin and Saxagliptin in bulk and tablet dosage form. The analysis has been performed on Agilent BDS column (250 x 4.6 mm, 5µ) at 30°C using water:acetonitrile (50:50, v/v) as mobile phase. The detection was carried out at 210 nm with a flow rate of 1.0 ml/min. The retention time of Dapagliflozin and Saxagliptin was found to be 3.172 min & 2.583 min respectively. The linearity range was 25-150 µg/ml for Dapagliflozin and 1.25-75 µg/ml for Saxagliptin respectively. The forced degradation studies were performed as per the guidelines of ICH under acidic, alkaline, oxidative, thermal, photo stability & neutral conditions. The developed method was successfully validated for all the parameters and was found to be within the limits. The developed method could be successfully employed for the simultaneous estimation of Dapagliflozin and Saxagliptin in pure and tablet dosage form.*

Introduction

Dapagliflozin (DAP) (Figure 1) is chemically (2S,3R,4R,5S,6R)-2-[4-chloro-3-[(4-ethoxyphenyl)methyl]phenyl]-6-(hydroxymethyl) oxane-3,4,5-triol[1]. DAP is indicated for the management of diabetes mellitus type 2, and functions to improve glycemic control in adults when combined with diet and exercise. DAP is a sodium-glucose cotransporter 2 inhibitor, which prevents glucose reabsorption in the kidney[2].

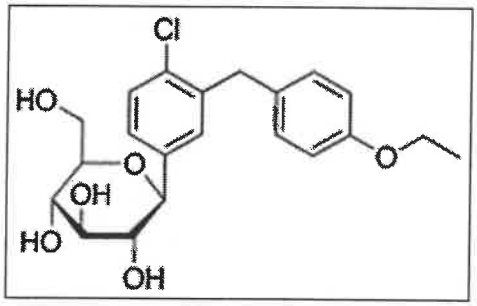

Figure 1: Chemical structure of Dapagliflozin

Saxagliptin (SAX) (Figure 2) is chemically (1S,3S,5S)-2-[(2S)-2-amino-2-(3-hydroxy-1-adamantyl)acetyl]-2-azabicyclo[3.1.0] hexane-3-carbonitrile[3]. SAX is a dipeptidyl peptidase-4 (DPP-4) inhibitor antidiabetic for the treatment of type 2 diabetes. DPP-4 inhibitors are a class of compounds that work by affecting the action of natural hormones in the body called incretins. The new combination of Dapagliflozin and Saxagliptin is indicated as an adjunct to diet and exercise to improve glycaemic (blood sugar level) control in adults with type-2 diabetes[4].

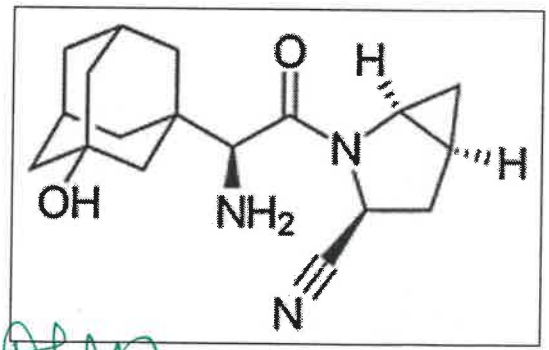

Figure 2: Chemical structure of Saxagliptin

[1*]Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar, A.P., [2]College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, A.P., [3]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P. **Email: rajanivetapalem13@gmail.com**

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Research Article

BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF PRAZOSIN AND POLYTHIAZIDE DRUGS IN SPIKED HUMAN PLASMA BY RP-HPLC

M. Mukkanti Eswarudu[1], A. Lakshmana Rao[2*] and K. Vijay[3]

[1]Department of Pharmacy, Jawaharlal Nehru Technological University, Kakinada – 533 003, Andhra Pradesh, India.

[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru – 521 356, Andhra Pradesh, India.

[3]University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Nagarjuna Nagar – 522 510, Andhra Pradesh, India.

ABSTRACT

A simple, novel, sensitive, rapid, precise and accurate high performance liquid chromatography method has been developed and validated for simultaneous determination of Prazosin and Polythiazide in human plasma using Hydrochlorothiazide as internal standard (ISTD).The analytes were extracted from 500 µl aliquots of human plasma sample by direct protein precipitation technique using acetonitrile. Evaluation of content of the drugs were done by employing a mixture of acetonitrile and potassium dihydrogen orthophosphate buffer in ratio of 35: 65 v/v as the mobile phase with a flow rate of 1 ml/min and injection volume of 10µl. Chromatographic separation was accomplished using Zorbax C18, (150×4.6 mm; 5µm) analytical column and the effluents were monitored at 265 nm with PDA detector. The total run time was 8 min with retention time of Prazosin, Polythiazide and Hydrochlorothiazide was 6.598 min, 5.214 min and 3.579 min respectively. Linearity was established at a concentration range of 5.0-500 ng/ml for Prazosin and 2.5-250 ng/ml for Polythiazide. The method was validated as per the US-FDA guidelines and the results were within the acceptance criteria and proposed method was successfully applied for the simultaneous determination of Prazosin and Polythiazide in human plasma.

Keywords: Prazosin. Polythiazide. Protein precipitation. Human plasma. RP-HPLC.

INTRODUCTION

Selective and sensitive analytical methods for the quantitative evaluation of drugs and their metabolites are critical for the successful evaluation of preclinical, biopharmaceutical and clinical pharmacological studies. Bioanalytical method validation includes all of the procedures which demonstrate that a particular method used for the quantitative measurement of analytes in a given biological matrix, such as blood, plasma, serum, or urine. These methods are reliable and reproducible[1].

Prazosin is a quinazoline derivative, is the first of that chemical class of antihypertensive. Chemically it is designated as 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(2-furoyl) piperazine and its structural formula is shown in Fig. 1. Prazosin is a sympatholytic alpha-adrenergic blocker used in the treatment of anxiety, hypertension, refractory pulmonary oedema and panic disorders. It reduces peripheral resistance and blood pressure by vasodilatation of peripheral vessel in arterioles and veins without increasing the heart rate or significantly impairing sympathetic function[2-5]. It is official in Indian pharmacopoeia[6], British pharmacopoeia[7], United States Pharmacopoeia[8].

Polythiazide is an orally effective benzothiadiazine sulfonamide derivative belonging to the class of the thaiazide diuretics. Chemically it is designated as 2*H*-1,2,4-Benzothiadiazine-7-sulfonamide,6-chloro-3,4-dihydro-2-methyl-3-[[(2,2,2-trifluoroethyl) thio]methyl]-1,1dioxide and its structural

Original Article

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Analytical Method for the Simultaneous Estimation of Sitagliptin and Simvastatin using RP-HPLC

A. Lakshmana Rao[1], T. Raja[2]

[1]Professor & Principal, [2]Associate Professor, Dept. of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

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A. Lakshmana Rao, T. Raja. Analytical Method for the Simultaneous Estimation of Sitagliptin and Simvastatin using RP-HPLC. J Pharmaceut Med Chem. 2019;5(1):5-11.

Abstract

A novel, rapid, precise and accurate high performance liquid chromatographic method was developed and validated for the simultaneous determination of Sitagliptin phosphate and Simvastatin in bulk drug and pharmaceutical formulation. The components were separated on Ymc Cyano (150 mm × 4.6 mm I.D., 5 µm particle size) with a mobile phase composed of 20 mM ammonium formate and acetonitrile in the ratio of 50:50 v/v (Adjust the pH to 3.5 with 0.1% formic acid) at a flow rate of 1.2 mL/min. The response was measured at 218 nm. The peaks were detected at 5.33 minutes and 4.19 minutes for Sitagliptin phosphate and Simvastatin respectively. Calibration curves were found to be linear (r^2=0.999 for both Sitagliptin phosphate and Simvastatin respectively) over the concentration range of 2.5-200 µg/mL for Sitagliptin phosphate and 1-80 µg/mL for Simvastatin. The method was validated for linearity, precision, accuracy, ruggedness and robustness. The proposed method can be applicable for simultaneous quantitation of Sitagliptin phosphate and Simvastatin in tablet dosage form. Validation results assured that the recommended method was specific, rapid, reliable and reproducible. Good percent recoveries and low % RSD reveals the suitability of the present method for analysis of Sitagliptin phosphate and Simvastatin in quality control laboratories.

Keywords: Sitagliptin; Simvastatin; RP-HPLC; Estimation.

Introduction

Sitagliptin phosphate (Fig. 1) is an oral dipeptidyl peptidase-4 (DPP-4) reversible inhibitor [1]. Chemically Sitagliptin is (3R)-3-amino-1-[3-(trifluoromethyl)-5,6 dihydro [1,2,4] triazolo [4,3-a] pyrazin-7(8*H*)-yl]-4-(2,4,5-trifluorophenyl)-1-butanone. It acts as DPP-4 inhibitorwhich exerts its action by slowing the inactivation of the incretin

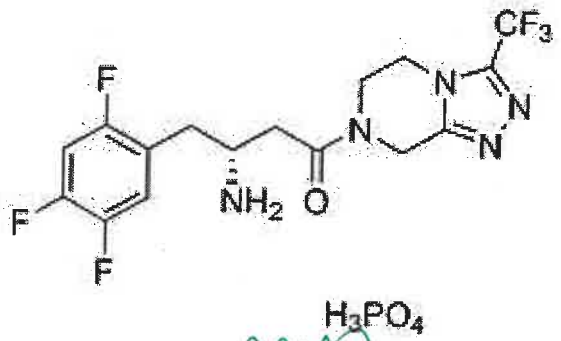

Fig. 1: Chemical structure of Sitagliptin phosphate

Corresponding Author: A. Lakshmana Rao, Professor and Principal, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

E-mail: dralrao@gmail.com

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Original Article

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RP-HPLC Method Development and Validation for Estimation of Dalfampridine in Pure and Tablet Dosage Form

T. Prasanthi[1], A. Lakshmana Rao[2], Shabana Begum[3], S. Tejaswini[4], T. Krishna[5], TNSD Prathima[6]

[1]Associate Professor, [2]Professor & Principal, [3-6]Students, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh 521356, India.

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T. Prasanthi, A. Lakshmana Rao, Shabana Begum et al. RP-HPLC Method Development and Validation for Estimation of Dalfampridine in Pure and Tablet Dosage Form. J Pharmaceut Med Chem. 2019;5(1):41-46.

Abstract

A simple, economic, rapid, accurate and stability indicating RP-HPLC method was developed for the estimation of amount of of Dalfampridine in pure and tablet dosage form. The method was performed on Phenomenex C18 (125 X 4.6 mm, 5 µm) using the mobile phase composed of buffer (0.01M sodium acetate pH 4.5): methanol in the ratio of 60:40 v/v. Th flow rate was maintained at 0.8 mL/min. The retention time for Dalfampridine was found to be 1.713 min. The method was found to be linear in the range of 5-25 µg/mL and the regression equation was found to be y=14691x-12844. For intra- and inter-day precision the %RSD for Dalfampridine was found to be 0.218 and 0.622%. Percentage mean recovery was found to be 98.36%. LOD and LOQ values obtained for Dalfampridine were found to be 0.107 µg/mL and 0.323 µg/mL respectively. Acid, alkali, oxidative, thermal and neutral degradation studies were performed. The results are analysed statistically and are found to be satisfactory. Hence this method can be routinely applicable for analysis of Dalfampridine in pure and tablet dosage form.

Keywords: Dalfampridine, RP-HPLC, Recovery, Dosage form.

Introduction

Dalfampridine (Fig. 1), is a potassium channel blocker prescribed for the treatment of multiple sclerosis. It is chemically pyiridine 4-amine or 4-Amino pyridine. It is also useful as an antagonist or non-depolarising neuro muscular blocking agents such as d-tubocurarine, gallamine, pancuroniun. Dalfampridine (DFP) which acts as at central and peripheral nervous system enhances conduction in demylinated axons and improve walking ability of multiple sclerosis patients [1]. It strengthens brain signals through the nerves that have been damaged by multiple sclerosis [2]. The use of Dalfampridine is to stimulate the demylinated axons that are exposed in multiple sclerosis patients.

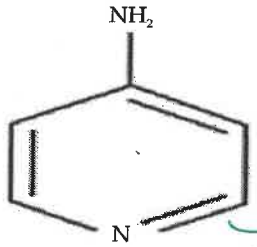

Fig. 1: Structure of Dalfampridine

Corresponding Author: T. Prasanthi, Associate Professor, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh 521356, India.

Email: prasanthi8585@gmail.com

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RP-HPLC Method Development and Validation for Estimation of Dalfampridine in Pure and Tablet Dosage Form

T. Prasanthi[1], A. Lakshmana Rao[2], Shabana Begum[3], S. Tejaswini[4], T. Krishna[5], TNSD Prathima[6]

[1]Associate Professor, [2]Professor & Principal, [3-6]Students, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh 521356, India.

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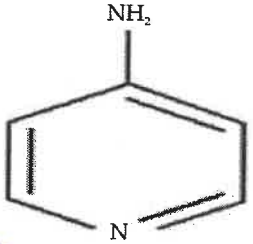

Fig. 1: Structure of Dalfampridine

Corresponding Author: T. **Prasanthi,** Associate Professor, Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna, Andhra Pradesh 521356, India.

Email: prasanthi8585@gmail.com

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Research Article

DEVELOPMENT AND VALIDATION OF HPTLC METHOD FOR THE ANALYSIS OF TOLPERISONE HYDROCHLORIDE IN PHARMACEUTICAL DOSAGE FORM

A. Lakshmana Rao*, T. Raja

Department of Pharmaceutical Analysis, V.V.Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

Keywords:
Tolperisone, HPTLC, Formulation, Estimation.

ABSTRACT

A simple, sensitive, rapid and precise high performance thin layer chromatographic method has been developed and validated for the estimation of Tolperisone hydrochloride in bulk and pharmaceutical dosage form. The stationary phase used was silica gel precoated aluminum plate $60F_{254}$ plates. The mobile phase used was a mixture of chloroform:acetone:toluene (6:2:2, v/v/v). The detection of spots was carried out at 265 nm. The method was validated in terms of specificity, linearity, precision and accuracy. The calibration curve was found to be linear between 50-600 ng/band. The developed method was subjected for forced degradation studies like acid, alkali, peroxide and thermal stress conditions were performed as per ICH guidelines. The proposed method was suitable for routine quality control analysis of Tolperisone hydrochloride in bulk and pharmaceutical formulation.

INTRODUCTION

Tolperisone hydrochloride (Fig. 1) is a skeletal muscle relaxant, acts at the level of spinal cord by blocking sodium channels and calcium channels [1-2]. Chemically it is 2-methyl-1-(4-methylphenyl)-3-(1-piperidinyl)-1-propanone hydrochloride [3]. Tolperisone hydrochloride exerts its spinal reflex inhibitory action predominantly via pre-synaptic inhibition of the transmitter release from the primary afferent endings via combined action on voltage-gated sodium and calcium channels [4]. Tolperisone hydrochloride increases the blood supply to skeletal muscle and antinociceptive activity against thermal stimulation that is likely to be attributed to its local anesthetic action [5].

Literature survey revealed that few HPTLC methods [6-7] were reported for the estimation of Tolperisone hydrochloride. Hence the objective of this method is to develop and validate a simple, precise and rapid HPTLC method in accordance with ICH guidelines [8-9] for the estimation of Tolperisone hydrochloride in bulk sample and its pharmaceutical formulation.

EXPERIMENTAL

Instrumentation

To develop a high performance thin layer chromatographic method for quantitative determination of Tolperisone hydrochloride using computerized Camag HPTLC system (Camag, Muttenz, Switzerland) consisting of a Camag 100 microlitre sample syringe (Hamilton, Bonded, Switzerland) on silica gel precoated aluminum plate $60F_{254}$ plates, [20 m × 20cm width 200µm thickness; E. Merck, Darmstadt, Germany] using a Camag Linomat V (Switzerland) sample applicator. Densitometric scanning was performed using a Camag TLC scanner III in the reflectance absorbance mode at 265 nm and operated by CATS software (V 3.15, Camag). The source of radiation used was deuterium lamp emitting a continuous UV spectrum between 190 nm and 400 nm. A Camag glass twin-trough development chamber, different size pipettes, volumetric flasks, measuring cylinders, micro syringes and ruler were used.

Chemicals and solvents

The reference samples of Tolperisone hydrochloride was obtained as gift sample from Spectrum Pharma Research Solutions, Hyderabad, India. Commercially available tablet formulation claimed to contain 150 mg of Tolperisone hydrochloride was purchased from local market. Chloroform, acetone and toluene purchased from Merck Chemicals, Mumbai, India.

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

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Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

CALENDER YEAR 2018

S.No.	Title of paper	Name of the author/s	Department	Name of journal	ISSN number
1	Evaluation of Hepatoprotective Activity of *Indigofera barberi* in Rats against Paracetamol Induced Hepatic Injury.	A.Lakshmana Rao	Pharmaceutical chemistry	Advances in investigational Pharmacology and Therapeutic Medicine.	NA
2	Evaluation of Hepatoprotective Activity of *Indigofera barberi* in Rats against Paracetamol Induced Hepatic Injury.	Sk.Aminabee	Pharmacology	Advances in investigational Pharmacology and Therapeutic Medicine.	NA
3	Evaluation of Pharmacognostic, Phytochemical and Physicochemical Standards of *Wedelia Trilobata* Root	D.S.N.B.K.Prasanth	Pharmacognosy	Open Access Journal of Pharmaceutical Research	2574-7797
4	Evaluation of Pharmacognostic, Phytochemical and Physicochemical Standards of *Wedelia Trilobata* Root	A.Lakshmana Rao	Pharmaceutical chemistry	Open Access Journal of Pharmaceutical Research	2574-7797
5	Design and Schematic Evaluation of Dextran Conjugated	A.Lakshmana Rao	Pharmaceutical chemistry	American Journal of Chemistry	2616-5244

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V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

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Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

	Dexibuprofen, a Gastrosparing NSAID	A.Lakshmana Rao	Pharmaceutical chemistry	American Journal of Chemistry	2616-5244
6	Formulation and Evaluation of Efavirenz Mucoadhesive Microspheres	G.N.A.Lakshmi	Pharmaceutics	Advance Research in Pharmaceutical s & Biologicals	2250-0774
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36	Development and Validation of RP-HPLC Method for Simultaneous Estimation of Paracetamol and Lornoxicam in Bulk and Pharmaceutical Dosage Form	A.Lakshmana Rao	Pharmaceutical chemistry	International Journal of Research in Ayush and Pharmaceutical Science	2456-9909

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KenKyu Advances in Investigational Pharmacology and Therapeutic Medicine 1:1-9 (2018)

Case Report

Evaluation of Hepatoprotective Activity of Indigofera barberi in Rats against Paracetamol Induced Hepatic Injury

A. Lakshmana Rao[1]*, Sk. Aminabee[1], M. Chinna Eswaraiah[2]

[1]Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[2]Department of Pharmacognosy, Anurag College of Pharmacy, Kodad, Telangana, India.

Received January 08, 2018; **Accepted** January 22, 2018; **Published** January 25, 2018

Abstract

Various fractions obtained from chloroform extract of Indigofera barberi (whole plant) was scrutinized in albino rats for hepatoprotective activity on paracetamol instigated hepatic injury. Into 11 groups rats were divided. 5 animals in each group. By giving paracetamol orally at a dose of 2 gm/kg hepatic injury was acquired. With fraction D, hepatoprotective action is achieved by depletion in various serum marker enzymes like AST (aspartate transaminase), ALT (alanine transaminase). Also diminished the high amount of serum bilirubin and ALP (alkaline phosphotase). The hepatoprotective activity of fraction D was additionally confined by histopathological investigations on paracetamol treated animals. With silymarin (100 mg/kg, orally), as a standard drug the effects acquired were collated. Valuable flavonoids in Fraction D had shown hepatoprotective activity via stability, suppressing oxidative stress and restrictive effect on cellular permeability, through their antioxidant characteristic.

Key words: I. barberi; Paracetamol; Hepatoprotective.

Introduction

Major body organ is the Liver. It executes a vital part in the metabolism of lipids, fats, proteins and carbohydrates. It maintains metabolic equilibrium. It plays vital role in biotransformation, detoxification and elimination of multiple environmental, endogenous and pharmaceutical wastes, biochemical's mandatory for digestion (bile pigments), hormones (angiotensinogen), productivity of many coagulation factors, vitamin A, D, B12 and growth factors. It also safeguards the physique from possible dangerous materials specifically endotoxins that are assimilated by the intestinal tract and virulent

***Corresponding author:** A. Lakshmana Rao Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Email: dralrao@gmail.com Mobile: 9848779133, Fax: 08674-274441

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***Corresponding author:** A. Lakshmana Rao Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Email: dralrao@gmail.com Mobile: 9848779133, Fax: 08674-274441

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Evaluation of Pharmacognostic, Phytochemical and Physicochemical Standards of Wedelia Trilobata (L.) Root

Prasanth DSNBK* and Lakshmana Rao A

Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, India

***Corresponding author:** Prasanth DSNBK, Associate Professor, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Tel: +917382027437; Email: dsnbkprasanth@gmail.com

Research Article

Volume 2 Issue 1

Received Date: January 11, 2018

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Abstract

Context: Ethnomedicinally, the root of Wedelia trilobata L. (Asteraceae) has long been used in various ailments in traditional system; most importantly it is used against backache, muscle cramp, rheumatism, stubborn wounds, sores, swelling and arthritic pain, fever and malaria. The main problem experienced in the standardization of herbal drugs is lack of proper identi ication of plant source. So there is need to establish quality control parameters by using pharmacognostic and phytochemical evaluation, which ensures the purity, safety and ef icacy of medicinal plant W. trilobata.

Aim: To evaluate pharmacognostic properties including macroscopic, microscopic and physicochemical parameters of the root of W. trilobata.

Methods: Micro and Macroscopic characters of fresh and dried root samples were investigated. Physicochemical parameters were done by utilizing WHO recommended parameters, preliminary phytochemical and luorescent analysis of root sample were performed for identi ication and standardization of root of W. trilobata.

Results: The color, shape, size, odor and surface characteristics were noted from the root and powdered root material of W. trilobata. Light electron microscope images of cross section of root and powdered root revealed that the presence of cork cells, ligni ied spiral vessels, and parenchymatous cells. Phytochemical screening showed the presence of lavonoids, tannins, phenols, saponins, steroids, carbohydrates and glycosides. Physicochemical parameters such as moisture content, ash value, extractive value and luorescent behavior of root powder were determined. These parameters are useful tools to differentiate the powdered drug material.

Conclusion: The present study is helpful to supplement the information with regard to its standardization and identi ication and in carrying out further research in Ayurvedic system of medicine.

Keywords: Pharmacognostic; Microscopical; Wedelia trilobata L; Physicochemical and ligni ied spiral vessels

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Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, India

***Corresponding author:** Prasanth DSNBK, Associate Professor, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Tel: +917382027437; Email: dsnbkprasanth@gmail.com

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Design and Schematic Evaluation of Dextran Conjugated Dexibuprofen, a Gastrosparing NSAID

American Journal of Chemistry
Vol. 3, No. 1, 30-41, 2018

(⚙ Corresponding Author)

Jaya Preethi P[1]
Lakshmana Rao A[2] ⚙
Basaveswara Rao MV[3]

[1]*Department of Pharmaceutical Chemistry, Sree Vidyanikethan College of Pharmacy, Tirupati, India; Department of Pharmaceutical Sciences, Krishna University, Machillipatnam, Andhra Pradesh, India*
Email: javapeesa@gmail.com Tel: 8099454224
[2]*Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, India*
Email: dralrao@gmail.com Tel: 9848779133
[3]*Krishna University, Machillipatnam, Andhra Pradesh, India*
Email: professormandava@gmail.com Tel: 9346234562

ABSTRACT

A novel prodrug approach was undertaken to develop the safe and therapeutically efficacious dexibuprofen to avoid oral NSAIDs induced ulceration. Dexibuprofen was esterified with dextran, using N,N-carbonyldiimidazole in one pot reaction. Synthesized dexibuprofen prodrug was characterized and evaluated by FT-IR and NMR spectroscopy, molecular weight, lipophilicity, partition coefficient, protein binding, degree of substitution, hydrolysis in simulated GI fluids, *in-silico* ADME properties and pharmacological potentials. Structural profile of dexibuprofen prodrug was elucidated by an ester linkage, glucosidic ring anomeric proton, dextran monomer protons and ester carbonyl carbon signals. Prodrug possessed physicochemical features as molecular weight of 83,368.11 g/mol, log P of 5.4 with optimal protein binding of 66% and degree of substitution of 25.3%. It was significantly hydrolyzed in SIF (99.53%) by following first-order kinetics with 85.9 min half-life. *In-silico* ADME properties of prodrug satisfied the Lipinski' rule of five and Jorgensen's rule of three without any CNS activity and cardiac toxicity, thus prodrug was suitable for oral administration. Prodrug has exhibited superior analgesic, anti-inflammatory, antipyretic activities devoid of antigenecity and ulceration in experimental animals. Data of the study were thus evinced that dexibuprofen prodrug is a safer therapeutic moiety in effective management of acute inflammation, pain and fever.

Keywords: *Acyl imidazole, Brewer's yeast, Challenge antigen, Complete freund's adjuvant (CFA), Gastric lesions, Sheep red blood cells (SRBC).*

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FORMULATION AND EVALUATION OF EFAVIRENZ MUCOADHESIVE MICROSPHERES

*G. N. A. Lakshmi, G.N.L. Rajitha, A. Lakshmana Rao
Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

Received on 11/01/2018 Revised on 21/01/2018 Accepted on 12/03/2018

ABSTRACT:
Efavirenz falls in the NNRTI class of antiretrovirals, it is an FDA approved drug for clinical use for the treatment of HIV infection, AIDS and AIDS-related conditions either alone or in combination with other antiviral agents. Efavirenz has short half life of about 3 hrs thereby requiring twice daily in large number of patients which leads to patient compliance. The side effects of Efavirenz are dose dependent and a reduction of the total administered dose reduces the severity of the toxicity. Efavirenz is typically administered orally as a capsule and tablet. Dosage forms that are retained in the stomach would increase the absorption, improve drug efficiency and decrease dose requirements. In the present study keeping an objective of dosage forms that are retained in the stomach, mucoadhesive microspheres of Efavirenz were prepared by orifice-gelation method using sodium alginate as coat and carbopol 934, chitosan, and natural mucoadhesive polymers viz., mucilage isolated from Acacia, Guar gum and Karaya gum.

KEY WORDS: Micropsheres, Mucoadhesive dosage forms, Efavirenz, Mucoadhesive microspheres.

***Corresponding author**
G. N. A. Lakshmi
Department of Pharmaceutics
V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.
Email: lakshmigna26@gmail.com , Tel.:+91-95428 94455

INTRODUCTION : Drug delivery systems [DDS] that can precisely control the release rates or target drugs to a specific body site have an enormous impact on the health care system. Microspheres constitute an important part of these particulate DDS by virtue of their small size and efficient carrier characteristics. However, the success of these novel DDS is limited due to their short residence time at the site of absorption. It would, therefore, be advantageous to have means for providing an intimate contact of the DDS with absorbing membranes. Mucoadhesive drug delivery systems are one of the novel drug delivery system, which utilize the property of bioadhesion of polymers that become adhesive on hydration[1]. These drug delivery systems can be used for targeting a drug to a particular region of the body for extended period of time[2]. The attachment could be between an artificial material and biological substrate such as adhesion between a polymer and

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FORMULATION AND EVALUATION OF EFAVIRENZ MUCOADHESIVE MICROSPHERES

***G. N. A. Lakshmi, G.N.L. Rajitha, A. Lakshmana Rao**
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KEY WORDS: Micropsheres, Mucoadhesive dosage forms, Efavirenz, Mucoadhesive microspheres.

***Corresponding author**
G. N. A. Lakshmi
Department of Pharmaceutics
V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.
Email: lakshmigna26@gmail.com , Tel.:+91-95428 94455

INTRODUCTION : Drug delivery systems [DDS] that can precisely control the release rates or target drugs to a specific body site have an enormous impact on the health care system. Microspheres constitute an important part of these particulate DDS by virtue of their small size and efficient carrier characteristics. However, the success of these novel DDS is limited due to their short residence time at the site of absorption. It would, therefore, be advantageous to have means for providing an intimate contact of the DDS with absorbing membranes. Mucoadhesive drug delivery systems are one of the novel drug delivery system, which utilize the property of bioadhesion of polymers that become adhesive on hydration[1]. These drug delivery systems can be used for targeting a drug to a particular region of the body for extended period of time[2]. The attachment could be between an artificial material and biological substrate such as adhesion between a polymer and

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ADVANCE RESEARCH IN PHARMACEUTICAL AND BIOLOGICALS
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Identification of *Helicobacter Pylori* in Dental Plaques

*Sk. Aminabee A. Bhargavi, A. Rohitha, B. Priya Nandini, K. Venkata Chalam, P. Ganesh, and A. Lakshmana Rao
Department of Pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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ABSTRACT:

Helicobacter pylori (*H. pylori*) were identified in dental plaque, raising the possibility of future gastritis and peptic ulceration. The aim of the present study was the assessment the association of *H. pylori* of dental plaque and stomach in a more homogenous population and also to determine the diagnostic value of dental plaque for gastric infection. *H. pylori* in dental plaque were assessed using three methods, rapid urease test, catalase test and culture method. The significance of the oral hygiene status in these individuals was assessed. Thirty eight patients were positive for *H. pylori* by rapid urease test, twenty nine patients were positive for *H. pylori* by catalase test and twenty three patients were positive for *H. pylori* by culture method out of fifty patients.

Key words: *H. pylori,* Dental plaque, Rapid Urease test, Catalase test, Culture method

*Corresponding author:
Dr. SHAIK AMINABEE*
Associate Professor,
V. V. Institute of Pharmaceutical Sciences,
Gudlavalleru-521356,
Krishna District, A.P., India.
E-mail: aminaammi786@gmail.com
Mobile: 9908037622

INTRODUCTION

Helicobacter pylori (*H. pylori*), a microaerophilic gram negative spiral bacteria, first isolated from a human gastric biopsy specimen in 1983, is well adapted to life in the hostile acidic environment of the stomach[1].

The association between *H. pylori* and the increased risk of duodenal ulceration and antral gastritis has been well established. Hence the importance of preventing reinfection by identifying the potential natural reservoirs of *H. pylori*[2]. The reservoir of *H. pylori* and its mode of transmission are unclear, a fecal-oral, oral-oral, and in developing countries a water borne route of infection have been suggested[3,4]. Studies on gastritis reinfection by *H. pylori* from an oral reservoir has produced conflicting reports as both supragingival and subgingival dental plaque provide an optimal microaerophilic environment required for the survival of *H. pylori*[5].

H. pylori were identified in dental plaque in 1989. Some researchers have hypothesized that dental plaque might be the reservoir for *H. pylori* in those patients with associated
gastritis and ulceration. As techniques have improved, this bacterium has been frequently isolated in dental plaque, with
some reports showing 100% correspondence between *H. pylori* containing dental plaque and patients with *H. pylori* associated gastritis and oral ulceration[6].

Various methods have been used to detect *H. pylori* in dental plaque, suggesting that dental plaque may be responsible for the transmission of the bacteria and

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Research Article

FORMULATION AND EVALUATION OF PARACETAMOL SUSPENSION BY USING NATURAL SUSPENDING AGENT EXTRACTED FROM BANANA PEELS

M. Sai Vishnu*, A. Lakshmana Rao, M. Yamini, M. Rajya Lakshmi, M. Meenakshi Prasanna, N. Uma Mounika

Department of Pharmaceutics, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru- 521 356, Andhra Pradesh.

Keywords: *Musa paradisica,* paracetamol, swelling index, phytochemical testing, sedimentation volume.

ABSTRACT

The present work was aimed to formulate and evaluate a new, cheap and effective natural suspending agent that can be used as an effective alternative for traditional suspending agent. The study procedure involved extraction of suspending agent from the *Musa paradisica* (Banana) fruit peels, determination of swelling index, phytochemical testing, Micromeritic properties of mucilage like Bulk density, Tapped density, Carr's index, Hausner's ratio, Angle of repose, Calibration of paracetamol, preparation of paracetamol suspensions and evaluated for pH determination, determination of sedimentation volume, redispersibility, determination of flow rate, measurement of viscosity, effect of temperature, drug content, particle size determination and *In-vitro* dissolution studies. The study showed that the extraction of suspending agent from banana fruit peels. The swelling index was found to be 40%. The photochemical test showed contains carbohydrates. As the concentration of suspending agent increases therefore viscosity of suspension increases which ultimately reduces the sedimentation of suspension.

INTRODUCTION

Taste is one of the most important parameters governing patient compliance. Undesirable taste is one of several important formulation problems that are encountered with certain drugs. Oral administration of bitter drugs with an acceptable degree of palatability is a key issue for health care providers, especially for paediatric patients. Several oral pharmaceuticals, numerous food and beverage products, and bulking agents have unpleasant, bitter tasting components. So, any pharmaceutical formulation with a pleasing taste would definitely be preferred over a competitor's product and would translate into better compliance and therapeutic value for the patient and more business and profits for the company. The desire of improved palatability in these products has prompted the development of numerous formulations with improved performance and acceptability.[1] Suspending agents also called thickening agents are used to stabilize suspensions are hydrophilic colloid i.e substances that spontaneously from colloidal dispersions with water because of an affinity between the dispersed particles and the dispersion medium.[2] They help in lowering the sedimentation rate of particles in suspension.[3,4]

Rationale of suspending agent selection

Mucilage of *Musa paradisica* can be used as Binding agent, Suspending agent, Thickening agent, Humidifying agent, Disintegrating agent, Gelling agent and Release controlling properties in medicines. In the present study, attempts shall be made to utilize dried powder of banana peel mucilage as suspending agent.

Aim: The present work was aimed to formulate and evaluation of paracetamol suspension by using a new, cheap and effective natural suspending agent from *Musa paradisica* (Banana) fruit peels.

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Synthesis and Biological Evaluation of Dithiocarbamates of 1-Naphylamine Chalchone

K. Madhavi[1], A. Lakshmana Rao[2], K. Jaya Bharathi[3], J. Subhashini[4], K. Bindu Bhargavi[5], K. Anjaneyulu[6]

[1]Assistant Professor, Dept. of Pharmaceutical Chemistry, [2]Principal & Professor, Dept. of Pharmaceutical Analysis, [3-6]Student, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

Abstract

The new dithio carbamate derivatives, 2-(naphthalen-8-ylcarbamoyl)-1-(4-hydroxyphenyl) ethyl diethylcarbamodithioate (IIIa) and 2-(naphthalen-8-ylcarbamoyl)-1-(2,4-dichlorophenyl) ethyl diethylcarbamodithioate (IIIa) were synthesized from 1-naphylamine chalchone. The new molecules were characterized by spectral and elemental analysis data. The synthesized analogues were evaluated for anti-mitotic activity by Bengal gram seed germination model showed strong to moderate activities compared with control. Both the molecules showed good inhibition.

Keywords: Dithiocarbamates; 1-Naphthalamine; Antimitotic Activity.

Introduction

Dithiocarbamates, the half amides of dithiocarbonic acids, were discovered as a class of chemical compounds in the history of organo sulphur chemistry. Dithiocarbamates are a common class of organic molecules that form mono and bidentate coordination with transition metals. Transition metal complexes of dithiocarbamate present a wide range of biological activities and are recently applied in the treatment of cancer. Since brassinin (Fig. 1), a phytoalexin first isolated from cabbage had cancer preventive activity,

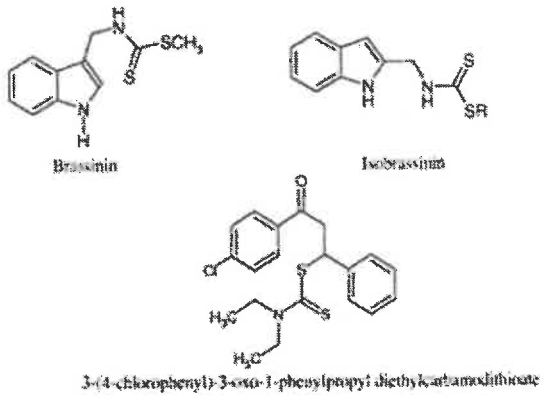

Fig. 1:

structural modification on this compound led to the synthesis of isobrassinin (Fig. 1) and a series of Dithiocarbamates [1], some of these were found to have antitumor activity. On the other side, Chalcones are the bio-genetic precursors of all known flavonoids and isoflavanoids and are abundant in edible plants. They exhibit a broad spectrum of pharmacological activities such as anticancer, anti-inflammatory, anti-malarial, antifungal, anti-lipidemic, antiviral, anti-Leshmanial, anti-ulcer and antioxidant activities. Recently Yong Qian and coworkers reported a series of chalcone derivatives (Fig. 1), with dithiocarbamated moieties which possessed potential anti-proliferative and anti-tubulin properties. Microtubules are among the most important molecular targets for cancer chemo-therapeutic agents. These small molecules bind to the tubulin, interfering with the polymerisation or depolymerisation of micro- tubules and there by inducing cell cycle arrest, resulting in cell death or apoptosis. Based on above information used to

Reprint Request: K. Madhavi, Assistant Professor, Department of Pharmaceutical Chemistry, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh 521356, India.

E-mail: madhavikamma19@gmail.com

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Research Article

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SYNTHESIS OF RU-NHC COMPLEX FROM CAFFINE AND ITS ACTIVITY AGAINST MALARIAL PARASITES

Karumutchu Sitalu[1]*, B. Hari Babu[2] and A. Lakshmana Rao[3]

[1]*Department of Chemistry, Krishna University, Machilipatnam-521001.
[2]Department of Chemistry, Acharya Nagarjuna University, Guntur-522510.
[3]VV Institute of Pharmaceutical Sciences, Gudlavalleru-521356.

***Corresponding Author: Karumutchu Sitalu**

Department of Chemistry, Krishna University, Machilipatnam-521001.

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ABSTRACT

Present day organometallic science is difficult to envision without flexible N-heterocyclic carbene ligands. Because of their remarkable soundness and auxiliary differing qualities these themes are utilized in incalculable coordination buildings in current days. Specifically, transition metal complexes bearing interchangeable and promptly accessible NHCs have been built up as intense homogeneous catalysts. This field concentrates on particular applications and adjustments. Therefore, the present scientific experts can depend on complex engineered apparatus for the functionalization of carbenes, empowering access to polydentate ligand frameworks with or without hemilabile conduct. With regards to this work, different functionalized carbene ligands were utilized to accomplish or examine particular properties of ruthenium complexes. Tetracarbene ligands are generally unbending structures which empower relatively stable mixes because of their chelating coordination mode. Be that as it may, the basic differences of these themes is frequently restricted because of the low adaptability of the ligand forerunners. Using a non-cyclic, open-chain tetraimidazolium salt, we blended Ru (II) edifices whose geometry can be adjusted relying upon the response conditions. Also, these buildings demonstrated articulated movement in the TH of ketones. The present study focuses on the synthesis of Ru-NHC and its impact on malarial parasites.

KEYWORDS: Carbene compounds, methylated caffeine, XRD, malarial parasite.

INTRODUCTION

Ruthenium (III) complexes are all octahedral and low-spin with one pair electron. It can also form extensive series of halide complexes, the aqua-chloro series being probably the best characterized of all its complexes. The Ru(III)/Cl-/H_2O system has received extensive study, especially by ion exchange technique. $K_3[RuF_6]$ can be synthesized from molten salt $RuCl_3/KHF_2$ (Goldberg *et al.*, 1968). The dimeric anion of bromo complexes were reported, for example, $[Ru_2Br_9]_3$- which is composed of a pair of faced-sharing octahedra. Cyano complexes of ruthenium (III) were prepared, the parent $[Ru(CN)_6]^{3-}$ was isolated as the brilliant yellow salt by aerial oxidation of dimethylsulfoxide solution of $[Ru(CN)_6]^{2+}$. Ruthenium (III) is much more amenable in coordination with N-donor ligands than is iron(III), and forms ammines with 3 to 6 NH_3 ligands (the extra ligands making up octahedral coordination are commonly H_2O or halides) as well as complexes with 2,2′-bipyridine and 1,10- phenanthroline (Dwyer *et al.*, 1963).

We are interested in the synthesis of Ruthenium NHC complexes that have the potential to be used as a new class of antibiotics, DNA binders particularly for the treatment of cancer, bacterial infections, malaria, Chagas disease, Spetic shock and also as immunosuppressants. Malaria is a life threatening mosquito-borne infectious disease caused by parasites transmitted to humans through the bite of the Anopheles mosquito and affects approximately 16,00,000 people world wide (Caraballo and Hector, 2014). Infections with infected anophilous mosquitoes cause most of the morbidity and mortality in patients with Malaria (Bousema and Drakeley, 2011).

The global scope of malaria and the spread of drug-resistant *Plasmodium falciparum* make the need for improved therapy undeniable (Guerin et al, 2002). Assessment of both existing drugs and new antimalarials, alone or in combination, requires reliable methods for high-throughput testing. For decades, antimalarial drug effects have been measured in vitro by quantifying parasite uptake of radioactive substrates as a measure of growth and viability in the presence of the test drug (Desjardins et al., 1979; Elabbadi, et al., 1992). Antimalarial drugs are used for the treatment and prevention of malaria infection. Most antimalarial drugs target the erythrocytic stage of malaria infection, which is the phase of infection that causes symptomatic illness. The extent of preerythrocytic (hepatic stage) activity for

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Research Article

EVALUATION OF ANTIPYRETIC ACTIVITY OF ETHANOLIC EXTRACT OF *WEDELIA TRILOBATA*

M.Madhu Babu*, A.Lakshmana Rao, V.Harshitha, V.Madhavi, V.N.S.Lavanya, V.Vineetha, M.Sai Sailaja

Department of pharmacology, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru- 521 356, Andhra Pradesh.

Keywords: *Wedelia trilobata*, Brewer's yeast, Paracetamol, Digital clinical thermometer.

ABSTRACT

The aim of present study was to investigate antipyretic activity of ethanolic extract of leaves of *Wedelia trilobata* in yeast induced pyrexia in wistar albino rats. In which pyrexia was induced by an intraperitonial injection of 20% brewer's yeast (10 ml/kg b.wt.). The body temperature of rats were measured before the injection of yeast and injected ethanolic extract of leaves of *Wedelia trilobata* (100 mg/kg b.wt.) and (200 mg/kg b.wt.) and followed by treatment with paracetamol (150 mg/kg b.wt.). The body temperature of experimental animals were recorded in the time interval of 0 hr, 1 hr, 2 hr and 3 hr with help of digital clinical thermometer which is placed in rectum in the depth of 2 cm and recorded body temperature values shown that the leaves extract of of *Wedelia trilobata* possess antipyretic activity.

INTRODUCTION

Wedelia trilobata is a mat forming perennial herb with rounded stems. Leaves are fleshy, usually 2 to 4 inches long and 1 to 5 inches wide, with irregularly toothed margins. Flowers are solitary, one inch in diameter and yellow-orange in color. The major components were germacrene D, α-phellandrene, α-pinene, E-caryophyllene, bicycle-germacrene, limonene and α-humulene. The percentage of most of the individual constituents present in *W. trilobata* essential oil changed significantly during the months. The plant has reported various pharmacological activities i.e., antimicrobial, antiproliferation, wound healing, antioxidant, antiinflammatory, *in-vitro* thrombo-lytic, antiproteinase, antifungal, antitumour and leishmanicidal activities[1]. Aerial parts of this plant used in traditional medicine against bronchitis, colds, abdominal pains, dysmenorrheal, fertility enhancer. Antipyreic compounds available in the market still present a wide range of undesired effects, leaving an open door for new and better compounds. Therefore, the present study was made on antipyretic effects on *Wedelia trilobata*.

EXPERIMENTAL METHODOLOGY

Identification & collection of plant material

The whole plant of *Wedelia trilobata* was collected from Gudlavalleru. These plants were identified and authenticated by Department of Botany, Hindu College, Machilipatnam. The plants were sorted, cleaned and air dried at room temperature for one week. Then it was ground to powder. Powdered sample was collected and stored in air and water proof containers protected from direct sunlight and heat until used for extraction.

Preparation of plant material

The powdered material of *Wedelia trilobata* was extracted with maceration for 3 days with distilled water followed by simple distillation. The extracts were concentrated to dryness till free from the solvents.

Qualitative Phytochemical screening

The following tests were carried out on standardized herbal extract to detect the presence of various phytoconstitutents like saponins, tannins, flavonoids, alkaloids, steroids, carbohydrates, proteins and phenols by different methods.

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Simultaneous estimation of canagliflozin and metformin hydrochloride in tablet dosage form by UV spectrophotometry

D. Sharmila[1,*], J. Chandini[2], K. Vasantha Lakshmi[3], Ch. Hari Balaji[4], A. Lakshmana Rao[5]

[1]Associate Professor, [2-4]UG Student, [5]Principal, Dept. of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India

***Corresponding Author:**
Email: sharmiladonepudi@gmail.com

Abstract
The combination of Canagliflozin and Metformin was available as fixed dose tablets for the treatment of type 2 diabetes. The present method aims to develop a simple, precise and accurate spectrophotometric method for simultaneous determination of Canagliflozin and Metformin in commercial formulation. The method utilizes Vierordt's equation based on the measurement at two wavelengths 290nm (λmax of Canagliflozin) and 236nm (λmax of Metformin). The method exhibited linear range of 2.5 to 15µg/ml and 5 to 17.5µg/ml for Canagliflozin and Metformin, respectively, with a correlation coefficient of 0.999. The LOD and LOQ for Canagliflozin were found to be 0.43 and 1.31 respectively. For Metformin the LOD and LOQ were found to be 0.49 and 1.49 respectively. The recovery of Canagliflozin and Metformin were found to be 99.43 and 98.82 respectively. The results were validated statistically as per ICH guidelines and were found to be satisfactory. To conclude, the developed UV spectrophotometric method is more economical for analysis of Canagliflozin and Metformin in both bulk and pharmaceutical dosage form for routine analysis.

Keywords: Canagliflozin, Metformin, Vierordt's equation, UV-Spectrophotometry, ICH guidelines.

Introduction
The combination of Canagliflozin and Metformin is indicated as an adjunct to diet and exercise to improve glycemic control in adults with type-2 diabetes. The Canagliflozin and Metformin formulation is available in four dose strengths (50/500 mg, 50/1000 mg, 150/500 mg, 150/1000 mg) and should be taken twice daily with food.[1] Canagliflozin (Fig. 1a) is chemically (1S)-1, 5-anhydro-1-[3-[[5-(4-fluorophenyl)-2-thienyl]methyl]-4-methylphenyl]-D-glucitol and belongs to the class of SGLT2 inhibitors. It is used in the treatment of type-2 diabetes.[2] Canagliflozin inhibits the reabsorption of glucose from kidneys and lowers the renal glucose threshold by inhibiting sodium-glucose transport protein (SGLT2).[3-4] By blocking SGLT2, Canagliflozin decreases reabsorption of filtered glucose and reduces the renal threshold for glucose (RT_G), thereby elevating the urinary glucose excretion (UGE) and reducing raised plasma glucose in patients with type-2 diabetes.[5] Canagliflozin can be used as monotherapy or multi therapy in the treatment of type-2 diabetes.[6-9]

Metformin (Fig. 1b) a biguanide antihyperglycemic agent used for treating type-2 diabetes. It acts by decreasing hepatic glucose production and glucose absorption, and it enhances insulin mediated glucose uptake. Metformin is recommended as first line therapy for patients with type-2 diabetes. Patients, from whom Metformin monotherapy is not sufficient to achieve glycemic goals, it is referred to use in combination with other class of antidiabetic drugs.[10]

The literature survey revealed that few analytical methods were reported for estimation of the drugs individually and in combination using, UV,[11-13] HPLC,[14-16] HPTLC[17] and LC-MS.[18] In the present study an attempt was made for simultaneous estimation of Canagliflozin and Metformin in pharmaceutical dosage form by UV spectrophomerty. The method can be applied for routine quality control analysis.

Materials and Method
Reagents and Chemicals: The pure sample of Canagliflozin and Metformin was procured from Selleckchem LLC supplied by Pro lab marketing, India. The commercial formulations (Invokamet tablets containing 150mg of Canagliflozin and 500mg of Metformin) were procured from the local market. Methanol (AR grade) was purchased Merck Chemical Division, Mumbai, India and was used as diluent. Fresh purified distilled water was used throughout the experiment.

Instrumentation: Shimadzu UV1800 Double Beam UV-Visible Spectrophotometer, using software UV Probe (version 2.42) was used for spectral studies. Shimadzu BL220H Digital Weighing Balance having sensitivity of 0.001g was used for weighing the materials.

Method Development
Standard solution preparation: About 100mg of Canagliflozin and 100mg of Metformin was accurately weighed and transferred into a 100mL clean dry volumetric flask containing 70mL of methanol. The solution was sonicated for 5min and the drug was dissolved completely. The volume was made up to the mark with a further quantity of the methanol to get a stock concentration of 1mg/mL Canagliflozin and Metformin. From the above prepared stock solution

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Keywords: Canagliflozin, Metformin, Vierordt's equation, UV-Spectrophotometry, ICH guidelines.

Introduction
The combination of Canagliflozin and Metformin is indicated as an adjunct to diet and exercise to improve glycemic control in adults with type-2 diabetes. The Canagliflozin and Metformin formulation is available in four dose strengths (50/500 mg, 50/1000 mg, 150/500 mg, 150/1000 mg) and should be taken twice daily with food.[1] Canagliflozin (Fig. 1a) is chemically (1S)-1, 5-anhydro-1-[3-[[5-(4-fluorophenyl)-2-thienyl]methyl]-4-methylphenyl]-D-glucitol and belongs to the class of SGLT2 inhibitors. It is used in the treatment of type-2 diabetes.[2] Canagliflozin inhibits the reabsorption of glucose from kidneys and lowers the renal glucose threshold by inhibiting sodium-glucose transport protein (SGLT2).[3-4] By blocking SGLT2, Canagliflozin decreases reabsorption of filtered glucose and reduces the renal threshold for glucose (RT_G), thereby elevating the urinary glucose excretion (UGE) and reducing raised plasma glucose in patients with type-2 diabetes.[5] Canagliflozin can be used as monotherapy or multi therapy in the treatment of type-2 diabetes.[6-9]

Metformin (Fig. 1b) a biguanide antihyperglycemic agent used for treating type-2 diabetes. It acts by decreasing hepatic glucose production and glucose absorption, and it enhances insulin mediated glucose uptake. Metformin is recommended as first line therapy for patients with type-2 diabetes. Patients, from whom Metformin monotherapy is not sufficient to achieve glycemic goals, it is referred to use in combination with other class of antidiabetic drugs.[10]

The literature survey revealed that few analytical methods were reported for estimation of the drugs individually and in combination using, UV,[11-13] HPLC,[14-16] HPTLC[17] and LC-MS.[18] In the present study an attempt was made for simultaneous estimation of Canagliflozin and Metformin in pharmaceutical dosage form by UV spectrophomerty. The method can be applied for routine quality control analysis.

Materials and Method
Reagents and Chemicals: The pure sample of Canagliflozin and Metformin was procured from Selleckchem LLC supplied by Pro lab marketing, India. The commercial formulations (Invokamet tablets containing 150mg of Canagliflozin and 500mg of Metformin) were procured from the local market. Methanol (AR grade) was purchased Merck Chemical Division, Mumbai, India and was used as diluent. Fresh purified distilled water was used throughout the experiment.

Instrumentation: Shimadzu UV1800 Double Beam UV-Visible Spectrophotometer, using software UV Probe (version 2.42) was used for spectral studies. Shimadzu BL220H Digital Weighing Balance having sensitivity of 0.001g was used for weighing the materials.

Method Development
Standard solution preparation: About 100mg of Canagliflozin and 100mg of Metformin was accurately weighed and transferred into a 100mL clean dry volumetric flask containing 70mL of methanol. The solution was sonicated for 5min and the drug was dissolved completely. The volume was made up to the mark with a further quantity of the methanol to get a stock concentration of 1mg/mL Canagliflozin and Metformin. From the above prepared stock solution

ORIGINAL RESEARCH

DEVELOPMENT AND VALIDATION OF UV SPECTROSCOPIC METHODS FOR SIMULTANEOUS ESTIMATION OF OFLOXACIN AND TINIDAZOLE IN PHARMACEUTICAL DOSAGE FORM

*Sai Datri A, Lakshmana Rao A, Raja Sainadh S, Geethika S, Bhavani Devi S, Vatsavi Sai T
Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

Submitted on: 22.04.18; Revised on: 15.05.18; Accepted on: 24.06.18

ABSTRACT: A sensitive and validated UV method have been developed for the simultaneous estimation of Ofloxacin (OFL) and Tinidazole (TNZ) in bulk and pharmaceutical dosage form, without prior separation, by three different techniques (Simultaneous equation, Absorbance ratio method and Dual wavelength method). The work was carried out on Shimadzu electron UV1800 double beam UV-Visible spectrophotometer. The absorption spectra of reference and test solutions were carried out in 1 cm matched quartz cell over the range of 200-400 nm. The first method is the application of simultaneous equation, where the linearity ranges for Ofloxacin and Tinidazole were 2-10 µg/ml and 5-15 µg/ml respectively. The second method is the dual wavelength method, where the linearity ranges for Ofloxacin and Tinidazole were 2-10 µg/ml and 5-15 µg/ml respectively. The third method is the determination of ratio of absorbance at 294.6 nm, the maximum absorption of Tinidazole and isobestic wavelength 285.6 nm, the linearity ranges for Ofloxacin and Tinidazole were 2-10 µg/ml and 5-15 µg/ml respectively. The results of the analysis have been validated statistically and by recovery studies. The proposed procedures are rapid, simple, require no preliminary separation steps and can be used for routine analysis of both drugs in quality control laboratories.

KEYWORDS: Ofloxacin, Tinidazole, UV spectroscopy and Validation.

Corresponding Author: Ms. Sai Datri Arige
Phone No: +91-8500542419
E-Mail: sai.dhatri_arige@yahoo.co.in

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Journal of Pharmaceutical and Health Sciences 2018;6(2), 169-176.

Original Article

JPHS

SYNTHESIS OF PARACETAMOL DERIVATIVES AS MANNICH BASES AND THEIR ANTIBACTERIAL ACTIVITY

K. Srikanth Kumar*, A. Lakshmana Rao, M. Bhagya Sri, M. Pravallika, M. Kalyani, K. Seetha Ramudu

Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India.

Abstract

A variety of Paracetamol derivatives as mannich bases were prepared through mannich reaction by reacting Paracetamol as compound containing active hydrogen, substituted benzaldehyde, morpholine as secondary amine compound and small amount of conc. HCl as catalyst. A simplistic one-pot method under mild conditions has been developed for the synthesis of all the compounds and they were characterized by physically (Rf values, Melting point, Molecular weight, Molecular formula) and by spectral data (IR and 1H-NMR spectral analysis). Antibacterial activity was carried out by using cup plate method. All the newly synthesized compounds were screened for antibacterial activity against gram positive and gram negative microorganisms i.e. Staphylococcus aureus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa in comparison with standard drug Streptomycin. However the antibacterial activity of the synthesized compounds against the tested organisms was found to possess good to moderate activity. The 1H-NMR spectra chemical shifts in δ, ppm were recorded on Bruker NMR 400 MHZ using spectrophotometer using DMSO-d6 as solvent. The IR spectra of the synthesized compounds were recorded on Bruker FT-IR spectrophotometer with KBr pellets. The progress of the reaction and purity of the compounds was checked by TLC on pre-coated silica gel G plates by using n-hexane:ethyl acetate (9:1) v/v as a mobile phase and visualized in UV cabinet. A facile one-pot method under mild conditions has been developed for the synthesis of the title compounds. All the compounds were evaluated for their antibacterial activity against gram +ve and gram -ve micro-organisms by cup plate method. 3-(4-chlorophenyl)-3-(morpholine-4-yl)-N-(4-hydroxyphenyl) propanamide 4a gives high % yield. The antibacterial screening results states that compound 4b shown significant activity against S. aureus, 4a and 4b compounds shown significant activity against B. subtilis, compound 4b shown significant activity against E. coli and compound 4f shown significant activity against P. aeruginosa.

Keywords: Paracetamol, Substituted benzaldehydes, Morpholine, Mannich reaction, In vitro antibacterial activity

**Corresponding author*: K. Srikanth Kumar, Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, Andhra Pradesh, India.
Tel: +9494682732
Email address: karumanchi002@gmail.com

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Curr Trends Biomedical Eng & Biosci

Pharmacognostic Study of *Eranthemum nigrum* Stem

DSNBK Prasanth* and A Lakshmana Rao

Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, India

Submission: April 20, 2018; **Published:** June 22, 2018

***Corresponding author:** DSNBK Prasanth, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village, Gudlavalleru, India, Email: dsnbkprasanth@gmail.com

Abstract

Objective: To analyze the pharmacognostic characteristics and physiochemical parameters of the stem of *Eranthemum nigrum* [*E. nigrum*].

Methods: Microscopic characters and powder analysis had been carried out with the help of a microscope. The physiochemical properties such as loss on drying, total ash value, acid insoluble ash value, water soluble ash value, extractive values and fluorescence of *E. nigrum* had been performed.

Results: The color, shape, size, odor, and surface characteristics were reported from the stem and powdered stem material of *E. nigrum*. Light microscope images of cross section and powdered stem revealed the presence of Phloem fibers, Lignified Xylem Vessels, Lignified xylem fibers and Parenchyma cells. Phytochemical testing confirmed the presence of steroids, alkaloids, tannins, saponins, carbohydrates, glycosides, amino acids and proteins.. Physicochemical parameters such as moisture content, ash value, extractive value and fluorescent behavior of stem powder have also been established.

Conclusion: The current research would be useful in order to supplement the information regarding standardization, identity and in performing additional explorations in Ayurvedic system of medicine.

Keywords: Pharmacognostic; *Eranthemum nigrum*; Lignified xylem vessels; Phloem fibers; Phytochemical; Physicochemical analysis

Introduction

Medicinal plants are usually playing a significant part in traditional medicines intended for therapy of various health issues. However a crucial hurdle, which has impeded the promotion in the usage of alternative medications in the developed countries, is lack of evidence of documentation and absence of stringent quality control measures. Additionally, there is a dependence on the data of all study meted out on traditional medicines by way of documentation. Keeping this issue, it is now quite necessary to generate assurance about the standardization of the plant as well as its parts to be used like a medication. During the process of standardization, we are able to take advantage of various techniques and methodology to achieve our goal in a phase wise approach e.g. pharmacognostic and phytochemical studies. These techniques and methods are helpful in recognition and standardization of the plant material. Appropriate characterization and quality assurance of starting material is a crucial step to ensure reproducible quality of herbal medicine to assist people in order to justify its safety and effectiveness. Because of this reason, we have executed pharmacognostic studies of *Eranthemum nigrum* belongs to family Acanthaceae [1]. This sort of research is not going to help in authentication but additionally ensures reproducibility of herbal goods in promoting [2].

In the present study, we have been focusing our exploration on one of the commonly available plant in India i.e., *Eranthemum nigrum*, belongs to family Acanthaceae. The family Acanthaceae consists of almost 4000 species of exotic plants. Various species of Genus *Eranthemum* being utilized traditionally for extensive kinds of ethno medicinal purposes. The genus *Eranthemum*, with around 138 species, some of the important species include *E. austrosinensis, E. burmanicum, E. capense, E. ciliatum, E. erythrochilum, E. griffithii, E. macrophyllum, E. macrostachyus, E. obovatum, E. pulchellum, E. purpurascens, E. roseum, E. strictum, E. tapingense, E. tubiflorum* and *E. watti*. The *Eranthemum nigrum* [Acanthaceae] is native to Pacific Islands. The shrub attains height a height of 1.5-1.8m. The upper surface of leaves is blackish purple and the lower surface purplish with dark veins. The flowers are in terminal erect spikes, white and

spotted rose at the base [3]. Plants are adapted to partial shade. The leaves are elliptical, glossy or dull with smooth margins and acute tips [4,5]. All parts of this plant are widely used as a folklore medicine for the treatment of various ailments by the Indian traditional healer. Ethno medicinally, the genus *Eranthemum* has been documented various pharmacological activities including antipyretic [6], antidiabetic [7], antiulcer [8], antimicrobial [9],

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Thiazolidine-2,4-dione Derivatives Bearing Indole Moiety: Design, Synthesis, Hypoglycaemic activity and Molecular Docking Studies

K. Srikanth Kumar[1,2], A. Lakshmana Rao[2]* and M.V. Basaveswara Rao[3]

1. Faculty of Pharmaceutical Sciences, Krishna University, Machilipatnam-521002, A.P., **INDIA**
2. Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru-521356, A.P., **INDIA**
3. Department of Chemistry, Krishna University, Machilipatnam-521002, A.P., **INDIA**

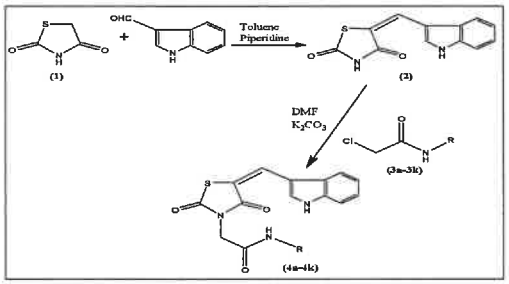
Email: dralrao@gmail.com

Accepted on 16th September, 2018

ABSTRACT

A series of novel thiazolidine-2,4-dione derivatives having N-aryl acetamide appendage at 3rd position and indolyl methylene appendage at 5th position was synthesized by using appropriate procedures. The synthesized compounds were characterized physically, FT-IR, ^{1}H-NMR, ^{13}C-NMR and mass spectral analysis. The newly synthesized compounds were evaluated for their hypoglycemic activity by means of tail tipping method in Alloxan induced Wister albino rats of both sexes. Compounds 4a and 4b showed promising hypoglycaemic activity in both acute studies as well as in chronic study when compared with the standard drug Rosiglitazone. Molecular docking studies were carried out using AutoDock software and revealed that compounds 4a and 4b exhibit significant binding interaction with PPARγ receptor compared with the standard ligand Rosiglitazone.

Graphical Abstract



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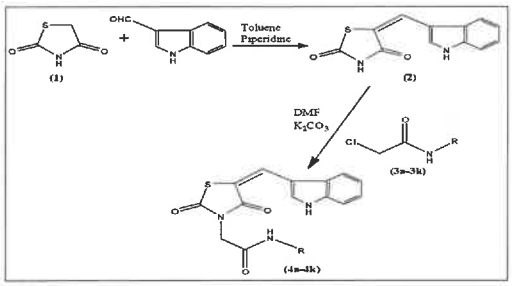

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DEVELOPMENT AND VALIDATION OF HPLC METHOD FOR DETERMINATION OF CERITINIB IN RABBIT PLASMA USING PDA DETECTOR

M. S. V. Sakuntala [*1], M. William Carey [2] and A. Lakshmana Rao [3]

Department of Pharmacy [1], JNTUK, Kakinada - 533003, Andhra Pradesh, India.
Department of Pharmacy [2], Government Polytechnic, Visakhapatnam - 531116, Andhra Pradesh, India.
V. V. Institute of Pharmaceutical Sciences [3], Gudlavalleru - 521356, Andhra Pradesh, India.

Keywords:

Ceritinib, Dasatinib, Rabbit plasma, HPLC

Correspondence to Author:
M. S. V. Sakuntala

Research Scholar,
School of Pharmaceutical Sciences,
JNTUK, Kakinada - 533003
Andhra Pradesh, India.

E-mail: m.sakuntala1@gmail.com

ABSTRACT: A rapid, sensitive and reproducible HPLC method was developed and validated for the quantification of Ceritinib in rabbit plasma using PDA detector at wave length 264 nm. The method was developed using Dasatinib as internal standard (IS). Ceritinib is a selective and potent inhibitor of anaplastic lymphoma kinase (ALK) indicated in the treatment of non-small cell lung cancer (NSCLC). The Ceritinib and Dasatinib were separated as symmetrical peaks on an analytical column ODS (250 × 4.6 mm, 5 µm) column using a mixture of 75% phosphate buffer (pH 3.6) and 25% acetonitrile as mobile phase with a flow rate of 1.0 ml/min. The total chromatographic run time is 10.0 min with retention times for Ceritinib and Dasatinib at 7.630 min and 2.771 min respectively, no interferences from the endogenous plasma peaks is observed. The method is validated and linear calibration curves were obtained across a range of 0.002 - 0.2 µg/ml for Ceritinib with a correlation coefficient of 0.999. The coefficients of variation for intra-day and inter-day assays were less than 10%. The intra-batch and inter-batch precision (% CV) across five levels (LLOQ, LQC, MQC, HQC, and ULOQ) is less than 11.15. The method was validated as per the USFDA guidelines and the results were within the acceptance criteria for selectivity, sensitivity, linearity, precision, accuracy, recovery stability of solution and stability of solution in plasma.

INTRODUCTION: Ceritinib **Fig. 1** is used for the treatment of adults with anaplastic lymphoma kinase (ALK)-positive metastatic non-small cell lung cancer [1] (NSCLC). Chemically Ceritinib is N-{2- [(5-chloro-2- {[5-methyl-4- (piperidin-4-yl)- 2-(propan- 2- loxy) phenyl] amino} pyrimidin- 4-yl) amino] phenyl} propane- 2- sulfonamide.

QUICK RESPONSE CODE

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Ar cle can be accessed online on: www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.9(7).2897-04

Ceritinib exerts its therapeutic effect by inhibiting auto-phosphorylation of ALK, ALK-mediated phosphorylation of the downstream signaling protein STAT3, and proliferation of ALK-dependent cancer cells [2].

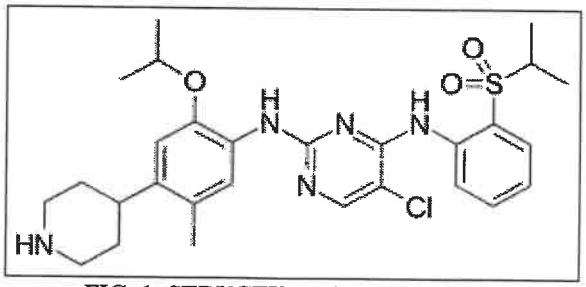

FIG. 1: STRUCTURE OF CERITINIB

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K. Srikanth Kumar [a], **A. Lakshmana Rao** [a,*], **M. V. Basaveswara Rao** [b]

[a] *Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru 521356, Andhra Pradesh, India*

[b] *Department of Chemistry, Krishna University, Machilipatnam 521002, Andhra Pradesh, India*

* Corresponding author.

E-mail address: dralrao@gmail.com (A. Lakshmana Rao).

Abstract

Various thiazolidine-2,4-dione derivatives **3a-l** possessing indole moiety were designed, synthesized using appropriate conventional heating as well as microwave irradiation methods. All the synthesized compounds were characterized physically and spectrally. The compounds were evaluated for *in vitro* antibacterial activity, *in vitro* antioxidant activity and *in vivo* hypoglycemic activity in relation to the standard drugs. Most of the new compounds exhibited moderate activity and some showed considerable activity. Molecular docking studies were carried out using AutoDock software and revealed that compound **3b** has significant binding interaction with PPARγ receptor compared with the standard ligand Rosiglitazone.

Keyword: Pharmaceutical chemistry

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Pharmaceutical Sciences
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GUDLAVALLERU - 521 356

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STABILITY INDICATING RP-HPLC METHOD FOR SIMULTANEOUS QUANTIFICATION OF EZETIMIBE AND GLIMEPIRIDE IN BULK AND PHARMACEUTICAL DOSAGE FORM

M. Mukkanti Eswarudu[1]*, A. Lakshmana Rao[2], K. Vijay [3]

[1]Department of Pharmaceutical Analysis, Vignan Pharmacy College, Vadlamudi, Guntur-522213 and Ph. D Research Scholar, Department of Pharmacy, JNTUK, Kakinada, India.

[2] Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru- 521356, A.P., India.

[3]Assistant Professor, University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur- 522510, A.P., India.

Abstract:

A simple, specific, accurate, and precise reverse phase high performance liquid chromatographic (RP-HPLC) method and Stability indicating tests was developed and validated for the simultaneous quantification of Ezetimibe and Glimepiride in Bulk drugs and Pharmaceutical dosage form. The quantification is carried out using Kromosil C18 (150 ×4.6mm, 5µ) column with mobile phase consisted of a mixture of Acetonitrile and Potassium dihydrogen ortho phosphate buffer in the ratio of 65:35 (v/v) delivered at a flow rate of 1.0 ml / min and effluents were monitored at 228 nm.The retention times of Ezetimibe and Glimepiride were found to be 2.789 min and 3.282 min respectively. The linearity for Ezetimibe and Glimepiride were in the range of 25-150 µg/ml and 2.5-15 µg/ml with correlation co-efficient of 0.999 for both drugs. The mean % recoveries of Ezetimibe and Glimepiride were found to be 98.41 to 100.78 % and 98.39 to 100.80 % respectively. The proposed method was validated as per ICH guidelines and it was found to be accurate, precise and robust, and it was applied to the estimation of Ezetimibe and Glimepiride in combined tablet dosage form. Forced degradation studies indicated the suitability of the method for stability studies.

Keywords: *Ezetimibe, Glimepiride, RP-HPLC, Validation and ICH Guidelines.*

***Corresponding Author:**
M. Mukkanti Eswarudu,
Assistant professor,
Department of Pharmaceutical Analysis,
Vignan Pharmacy College, Vadlamudi, Guntur- 522213 and
Ph. D Research Scholar, Department of Pharmacy,
JNTUK, Kakinada, India.
***Mobile:** +91 95538 08484, **Email:** eswarmunnangi@gmail.com*

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ACTA SCIENTIFIC MEDICAL SCIENCES

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Research Article

Pharmacognostic Study of *Passiflora foetida* Stem

DSNBK Prasanth[1]*, A Lakshmana Rao[2], J Sai Sowmya[3] and G Ooha Deepika[3]

[1]*Associate Professor, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*

[2]*Professor and Principal, Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*

[3]*Student, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*

***Corresponding Author:** DSNBK Prasanth, Associate Professor, Department of Pharmacognosy, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Abstract

Introduction: Ethnomedicinally, the stem of *Passiflora foetida* (Passifloraceae) is certainly utilized in numerous illnesses in traditional system; most significantly it is utilized against nausea, swelling, renal or bladder and feminine complications, dermatitis, measles, ulcers, injuries, itchiness and urinary burning. The primary hurdle accomplished in the standardization of natural drugs is deficit of correct recognition of herb source. Therefore, there exists an ought to set up quality control guidelines by making use of pharmacognostic and phytochemical analysis, which will assure the purity, safety, and efficiency of therapeutic herb *P. foetida.*

Aim: To judge pharmacognostic properties involves macroscopic, microscopic and physicochemical variables of the stem of *P. foetida.*

Methods: Micro and Organoleptic characteristics of fresh and dried stem samples had been examined. Physicochemical variables had been done by using WHO suggested variables, preliminary phytochemical and fluorescence evaluation of stem sample had been performed for identity and standardization of stem of *P. foetida.*

Results: The organoleptic characteristics were noted from the stem and powdered stem material of *P. foetida.* Light electron microscope pictures of cross portion of stem and powdered stem revealed that the existence of multicellular, uniseriate covering trichomes, epidermis, cortex, vascular bundles, lignified sclerenchyma and pith. Phytochemical testing revealed the existence of flavonoids, tannins, phenols, saponins, carbohydrates, proteins and glycosides. Physicochemical variables including moisture content, ash value, extractive value and fluorescent behaviour of stem powder had been established. These types of variables are helpful tools which will distinguish the powdered drug materials.

Conclusion: The current research is useful to supplement the data regarding its standardization and identity and in performing additional exploration in Ayurvedic system of medication.

Keywords: Pharmacognostic; Microscopical; *Passiflora foetida*; Physicochemical and Lignified Spiral Vessels

Introduction

The process of standardization is attained by pharmacognostic studies which usually help in authentication and recognition of herb. Appropriate quality and recognition poise of the raw materials are essential in herbal remedies to make sure their quality, safety, and effectiveness. Pharmacognosy might be a reliable and simple unit, by that utter details of the crude medication is acquired [1]. *Passiflora foetida* belonging to the Passifloraceae family the varieties are indigenous to exotic northern South America and Western Indies. It has become naturalized in several exotic areas across the globe and it is considered a pantropical weed around the globe [2-5]. It is utilized by Indians as traditionally in the treat-

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Research Article

SYNTHESIS AND BIOLOGICAL EVALUATION OF SOME NOVEL HETEROCYCLIC MANNICH BASES

Satya Sree B[1]*, Lakshmana Rao A[2], Lakshmi Sindhu A[3], Alekya P[3], Pavani B[3], Asha A[3]

*[1]Associate Professor, [2]Professor and Principal, [3]Student, Department of Pharmaceutical Chemistry, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, A.P., India.

Keywords: Acetanilide, Substituted benzaldehyde, Morpholine, Methyl amine.

ABSTRACT

Various novel heterocyclic mannich bases were prepared by using Mannich reaction. Acetanilide was treated with substituted benzaldehyde and morpholine / methyl amine to give corresponding titled compounds in good yields. The synthesized compounds were characterized by physical properties and spectral studies (IR, 1H-NMR) and tested for antimicrobial activity against Escherichia coli, Bacillus subtilis by using cup plate method with reference to the standard Streptomycin. All the titled compounds show good antimicrobial activity.

INTRODUCTION

The literature studies enlighten the fact that Mannich bases are very reactive and recognized to possess potent diverse activities[1] like anti-inflammatory, anticancer, antifilarial, anti-bacterial[2], antifungal[3], anticonvulsant[4], anthelmintic, antitubercular, analgesic, anti-HIV[5], antimalarial, antipsychotic, antiviral activities and so forth. In addition, several minor biological activities of Mannich bases, such as their ability to regulate blood pressure or inhibit platelet aggregation, their antiparasitic and anti-ulcer effects, as well as their use as agents for the treatment of mental disorders

Therefore, it seems promising to synthesize some novel heterocyclic mannich bases using compounds like acetanilide, substituted benzaldehyde and morpholine / methyl amine. Novel heterocyclic mannich bases possess numerous activities. As part of ongoing studies in developing new anti–microbials, we are reporting the synthesis of a novel novel heterocyclic mannich bases with interesting anti-microbial activity.

MATERIALS AND METHODS

Materials and reagents were purchased from commercial suppliers (Merck grade) and they were used without purification. Melting points were determined by using electrical melting point apparatus and are uncorrected. The progress of the reaction was monitored by TLC using Silica Gel G (Merck). IR spectra were recorded in KBr discs on a Bruker analyzer. ^{1}H-NMR spectra were recorded on a Bruker (400 MHz) spectrometer (chemical shifts in ppm) in DMSO using TMS as internal standard.

Experimental work: Scheme shown in Fig. 1.

General procedure for synthesis of novel heterocyclic mannich bases [6,7]:

A mixture of acetanilide (1.35 g), benzaldehyde (1.06 g) and morpholine (0.87 g) were taken in RBF and refluxed for 1 hour at a temperature of 60-70°C. The progress of the reaction was checked by TLC. After completion of reaction, cool the solution and add cold water. The obtained precipitate was filtered and dried.

Various novel heterocyclic mannich bases synthesized from the above procedure are:

- ✓ 3-Morpholino-N-3-diphenyl propanamide (1a)
- ✓ 3-(4-hydroxy phenyl)-3-morpholino-N-phenyl propanamide (1b)
- ✓ 3-(4-chloro phenyl)-3-morpholino-N-phenyl propanamide (1c)
- ✓ 3-(4-flouro phenyl)-3-(methyl amino)-N-phenyl propanamide (1d)
- ✓ 3-(3,4,5-trimethoxy phenyl)-3-(methyl amino)-N-phenyl propanamide (1e)

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Research Article

HPLC–PDA ANALYSIS OF PAZOPANIB IN RABBIT PLASMA USING GEFITINIB AS INTERNAL STANDARD

MSV. Sakuntala[1*], A. Lakshmana Rao[2] and M. William Carey[3]

[1]Department of Pharmacy, Jawaharlal Nehru Technological University Kakinada, Kakinada, Andhra Pradesh, India.
[2]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.
[3]Department of Pharmacy, Government Polytechnic, Visakhapatnam, Andhra Pradesh, India.

ABSTRACT

In the present investigation, a rapid, specific and sensitive isocratic HPLC method coupled with photodiode array detection (PDA) has been described for the assay of pazopanib in rabbit plasma using gefitinib as an internal standard. The pazopanib and internal standard gefitinib were extracted from rabbit plasma in a single step using acetonitrile. The analysis of pazopanib was performed on Hypersil ODS C18 (250 mm × 4.0 mm I.D., 5.0 µm particle size) column with a mobile phase, 0.01 M potassium dihydrogen orthophosphate (pH 3.6):acetonitrile (75:25, *v/v*) and UV detection set at 264 nm. The developed method was validated by evaluating system suitability, selectivity, sensitivity, linearity, precision, accuracy, ruggedness and stability in conformity with the guidelines of the United States Food and Drug Administration (FDA). The results of validation parameters were found to be within the acceptance limits. Hence, the developed and validated method can be utilized for the routine determination of pazopanib in plasma samples of rabbit.

Keywords: Pazopanib, Gefitinib, Plasma, HPLC and Analysis.

INTRODUCTION

Pazopanib (Fig. 1) is chemically described as 5-({4-[(2, 3-dimethyl-2*H*-indazol-6-yl) (methyl) amino] pyrimidin-2-yl} amino)-2-methylbenzene-1-sulfonamide. Pazopanib was approved by FDA for treating patients with advanced renal cell carcinoma and soft tissue sarcoma (who already received chemotherapy)[1,2]. Pazopanib exhibits antiangiogenic and antitumour effects through inhibiting multiple receptor tyrokinases[3,4]. Pazopanib is a potent and selective second-generation multi targeted tyrosine kinase inhibitor. Pazopanib inhibits key proteins responsible for tumor growth and angiogenesis such as vascular endothelial growth factor receptor -1, -2, -3, platelet-derived growth factor receptor -α, -β, cytokine receptor, fibroblast growth factor receptor -1, -3, interleukin-2 receptor inducible T-cell kinase, transmembrane glycoprotein receptor tyrosine kinase and leukocyte-specific protein tyrosine kinase.

Few analytical methods have been reported for the quantification of pazopanib. Chaitanya et al[5] and Susena et al[6] reported spectrophotometric methods for the assay of pazopanib in bulk and in tablet formulations. UPLC-MS/MS methods were proposed by Paludetto et al[7] and Qiu et al[8]. Paludetto et al[7] method was applied for the simultaneous quantification of pazopanib and its metabolites in plasma of patients treated with pazopanib. Qiu et al[8] method was applied to investigate the pharmacokinetics of pazopanib in rat plasma. Mukul et al[9] determined pazopanib in mouse plasma and brain tissue homogenate using LC-MS/MS. Verheijen et al[10] quantified pazopanib in a dried blood sample by LC-MS/MS.

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Research Article

Formulation and Evaluation of Eplerenone Matrix Tablets using Aloe Vera, Guar Gum and Povidone K-30.

Bharghava Bhushan Rao P[1]*, Lakshmana Rao A[1], Ravi Kumar K[2], Sowmya K[3], Kameswara Rao S[4]

[1,3]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[2]Hindu College of Pharmacy, Guntur, Andhra Pradesh, India.

[4]Nirmala College of Pharmacy, Mangalagiri, Andhra Pradesh, India.

*Corresponding author: drbharghav84@gmail.com

Revised: 5 June 2018; Accepted: 22 June 2018

Abstract

Purpose: In the existing work different sustained release matrix tablets of eplerenone were prepared with dried mucilage of *Aloe vera,* guar gum and povidone K30 by using different binder: tablet weight ratios viz. 1:20, 2:20, 3:20, 4:20 and 5:20. **Method**: During this process *Aloe vera* leaves are procured, extracted, dried and characterized to obtain *Aloe vera* mucilage powder. Pre-formulation studies were performed and studied for the functional groups and also compatibility studies were conducted. The formulations that were prepared using *Aloe vera* were named as EPA, for Guar gum as EPG, for Povidone K30 as EPP and finally combination of *Aloe vera* and Povidone K30 was named as EPAP. **Results**: From the graphs, kinetic evaluation was done and observed that the drug release is governed by diffusion mechanism and this is confirmed by r values. The regression coefficient values, clearly indicates that the drug release is governed by zero order and almost all formulations showing Fickian release. Among all the formulations that were prepared EPAP-5 is selected as best. The best formulation is compared with the marketed formulation. **Conclusion**: *Aloe vera* gel dried powder is a suitable matrix agent in formulating sustained release tablets of eplerenone. It may be useful in similar preparations of other drugs.

Key words: *Eplerenone, Matrix tablets, Aloe vera, Guar gum, Povidone K-30.*

Introduction

Among the entire delivery systems oral route is highly preferred because of its high comfort zone that cannot be produced by other routes. In order to release the drug at specific location different types of polymers are used and they also help to show prolonged action. Many advanced technologies are available and these are making the delivery systems more suitable and advantageous when compared to the past. Controlled release oral drug delivery system is one among the advanced technologies that is most widely preferred. (1)

Eplerenone is a steroidal anti mineralcorticoid of the spirolactone group that is used as an adjunct in the management of chronic heart failure. The recommended starting dose of eplerenone for the treatment of essential hypertension is 50 mg once daily titrated to a maximum of 50 mg twice daily.

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Research Article

DEVELOPMENT AND VALIDATION OF RP-HPLC METHOD FOR SIMULTANEOUS ESTIMATION OF PARACETAMOL AND LORNOXICAM IN BULK AND PHARMACEUTICAL DOSAGE FORM

A. Lakshmana Rao[1]*, T. Raja[1], B. Madhu Harika[2]

*[1]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[2]Department of Pharmaceutical Chemistry, Vikas Institute of Pharmaceutical Sciences, Rajahmundry, Andhra Pradesh, India.

Keywords:
Paracetamol, Lornoxicam, Estimation, HPLC.

ABSTRACT

A simple, rapid, accurate and precise isocratic reversed phase high performance liquid chromatographic method has been developed and validated for simultaneous estimation of Paracetamol and Lornoxicam in tablet dosage form. The chromatographic separation was carried out on Zorbax C18 column (150 mm x 4.6 mm I.D., 5 µm particle size) with a mixture of 20 mM ammonium acetate pH 3.2 buffer and acetonitrile in the ratio of 60:40 v/v as a mobile phase at a flow rate of 1.0 mL/min. UV detection was performed at 265 nm. The retention times were 2.74 minutes and 5.36 minutes for Paracetamol and Lornoxicam respectively. Calibration plots were linear (r^2=0.999 for both Paracetamol and Lornoxicam respectively) over the concentration range of 6.25-250 µg/mL for Paracetamol and 0.1-4 µg/mL for Lornoxicam. The method was validated for linearity, precision, accuracy, ruggedness and robustness. The proposed method was successfully used for simultaneous estimation of Paracetamol and Lornoxicam in tablet dosage form. Validation studies revealed that the proposed method is specific, rapid, reliable and reproducible. The high % recovery and low % RSD confirms the suitability of the proposed method for routine quality control analysis of Paracetamol and Lornoxicam in bulk and tablet dosage form.

INTRODUCTION

Paracetamol (Fig. 1) is a non-selective COX inhibitor and has weak activity on prostaglandin synthetase in the inflamated peripheral tissues [1]. Paracetamol is used to treat many conditions such as headache, muscle ache, arthritis, backache, toothache, cold and fever. Chemically it is N-acetyl-p-amino phenol [2].

Lornoxicam (Fig. 2) is a potent analgesic with excellent anti inflammatory properties in a range of painful and inflammatory conditions, including postoperative pain and rheumatoid arthritis [3]. Chemically it is 6-chloro-4-hydroxy-2-methyl-N-2-pyridinyl-2*H*-thieno[2,3-e]-1,2-thiazine-3-carboxamide1,1-ioxide [4].

Literature survey reveals that few analytical methods using spectrophotometry [5-7], HPLC [8-10] and HPTLC [11-13] have been reported for the simultaneous determination of Paracetamol and Lornoxicam in combined dosage forms. Therefore, an attempt has been made to develop a novel, rapid, accurate and precise RP-HPLC method for simultaneous estimation of Paracetamol and Lornoxicam in tablet dosage form and validated in accordance with ICH guidelines [14].

MATERIALS AND METHODS

Instrumentation

To develop a high performance liquid chromatographic method for simultaneous estimation of Paracetamol and Lornoxicam using Waters 2695 HPLC system on a Zorbax C-18 (150 mm × 4.6 mm I.D., 5 µm particle size) column was used. The instrument is equipped with pump-515,

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DEVELOPMENT AND VALIDATION OF HPTLC METHOD FOR THE ESTIMATION OF EPERISONE HYDROCHLORIDE IN PHARMACEUTICAL FORMULATION

A. Lakshmana Rao*[1] and T. Raja[1]

[1*]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

ABSTRACT

A simple, precise, accurate and rapid high performance thin layer chromatographic method has been developed and validated for the estimation of Eperisone hydrochloride in bulk and pharmaceutical dosage form. The stationary phase used was silica gel precoated aluminum plate $60F_{254}$ plates. The mobile phase used was a mixture of ethyl acetate: methanol: toluene (4:3:3, v/v/v). The detection of spots was carried out at 272 nm. The method was validated in terms of specificity, accuracy, linearity, precision and accuracy. The calibration curve was found to be linear between 100-700 ng/band. The proposed method can be successfully used to determine the drug Eperisone hydrochloride in bulk and pharmaceutical formulation.

KEYWORDS

Eperisone, HPTLC, Validation and Precision.

Author for Correspondence:

Lakshmana Rao A,

Department of Pharmaceutical Analysis,

V. V. Institute of Pharmaceutical Sciences,

Gudlavalleru, Andhra Pradesh, India.

Email: dralrao@gmail.com

INTRODUCTION

Eperisone hydrochloride acts by relaxing both skeletal muscles and vascular smooth muscles and demonstrates a variety of effects such as reduction of myotonia, improvement of circulation and suppression of the pain reflex[1]. Chemically it is 4-ethyl-2-methyl-piperdino prophenone hydro-chloride. The chemical structure of Eperisone hydrochloride was shown in Figure No.1. Eperisone hydrochloride also facilitates voluntary movement of the upper and lower extremities without reducing muscle power, it is therefore useful during the initial stage of rehabilitation and as a supporting drug during subsequent rehabilitative therapy[2-4].

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Research Article

METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF EPALRESTAT AND PREGABALIN IN HUMAN PLASMA BY USING RP-HPLC

Prem Kumar Bichala[1*], Lakshmana Rao Atmakuri[2] and Vijay Kotra[3]

[1*]School of Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India.

[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[3]University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India.

ABSTRACT

A simple, rapid, sensitive, precise and accurate high-performance liquid chromatography method was developed for simultaneous determination of Epalrestat and Pregabalinin human plasma using Glipizide as an internal standard (ISTD). The analytes were extracted from 500 µL aliquots of a human plasma sample by direct protein precipitation technique using acetonitrile. Evaluation of content of the drugs was done by employing a mixture of acetonitrile and 0.1% orthophosphoric acid (OPA) buffer in the ratio of 45:55 v/v as the mobile phase with a flow rate of 1 mL/min and injection volume of 10µL. Chromatographic separation was accomplished using Symmetry C18 150 X 4.6mm, 5µm analytical column and the effluents were monitored at 220 nm with a photodiode array (PDA) detector. The total run time was 8 min with a retention time of Epalrestat, PregabalinandGlipizide was 3.828, 4.699, and 2.463 min respectively. Linearity was established at a concentration range of 0.250-5.00 µg/mL for Epalrestat and 0.160-3.25 µg/mL for Pregabalin. The method was validated as per the US-FDA guidelines and the results were within the acceptance criteria and proposed method was successfully applied for the simultaneous determination of Epalrestat and Pregabalinin human plasma.

Keywords: Epalrestat, Pregabalin, Protein Precipitation, Human Plasma, RP-HPLC.

INTRODUCTION

Epalrestat is an aldose reductase inhibitor. It is chemically designated as 2-[(5Z)-5-[(*E*)-2-methyl-3-phenylprop-2-enylidene]-4-oxo-2-sulfanylidene-1,3-thiazolidin-3-yl] acetic acid. The chemical Formula of Epalrestat $C_{15}H_{13}NO_3S_2$. Aldose reductase reduces glucose to sorbitol. Epalrestat restrained high glucose-intervened neutrophils. Endothelial cell grip and articulation of endothelial bond particles not just through the hindrance of a PKC-subordinate pathway, yet additionally through expanded endothelial NO generation.

Epalrestat is a carboxylic corrosive subsidiary and a non-competitive and reversible utilized for the treatment of which is a standout amongst the most widely recognized long haul intricacies in patients with. It lessens the aggregation of intracellular sorbitol which is accepted to be the reason for diabetic neuropathy, retinopathy and, nephropathy. Artificially, Epalrestat is strange in that it is a medication that contains a gathering. Epalrestat is the main ARI economically accessible. It is effortlessly assimilated into the neural tissue and hinders the compound with the least symptoms.[1]

INTERNATIONAL JOURNAL OF PHARMACEUTICAL, CHEMICAL AND BIOLOGICAL SCIENCES

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Research Article

METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF SITAGLIPTIN AND ERTUGLIFLOZIN IN HUMAN PLASMA BY USING HPLC

Prem Kumar Bichala[1*], Lakshmana Rao Atmakuri[2] and Vijay Kotra[3]

[1]School of Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India.

[2]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

[3]University College of Pharmaceutical Sciences, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India.

ABSTRACT

A simple, rapid, sensitive, precise and accurate high-performance liquid chromatography method was developed for simultaneous estimation of Sitagliptin and Ertugliflozin in human plasma using Dapagliflozin as an internal standard (ISTD). The analytes were extracted from 500 µL aliquots of a human plasma sample by direct protein precipitation technique using acetonitrile. Evaluation of content of the drugs was done by employing a mixture of acetonitrile and 0.1% orthophosphoric acid (OPA) buffer in the ratio of 40:60 v/v as the mobile phase with a flow rate of 1 mL/min and injection volume of 10 µL. Chromatographic separation was accomplished using Inertsil 250 X 4.6 mm, 5 µm analytical column and the effluents were monitored at 220 nm with a photodiode array (PDA) detector. The total run time was 8 min with a retention time of Sitagliptin, Ertugliflozinand,Dapagliflozin 4.548, 5.331, and 3.945 min. respectively. Linearity was established at a concentration range of 0.020-0.750 µg/mL for Sitagliptin and 0.008-0.300 µg/mL for Ertugliflozin. The method was validated as per the US-FDA guidelines and the results were within the acceptance criteria and proposed method was successfully applied for the simultaneous determination of Sitagliptin and Ertugliflozin in human plasma.

Keywords: Sitagliptin, Ertugliflozin, Dapagliflozin, Protein Precipitation, Human Plasma.

INTRODUCTION

Sitagliptin is an oral dipeptidyl peptidase-4 (DPP-4) inhibitor used in conjunction with diet and exercise to improve glycemic control in patients with type 2 diabetes mellitus. It is chemically designated as (3*R*)-3-amino-1-[3-(trifluoromethyl)-6,8-dihydro-5*H*-[1,2,4] triazolo [4,3-a]pyrazin-7-yl]-4-(2,4,5-trifluorophenyl) butan-1-one. The chemical formula of Sitagliptin is $C_{16}H_{15}F_6N_5O$. Sitagliptin inhibits DPP-4 which leads to increased levels of glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropicpolypeptide (GIP), decreased levels of glucagon, and stronger insulin response to glucose.[1,2] The chemical structure of Sitagliptin is shown in Fig. 1.

Ertugliflozin belongs to the class of potent and selective inhibitors of sodium-dependent glucose cotransporters (SGLT). It is chemically designated as(1*S*,2*S*,3*S*,4*R*,5*S*)-5-[4-chloro-3-[(4-ethoxy phenyl)methyl]phenyl]-1-(hydroxymethyl)-6,8-dioxabicyclo[3.2.1]octane-2,3,4-triol. The chemical formula is $C_{22}H_{25}ClO_7$. The administration of Ertugliflozin in combination with Sitagliptin is indicated to improve glycemic control in adult patients with type 2 diabetes

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A Novel Method for the Estimation of Budesonide in Human Plasma by Using LC-MS-MS

Raveendra Babu Gudimitla[1], Lakshmana Rao Atmakuri[2*], Venkateswara Rao Jangala[3]

[1]*Department of Pharmaceutical Analysis, A.K.R.G. College of Pharmacy, Nallajerla, Andhra Pradesh, India*
[2]*Department of Pharmaceutical Analysis, V.V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India*
[3]*Department of Pharmaceutical Analysis, St Pauls College of Pharmacy, Turkayamijal, Hyderabad, Telangana, India*

ABSTRACT

A novel method for the estimation of Budesonide in human plasma by using LC-MS-MS and the analyte is budesonide and internal standard is levenorgestreol were extracted with the tertbutyl methyl ether: n-hexane (70:30, v/v) from human plasma. The chromatographic severance was attained of the peak using Agilent Zorbax Eclipse XDB-C_8, (100 mm × 4.6 mm, 3.5 µm) column with a run time is 2.5 min. Budesonide and levenorgestreol were recorded at the total ion current of their relevant multiple reaction monitoring. The LC-MS-MS system composed an Agilent 1100 infinity combined with an AB Sciex Qtrap® 4000 thermo Finnigan TSQ quantum discovery triple quadruple mass spectrometer. All of the parameters must be validated like selectivity, accuracy, precision, linearity, lower limit of quantification, matrix effect, recovery reached the acceptance criteria under the following of ICH guidelines. Budesonide have checked the various stability studies like short term stability at 25°C, long term stability for 55 days at -70°C, wet extract stability for 54 h, auto sampler stability for 63 h, bench top stability for 14 h and freeze-thaw stability at -60°C. Hence, it can be used for routine drug analysis and bioequivalence studies of budesonide in human plasma samples.

Keywords: Budesonide, Levenorgestreol, Estimation, Human plasma, LC-MS/MS and Validation

INTRODUCTION

Budesonide was a glucocortico steroid and its chemical name is 16,17-(butylidenebis(oxy))-11,21-hydroxy-(11-β,16-α)-pregna-1,4-diene-3,20-dione. Budesonide designated for the asthma, nasal polyposis and Crohn's disease [1] and it was used for long term management of asthma and chronic obstructive pulmonary disease with the help of inhaled corticosteroid therapy [2]. A relevant number of studies for estimation of budesonide have been reported, the methods employed includes UV spectroscopy [3,4] high performance liquid chromatography [5-7] and liquid chromatography-mass spectroscopy [8-10]. Pharmacokinetics and pharmacodynamics of budesonide have been measured in healthy volunteers [11,12] and primary biliary cirrhosis patients [13] However, no studies regarding the estimation of budesonide in human plasma by using Liquid Chromatography-Mass Spectroscopy-Mass Spectroscopy (LC-MS-MS) has published so far. The goal of the present study was estimation of budesonide in human plasma by using LC-MS-MS. Besides, until now, no studies have been reported in scientific literature regarding the data of full bio-analytical validation of estimation of budesonide in human plasma by using LC-MS-MS. This paper reports the simple, sensitive, rapid, precise and accurate method for the estimated of budesonide in human plasma by using LC-MS-MS. Based on the data obtained the LC-MS-MS has been applied for analysis of commercial and bioequivalence studies of budesonide samples.

MATERIALS AND METHODS

Materials

Budesonide (≥ 99%) was purchased from Aarti Industries Limited (Mumbai, India). Levonargestrel (≥ 98%) was purchased from Clearsynth Labs (Mumbai, India). Acetonitrile (≥ 95.8%) and methanol (≥ 98.5%), tert butyl methyl ether (≥ 99.5%), HPLC grade were purchased from J.T. Baker (Philipsbur, USA). Formic acid, analytical grade, n-hexane and water, both HPLC grade, were purchased from Merck Limited (Mumbai, India).

Instrument

The LC-MS-MS system composed an Agilent 1100 infinity combined with an AB Sciex Qtrap® 4000 thermo Finnigan TSQ quantum discovery

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Development and validation of RP-HPLC method for the estimation of Ramosetron hydrochloride in tablet dosage form

A. Lakshmana Rao*, D. Prasanthi, D. Sai Krishna, E. Chinni and E. Sravani

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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***Corresponding author:**

Email : dralrao@gmail.com
Phone : +91-9848779133

ABSTRACT

A simple, rapid, sensitive, accurate and precise RP-HPLC method has been developed and validated for the estimation of Ramosetron hydrochloride in bulk and tablet dosage form. The method was carried out using Hypersil ODS C18 (150 x 4.6 mm I.D., 5 m particle size) column and mobile phase comprised of buffer pH 3.2 and acetonitrile in proportion of ratio 50:50 v/v and degassed in ultrasonic water bath. The flow rate was 0.8 mL/min and the detection wavelength was at 310 nm. The linearity was observed in the range of 1-5 µg/mL with a correlation coefficient of 0.999. The retention time of Ramosetron hydrochloride was 2.54 min. The method was validated as per the ICH guidelines for its linearity, precision, accuracy, specificity, limit of detection, limit of quantitation and by performing recovery studies. The percentage recovery of the drug Ramosetron hydrochloride was 99.76 % to 100.33 % from the tablet formulation. The proposed method is suitable for the routine quality control analysis for the estimation of Ramosetron hydrochloride in bulk and tablet dosage form.

INTRODUCTION

Ramosetron hydrochloride (Fig. 1) is a serotonin 5-HT_3 receptor antagonist for the treatment of nausea and vomiting [1]. Chemically Ramosetron hydrochloride is (1-Methyl-1*H*-indol-3-yl) (4,5,6,7-tetrahydro-1 *H*-benzo [d] imidazol-6-yl) methanone hydrochloride. Ramosetron is also indicated for a treatment of diarrhea-predominant irritable bowel syndrome in males. Ramosetron was shown in pharmacological assays to inhibit activities mediated by 5-HT3 receptors, such as emesis caused by cisplatin [2]. A few HPLC methods [3-5] were reported earlier for the estimation of Ramosetron hydrochloride in bulk and pharmaceutical dosage form. In the present study the authors report a rapid, sensitive, accurate and precise HPLC method for the estimation of Ramosetron hydrochloride in bulk drug and in tablet dosage form.

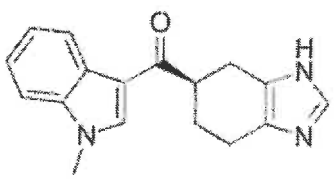

Figure 1: Chemical structure of Ramosetron

MATERIALS AND METHODS

Chromatographic conditions

The analysis of the drug was carried out on a Agilent 1260 Infinity Binary HPLC system equipped with a reverse phase Hypersil ODS C18 (150 x 4.6 mm I.D., 5 m particle size) column, mp, a 20 µL injection loop, rheodyne injector, DAD detector and running on Open Labs EZChrom software.

Chemicals and solvents

The reference sample of Ramosetron hydrochloride (API) was provided as gift sample from Spectrum Pharma Research Solutions, Hyderabad, India. The commercial formulations (IBSET tablets containing 5 mg of Ramosetron hydrochloride) were procured from the local market. Acetonitrile (HPLC grade), ortho phosphoric acid, triethyl amine were purchased from E.Merck (India) Ltd., Mumbai, India. Freshly prepared triple distilled water was used throughout the experiment.

Preparation of buffer

Dissolve 1 mL of ortho phosphoric acid (OPA) in 1000 mL of water. Adjusted the pH to 3.2 by using triethyl amine and the solution is filtered and sonicated for 5 min.

Preparation of mobile phase and diluent

500 ml of the buffer (0.1% OPA) was mixed with 500 ml of

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Validated stability indicating RP-HPLC method for simultaneous determination of Cefixime and Acetylcysteine in pharmaceutical dosage form

A. Lakshmana Rao*, T. Prasanthi , V. Aswini

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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Keywords:

Cefixime, Acetylcysteine, HPLC, Validation.

***Corresponding author:**

Email : dralrao@gmail.com
Phone : +91-9848779133

ABSTRACT

A simple stability indicating RP-HPLC method has been developed for the simultaneous determination of Cefixime in combination with Acetylcysteine using ODS C18 column (250 × 4.6 mm, 5 µm) with UV detection at 274 nm. The mobile phase consisting of 0.1% Ortho Phosphoric Acid (OPA) and acetonitrile in a ratio of 58:42, v/v and at a flow rate of 1.0 mL/min. The method was linear over the concentration range for Cefixime 50-375 µg/mL and for Acetylcysteine 75-400 µg/mL. The retention times for Cefixime and Acetylcysteine were found to be 2.018 min and 5.141 min respectively. The average percentage recoveries of active pharmaceutical ingredient (API) Cefixime and Acetylcysteine were found to be in the range of 99.23% and 100.13% respectively. The method was validated and was successfully employed for the routine quantitative analysis of pharmaceutical formulations containing Cefixime and Acetylcysteine in combined tablet dosage form.

INTRODUCTION

Cefixime (Fig. 1), an antibiotic, is a third-generation oral bactericidal cephalosporin. Cefixime is chemically known as (6R,7R)-7-[(2Z)-2-(2-amino-1,3-thiazol-4-yl)-2-[(carboxymethoxy) imino] acetamido]-3-ethenyl-8-oxo-5-thia-1-azabicyclooct-2-ene-2-carboxylic acid [1]. The antibacterial effect of Cefixime results from inhibition of mucopeptide synthesis in the bacterial cell wall. Cefixime is extremely stable in presence of β-lactamase enzymes and some cephalosporins may be susceptible to Cefixime. Cefixime is used in the treatment of uncomplicated urinary tract infections caused by *Escherichia coli* and *Proteus mirabilis*, otitis media caused by *Haemophilus influenza,* pharyngitis and tonsillitis caused by *S. pyogenes*, uncomplicated gonorrhea (cervical/urethral) caused by *Neisseria gonorrhoeae etc.*

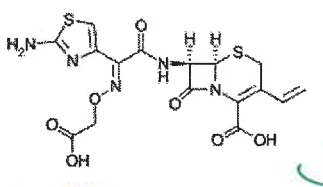

Fig. 1 : Structure of Cefixime

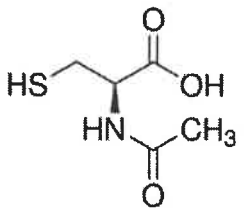

Fig. 2 : Structure of Acetylcysteine

Acetylcysteine (Fig. 2), is primarily used as a mucolytic agent and in the management of acetaminophen poisoning. It is chemically known as (2R)-2-acetamido-3-sulfanylpropanoic acid [2]. It is a derivative of cysteine with an acetyl group attached to the amino group of cysteine. Acetylcysteine can also be used as a general antioxidant which can help mitigate symptoms for a variety of diseases exacerbated by reactive oxygen species (ROS). N-acetylcysteine is now widely used in the treatment of HIV. Acetylcysteine is also being successfully used to treat a variety of neuropsychiatric and neurodegenerative disorders including cocaine, cannabis, and smoking addictions, Alzheimer's and Parkinson's diseases, autism, compulsive and grooming disorders, schizophrenia, depression, and bipolar

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Validated stability indicating RP-HPLC method for simultaneous determination of Cefixime and Acetylcysteine in pharmaceutical dosage form

A. Lakshmana Rao*, T. Prasanthi , V. Aswini
Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India.

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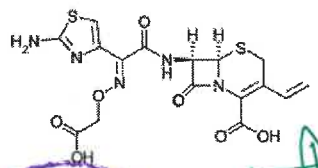
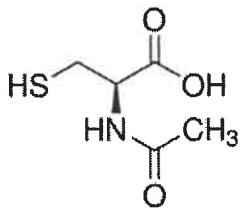


Fig. 1 : Structure of Cefixime



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RESEARCH ARTICLE

Validated Stability Indicating RP-HPLC method for estimation of antiviral class of drugs Sofosbuvir and Velpatasvir in combination and its comparison with reported methods

P. Venkateswara Rao[1*], A. Lakshmana Rao[2], S.V.U.M. Prasad[3]

[1]PhD Research Scholar, JNTUK, Kakinada and Vikas College of Pharmacy, Vissannapeta, Krishna DT, AP, India.

[2] V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, AP, India.

[3]School of Pharmacy, JNTUK, Kakinada, AP, India

*Corresponding Author E-mail: **venkats0425@gmail.com**

ABSTRACT:

A simple, specific, accurate and stability-indicating reverse phase high performance liquid chromatographic method was developed for simultaneous determination of Sofosbuvir and Velpatasvir, using a BDS C8 (150 x 4.6 mm, 5 µm) column and a mobile phase composed of Buffer (0.1% OPA): Acetonitrile (50:50, v/v).The retention time of Sofosbuvir and Velpatasvir was found to be 2.267 mins and 2.983 mins respectively when compared with the developed methods the retention time was very less. Linearity was established in the range of 100-600 µg/ml and 25-150 µg/ml for Sofosbuvir and Velpatasvir respectively. The percentage recoveries of Sofosbuvir and Velpatasvir were found to be 100.34% and 101.37% respectively. The drugs were subjected to acid, alkali, hydrolysis, oxidation, dry heat, photolytic and UV degradation and showed very less degradation where no method has reported about the degradation data. The developed method can be successfully employed for simultaneous quantitative analysis of Sofosbuvir and Velpatasvir in bulk and formulations.When the validation parameters of the method developed are compared with those of the earlier reported methods. The developed method was found to be superior in the aspects such as retention time, system suitability and the method was more economical when compared to others as the run time is only 5 minutes.

KEYWORDS: Comparison, Degradation, RP-HPLC, Stability, Sofosbuvir and Velpatasvir.

INTRODUCTION:

Sofosbuvir N- [[P(S), 2′R] -2′-Deoxy -2′-fluoro -2′-methyl – P– phenyl - 5′-uridylyl] -l-alanine (fig.1). Sofosbuvir a recently approved nucleotide analog, is a highly potent inhibitor of the NS5B polymerase in the Hepatitis C virus (HCV), and has shown high efficacy in combination with several other drugs, with and without PEG-INF, against HCV.

Sofosbuvir is used for treatment of chronic HCV genotype 1, 2, 3, or 4 infection in treatment-naive (previously untreated) or previously treated adults without cirrhosis or with compensated cirrhosis, including those with HIV infection and those with hepatocellular carcinoma awaiting liver transplantation[1,2].

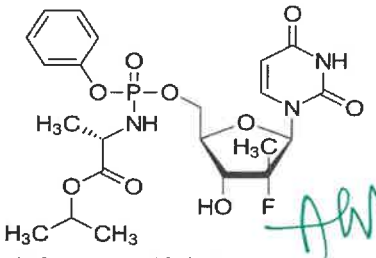

Fig. 1: Chemical structure of Sofosbuvir

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Research Article

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Method Development and Validation of Stability Indicating RP-HPLC Method for Simultaneous Estimation of Sofosbuvir and Velpatasvir in Tablet Dosage Form

Lakshmana Rao A* and Pallavi A

Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, India

***Corresponding author:** Dr. A Lakshmana Rao, Professor and Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, Tel No: 9848779133; Email: dralrao@gmail.com

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Abstract

A simple, accurate and precise stability indicating RP-HPLC method was developed for the simultaneous estimation of the Sofosbuvir and Velpatasvir in tablet dosage form. Chromatogram was run through Discovery C18 (250 x 4.6 mm, 5µm) column. Mobile phase containing buffer 0.1% OPA: acetonitrile taken in the ratio 50:50 v/v was pumped through column at a flow rate of 1 ml/min. Temperature was maintained at 30°C. Optimized wavelength selected was 240 nm. The method was linear over the concentration range for Sofosbuvir is 100-600µg/ml and for Velpatasvir is 25-150µg/ml. The retention times of Sofosbuvir and Velpatasvir were found to 2.473 min and 3.316 min respectively. %RSD of the Sofosbuvir and Velpatasvir were found to be 0.2 and 0.3 for system precision, 0.4 and 0.5 for repeatability and 0.2 and 0.3 for intermediate precision respectively. %Recovery was obtained as 99.32% and 100.43% for Sofosbuvir and Velpatasvir respectively. LOD and LOQ values obtained from regression equations of Sofosbuvir and Velpatasvir were 0.44, 1.32 and 0.33, 1.01 respectively. Regression equation of Sofosbuvir is y=10179x+3201 and y=16944x+13228 for Velpatasvir respectively. The method was validated and was successfully employed for the routine quantitative analysis of pharmaceutical formulations containing Sofosbuvir and Velpatasvir in combined tablet dosage form.

Keywords: Sofosbuvir; Velpatasvir; RP-HPLC; Validation

Abbreviations: RP-HPLC: Reverse Phase High Performance Liquid Chromatography; USFDA: US Food and Drug Administration; EMA: European Medicine Agencies; ICH: International Conference on Harmonisation; LOD: Limit of Detection; LOQ: Limit of Quantitation; HCV: Hepatitis C Virus.

Introduction

Sofosbuvir (Figure 1) is a direct acting antiviral medication used as part of combination therapy to treat chronic Hepatitis C, an infectious liver disease caused by infection with Hepatitis C Virus (HCV) [1]. Chemically it is Propan-2-(2S)-2-{[(S)-{[(2R,3R,4R,5R)-5-(2,4-dioxo-

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Article

Simultaneous determination of candesartan and hydrochlorothiazide in human plasma by LC-MS/MS

Mohan Gandhi Bonthu[1*], Lakshmana Rao Atmakuri[2], Venkateswara Rao Jangala[3]

[1]Department of Pharmaceutical Analysis, Sri Vasavi Institute of Pharmaceutical Sciences, Tadepalligudem, Andhra Pradesh, India, [2]Department of Pharmaceutical Analysis, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh, India, [3]Department of Pharmaceutical Analysis, St. Paul's College of Pharmacy, Turkayamjal(V), Telangana, India

A simple, sensitive, rapid and highly efficient LC-MS/MS method was developed for the determination of Candesartan and Hydrochlorothiazide simultaneously in human plasma. The method employed Zorbax eclipse C18 (150 X 4.6 mm, 5µ) column using acetate buffer: acetonitrile (25:75%, v/v) as the mobile phase. The mobile phase flow rate is 1 mL/min which was delivered into the mass spectrometer electron spray ionization chamber. The Liquid/liquid extraction procedure was used in the method for the extraction of analytes. The chromatograph was attached to a negative ion mode tandem mass spectrometer and the method was validated for all the parameters as per the guidelines of US-FDA. The ions were detected in multiple reaction monitoring mode and the transitions are m/z 439.00→309.10 and 295.80→268.80 for candesartan and hydrochlorothiazide respectively. Isotopic standards were used as internal standards for effective recovery of the analytes. The drugs were analyzed over a calibration range of 1.027-302.047 ng/mL for candesartan and 1.044-306.945 ng/mL for hydrochlorothiazide respectively with regression coefficient greater than 0.99. The mean extraction recoveries are 96.95±5.61 and 100.55±4.82 for candesartan and hydrochlorothiazide respectively. The precision and accuracy values for all the studies were within the range of ≤15% and 85-115%. The performed stability studies indicate that the developed method is stable in plasma for 15 h at room temperature (bench top); 52 h (in injector); for 112 days at -70 °C for long term stability; five successive freeze and thaw cycles. The developed method could be successfully employed for the determination of selected drugs in biological samples.

Keywords: Candesartan. Hydrochlorothiazide. LC-MS/MS. Method validation. Human plasma.

INTRODUCTION

Candesartan (CAN), is chemically 2-ethoxy-1-({4-[2-(2*H*-1, 2, 3, 4-tetrazol-5-yl) phenyl] phenyl} methyl)-)-1*H*-1,3-benzodiazole-7-carboxylic acid. It is an angiotensin receptor blocking agent which can be used alone or in combination with other drugs for the treatment of hypertension. It competes with angiotensin-II for its receptors there by lowering blood pressure. It is also used as an effective alternative for the treatment of heart failure, myocardial infarction, coronary diseases and systolic dysfunction (The Merck Index, 2006).

Hydrochlorothiazide (HCT), is chemically 6-chloro-1, 1-dioxo-3, 4-dihydro-2*H*-1,2,4-benzo-thiadiazine-7-sulfonamide. It is a prototypical member of the thiazide diuretic. It helps in reduction of reabsorption of various electrolytes through renal tubules resulting in excretion of water along with different electrolytes like sodium, potassium, chloride, magnesium etc. It is widely used in the treatment of edema, hypertension, hyperparathyroidism, and diabetes insipidus (The Merck index, 2006).

Thorough survey of literature disclosed good number of analytical methods which include UV (Erk, 2003a; Naseem*et al.*, 2009), HPTLC (Bipin, Sachin*et al.*, 2008), HPLC (Qutab *et al.*, 2007; Be *et al.*, 1990; Richter, Oertel, Kir, 1996; Erk, 2003b; Zendelovska, Stafilovm Molisevski, 2004; Balamuralikrishna, Syamasundar, 2010; Annapurna, Narendra, Ravi, 2012; Veeranjaneyulu, Aneesha, Nandakishore, 2012; Narendra, Satyanarayana, Ganga, 2012), LC-MS (Brushinina *et al.*, 2014; Surbhi *et al.*, 2010; Bharathi *et al.*, 2012) and UPLC-MS (Singh

***Correspondence:** M. G. Bonthu. Assistant Professor, Sri Vasavi Institute of Pharmaceutical Sciences, Tadepalligudem-534201, Andhra Pradesh, India. E-mail:bmgandhipharma@gmail.com

PATENTS

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

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2. **Mrs. B. Satyasree.** Indole moiety bearing schiff's base-n1,n 2-bis[(1 h-indol-3-yl)-methylene]-benzene-1,2-diamine:conventional synthesis versus green synthesis. Indian Patent Application No: 2017 41006021. Date of Filing: 19-12-2022. Date of Publication: 30-12-2022.
3. **Dr. Mohan Gandhi Bonthu.** Infrared Spectrometer. Indian Design Patent. Design number: 378946-001; Date of Filing: 08-02-2023. Date of Issue: 11-05-2023.
4. **Dr. Mohan Gandhi Bonthu.** A Process for formulating fast dissolving tablets of etodolac and its composition thereof. Soth African Patent. Application no; 2023/02375. Date of filing: 23-02-2023.
5. **Dr. Mohan Gandhi Bonthu, Ms. Alluri Pavani Gaytri.** Annona Reticulata and Ocimum basilicum extract and their combination useful for the treatment of atherosclerosis. Indian Papent Application no: 202341022684 A. Date of Filing: 28-03-2023. Date of Publication: 07-04-2023.
6. **Dr. Lakshmana Rao Atmakuri., Peeriga Raveesha, Shaik Aminabee.** A Composition of Mesalazine Mini Tablet in Capsule System for Targeted Delivery to the Colon. German Patent. Application No: 20 2023 101 811. Date of Filing: 11-04-2023. Date of Grant: 22-05-2023.
7. **Dr. Lakshmana Rao Atmakuri., Peeriga Raveesha, Shaik Aminabee.** A Pharmaceutical Composition of Floating Bilayered Tablet of Atorvastatin Cacium and Nicotinic Acid. German Patent. Application No: 20 2023 103 088. Date of Filing: 06-06-2023. Date of Grant: 03-07-2023.

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

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Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

8. **Arige Sai Datri, Dr. Lakshmana Rao Atmakuri.** Controlled-Release Matrix Tablet Composition of Apremilast. German Patent. Application No: 20 2023 104 259. Date of Filing: 28-07-2023. Date of Grant: 01-09-2023.
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(54) Title of the invention : PREPARATION OF ROSUVASTATIN FORMULATION FOR TREATING HUMAN ORAL SQUAMOUS CELL CARCINOMA

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(31) Priority Document No :NA
(32) Priority Date :NA
(33) Name of priority country :NA
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
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(71)Name of Applicant :
1)DR. MANISH KUMAR THIMMARAJU
Address of Applicant :Balaji Institute of Pharmaceutical Sciences, Laknepally Village, Narsampet Mandal, Warangal District- 506331, Telangana, India. Telangana India
2)KHAGGESWAR BHEEMANAPALLY
(72)Name of Inventor :
1)KHAGGESWAR BHEEMANAPALLY
2)DR. A. LAKSHMANA RAO
3)Dr. SRIDHAR BABU GUMMADI
4)DR. MANISH KUMAR THIMMARAJU

(57) Abstract :
The present invention relates to a preparation method of rosuvastatin formulation for treating human oral squamous cell carcinoma. All the compositions are added appropriately. The required quantity of beta cyclodextrin is dispersed in beaker comprising water. After, rosuvastatin calcium is dissolved in a solvent by stirrer. Aqueous component is added to solvent with continuous stirring, the solvent in the composition are evaporated by flash evaporation and solidifying the aqueous composition and subjected to freeze drying or by lyophilization method and finally cyclodextrin complexes of rosuvastatin salt is formed.

No. of Pages : 10 No. of Claims : 8

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GUDLAVALLERU - 521 356

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(19) INDIA

(22) Date of filing of Application :19/12/2022

(21) Application No.202241073480 A

(43) Publication Date : 30/12/2022

(54) Title of the invention : INDOLE MOIETY BEARING SCHIFF'S BASE-N1,N2-BIS[(1 H-INDOL-3-YL)-METHYLENE]-BENZENE-1,2-DIAMINE:CONVENTIONAL SYNTHESIS VERSUS GREEN SYNTHESIS

(51) International classification	:A61K0031404000, A61K0031000000, A61K0031198000, G01N0033500000, C07D0209520000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
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(71)**Name of Applicant :**

1)Dr. SRIKANTH KUMAR KARUMANCHI

Address of Applicant :PROFESSOR & HOD, DEPARTMENT OF PHARMACEUTICAL CHEMISTRY, QIS COLLEGE OF PHARMACY, ONGOLE-523272, PRAKASAM DT., ANDHRA PRADESH ---------- ----------

2)Mrs. B. SATYASREE

3)Mrs. D. ALEKHYA

4)Dr. GVN. KIRANMAYI

5)Ms. RAJALA SRIKALA

6)Mr. M. JALAIAH

7)Mr. CHAPALA DEVASASU

Name of Applicant : NA

Address of Applicant : NA

(72)**Name of Inventor :**

1)Dr. SRIKANTH KUMAR KARUMANCHI

Address of Applicant :PROFESSOR & HOD, DEPARTMENT OF PHARMACEUTICAL CHEMISTRY, QIS COLLEGE OF PHARMACY, ONGOLE-523272, PRAKASAM DT., ANDHRA PRADESH ---------- ----------

2)Mrs. B. SATYASREE

Address of Applicant :ASSOCIATE PROFESSOR, DEPARTMENT OF PHARMACEUTICAL CHEMISTRY, V.V. INSTITUTE OF PHARMACEUTICAL SCIENCES, GUDLAVALLERU-521356, KRISHNA DT., ANDHRA PRADESH. ---------- ----------

3)Mrs. D. ALEKHYA

Address of Applicant :ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACEUTICAL CHEMISTRY, KRISHNA UNIVERSITY COLLEGE OF PHARMACEUTICAL SCIENCES & RESEARCH, MACHILIPATNAM-521004, KRISHNA DT., ANDHRA PRADESH. ---------- ----------

4)Dr. GVN. KIRANMAYI

Address of Applicant :PROFESSOR, DEPARTMENT OF PHARMACOLOGY, FACULTY OF PHARMACY, Dr. MGR EDUCATIONAL AND RESEARCH INSTITUTE, CHENNAI-600095, TAMILNADU. ---------- ----------

5)Ms. RAJALA SRIKALA

Address of Applicant :ASSISTANT PROFESSOR, SCHOOL OF PHARMACY, DEPARTMENT OF PHARMACEUTICAL CHEMISTRY, GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (GNITC), IBRAHIMPATNAM, HYDERABAD, RANGAREDDY (DIST), TELANGANA-501506 ---------- ----------

6)Mr. M. JALAIAH

Address of Applicant :ASSISTANT PROFESSOR, DEPARTMENT OF PHARMACOLOGY, QIS COLLEGE OF PHARMACY, ONGOLE-523272, PRAKASAM DT., ANDHRA PRADESH. ---------- ----------

7)Mr. CHAPALA DEVASASU

Address of Applicant :ASSITANT PROFESSOR, DEPARTMENT OF PHARMACEUTICAL ANALYSIS, QIS COLLEGE OF PHARMACY, ONGOLE-523272, PRAKASAM DT., ANDHRA PRADESH ---------- ----------

(57) Abstract :

The present investigation was carried out to design and synthesis indole moiety bearing Schiffs base. N',N2-bis[(l#-indol-3-yl)-methylene]-benzene-l,2-diamine is a new Schiffs base that was made using a tamarind water-based green and traditional synthesis methods. Condensation of o-phenylenediamine with indole-3-carboxaldehyde led to the synthesis of a novel Schiffs base compound. Mass spectral and physical analysis was used to describe the produced schiffs base compound. The results indicate that the green synthesis produced higher yield of N\N2-bis[(l//-indol-3-yl)-memylene]-benzene-l,2-diamine in less time than the conventional route.

No. of Pages : 15 No. of Claims : 5

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डिजाइन सं. / Design No.	:	378946-001
तारीख / Date	:	08/02/2023
पारस्परिकता तारीख / Reciprocity Date*	:	
देश / Country	:	

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निर्गमन की तारीख/Date of Issue : 11/05/2023

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accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that:

. Utpal Jana; Dr. Arya Lakshmi Marisetti; Dr. DSNBK Prasanth; Mr. Darla Raju; Dr. Harshal Ashok Pawar; Dr Bhaskara Raju Vatchavai; Dr Kamala Lumari P V; Dr Mohan Gandhi Bonthu; Dr. Praveena Maddi; Pavan Kumar Krosuri

Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

2023/02375

copy of the complete specification is annexed, together with the relevant Form P2.

In te y thereof, the seal of the Patent Office has been affixed at Pretoria with effect from the 31st day of May 2023

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Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

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Registrar of Patents

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(22) Date of filing of Application :28/03/2023

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(71)**Name of Applicant :**
1)M. Ramayyappa
Address of Applicant :Associate Professor, Department of pharmaceutical analysis and Q.A., Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India Bhimavaram ---------- ----------
2)Dr. KNV Chenchu Lakshmi
3)G. Premi
4)Dr. G. Raveendra Babu
5)Dr. Mohan Gandhi Bonthu
6)Ms. Alluri Pavani Gayatri
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)M. Ramayyappa
Address of Applicant :Associate Professor, Department of pharmaceutical analysis and Q.A., Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India Bhimavaram ---------- ----------
2)Dr. KNV Chenchu Lakshmi
Address of Applicant :Assistant professor, KVSR Siddhartha College of Pharmaceutical Sciences, Vijayawada-520008, Andhra Pradesh, India Vijayawada ---------- ----------
3)G. Premi
Address of Applicant :Assistant Professor, Department of Pharmacology, Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India Bhimavaram ---------- ----------
4)Dr. G. Raveendra Babu
Address of Applicant :Associate Professor, Department of Pharmaceutical Analysis, QIS College of Pharmacy, Ongole-523272, Andhra Pradesh, India Ongole ---------- ----------
5)Dr. Mohan Gandhi Bonthu
Address of Applicant :Associate Professor, V V Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District 521356, Andhra Pradesh, India Gudlavalleru ---------- ----------
6)Ms. Alluri Pavani Gayatri
Address of Applicant :Assistant Professor, V V Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District 521356, Andhra Pradesh, India Gudlavalleru ---------- ----------

(57) Abstract :
ABSTRACT ANNONA RETICULATA AND OCIMUM BASILICUM EXTRACT AND THEIR COMBINATION USEFUL FOR TREATMENT OF ATHEROSCLEROSIS The present invention provides an Annona reticulata extract, an Ocimum basilicum extract and combination thereof for treatment of atherosclerosis. The process for the preparation of combination extract of Annona reticulata and Ocimum basilicum comprising of, collecting, washing and shade drying the leaves of Annona reticulata and Ocimum basilicum separately for 10 days; powdering the separated leaves in a grinder; weighing the dried powdered material and extracting by Soxhlet apparatus at a speed of 3cycles/hours for 16 hours; recovering the solvent by simple distillation; storing carefully the crude drug obtained and storing carefully at room temperature. The process for the preparation of combination of Annona reticulata and Ocimum basilicum extract, comprising of mixing Annona reticulata extract and Ocimum basilicum extract, adding carboxymethyl cellulose as vehicle to combined extracts. The combination of the present invention has potential usefulness as anti-atherosclerosis agent.

No. of Pages : 29 No. of Claims : 6

Bundesrepublik Deutschland

Urkunde

über die Eintragung des
Gebrauchsmusters Nr. 20 2023 101 811

Bezeichnung:

Mesalazin-Mini-Tablettenzusammensetzung in einem Kapselsystem zur gezielten Verabreichung an den Dickdarm

IPC:

A61K 31/606

Inhaber/Inhaberin:

Atmakuri, Lakshmana Rao, Dr., Gudlavalleru, Andhra Pradesh, IN
Chennuru, Madhavi Latha, Dr., Nellore, Andhra Pradesh, IN
Chirravuri, Satyanarayana Phani Kumar, Dr., Mallam, Andhra Pradesh, IN
Ghanta, Vijaya Kumar, Dr., Tadigadapa, Andhra Pradesh, IN
Kandimalla, Madhavi, Dr., Khammam, Telangana, IN
Kota, Padmaja, Dr., Visakhapatnam, Andhra Pradesh, IN
Nandyala, Srinivas, Dr., Mallepalli, Andhra Pradesh, IN
Pappula, Nagaraju, Dr., Guntur, Andhra Pradesh, IN
Peeriga, Raveesha, Dr., Gudivada, Andhra Pradesh, IN
Shaik, Aminabee, Dr., Machilipatnam, Andhra Pradesh, IN

Tag der Anmeldung:
11.04.2023

Tag der Eintragung:
22.05.2023

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Die Präsidentin des Deutschen Patent- und Markenamts

Eva Schewior

Eva Schewior

DEUTSCHES PATENT- UND MARKENAMT

München, 22.05.2023

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Bundesrepublik Deutschland

Urkunde

über die Eintragung des
Gebrauchsmusters Nr. 20 2023 103 088

Bezeichnung:

Pharmazeutische Zusammensetzung einer schwimmenden zweischichtigen Tablette aus Atorvastatin Calcium und Nikotinsäure

IPC:

A61K 31/40

Inhaber/Inhaberin:

Atmakuri, Lakshmana Rao, Dr., Gudlavalleru, Andhra Pradesh, IN
Chennuru, Madhavi Latha, Dr., Nellore, Andhra Pradesh, IN
Ghanta, Vijaya Kumar, Dr., Vijayawada, Andhra Pradesh, IN
Kandimalla, Madhavi, Dr., Khammam, Telangana, IN
Kodali, Balaji, Dr., Hanuman Junction, Andhra Pradesh, IN
Madda, Suresh Babu, Dr., Eluru, Andhra Pradesh, IN
Nandyala, Srinivas, Dr., Jaggampeta, Andhra Pradesh, IN
Pappula, Nagaraju, Dr., Guntur, Andhra Pradesh, IN
Peeriga, Raveesha, Dr., Gudivada, Andhra Pradesh, IN
Shaik, Aminabee, Dr., Machilipatnam, Andhra Pradesh, IN
Talasila, Eswara Gopalakrishna Murthy, Dr., Chirala, Andhra Pradesh, IN

Tag der Anmeldung:
06.06.2023

Tag der Eintragung:
03.07.2023

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Veshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Die Präsidentin des Deutschen Patent- und Markenamts

Eva Schewior

Eva Schewior
München, 03.07.2023

DEUTSCHES PATENT- UND MARKENAMT

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Bundesrepublik Deutschland

Urkunde

über die Eintragung des
Gebrauchsmusters Nr. 20 2023 104 259

Bezeichnung:

Matrix-Tablettenzusammensetzung mit kontrollierter Freisetzung von Apremilast

IPC:

A61K 31/4035

Inhaber/Inhaberin:

Arige, Sai Datri, Machilipatnam, Andhra Pradesh, IN
Atmakuri, Lakshmana Rao, Dr., Gudlavalleru, Andhra Pradesh, IN
Dangeti, Vinay Kumar, Dr., Kothavalasa, Andhra Pradesh, IN
Karri, Srinivasa Reddy, Anaparthy, Andhra Pradesh, IN
Kodali, Balaji, Dr., Hanuman Junction, Andhra Pradesh, IN
Mamidi, Satya Venkata Sakuntala, Dr., Kakinada, Andhra Pradesh, IN
Nandyala, Srinivas, Dr., Jaggampeta, Andhra Pradesh, IN
Pappula, Nagaraju, Dr., Guntur, Andhra Pradesh, IN
Ponnaganti, Satya Sai Prasanna Kumar, Darsiparru, Andhra Pradesh, IN
Vadithe, Vasu Naik, Dr., Guntur, Andhra Pradesh, IN

Tag der Anmeldung:
28.07.2023

Tag der Eintragung:
01.09.2023

V V Institute of Pharmaceutical Sciences

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Die Präsidentin des Deutschen Patent- und Markenamts

Eva Schewior

Eva Schewior

München, 01.09.2023

DEUTSCHES PATENT- UND MARKENAMT

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Den aktuellen Rechtsstand und Schutzumfang entnehmen Sie bitte dem DPMAregister unter www.dpma.de.

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :26/05/2023

(21) Application No.202341036575 A
(43) Publication Date : 01/09/2023

(54) Title of the invention : ACHYRANTHES ASPERA LEAF EXTRACT FOR TREATMENT OF OVARIAN DYSFUNCTION

(51) International classification :A61K0036210000, A61P0043000000, A61P0035000000, A61P0015000000, A61P0029000000
(86) International Application No :PCT//
Filing Date :01/01/1900
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

(71)**Name of Applicant :**
1)M. Ramayyappa
Address of Applicant :Associate Professor, Department of pharmaceutical analysis and Q.A., Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India ---------- ----------
2)Dr. KNV Chenchu Lakshmi
3)G. Premi
4)Dr. G. Raveendra Babu
5)Dr. Mohan Gandhi Bonthu
6)Ms. Alluri Pavani Gayatri
7)Bhaskara Raju Vatchavai
8)Nirmala Korukola
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)M. Ramayyappa
Address of Applicant :Associate Professor, Department of pharmaceutical analysis and Q.A., Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India ---------- ----------
2)Dr. KNV Chenchu Lakshmi
Address of Applicant :Assistant professor, KVSR Siddhartha College of Pharmaceutical Sciences, Vijayawada-520008, Andhra Pradesh, India ---------- ----------
3)G. Premi
Address of Applicant :Assistant Professor, Department of Pharmacology, Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram-534202, Andhra Pradesh, India ---------- ----------
4)Dr. G. Raveendra Babu
Address of Applicant :Associate Professor, Department of Pharmaceutical Analysis, QIS College of Pharmacy, Ongole-523272, Andhra Pradesh, India ---------- ----------
5)Dr. Mohan Gandhi Bonthu
Address of Applicant :Associate Professor, V V Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District 521356, Andhra Pradesh, India ---------- ----------
6)Ms. Alluri Pavani Gayatri
Address of Applicant :Assistant Professor, V V Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District 521356, Andhra Pradesh, India ---------- ----------
7)Bhaskara Raju Vatchavai
Address of Applicant :Professor & Principal, Sri Vasavi Institute of Pharmaceutical Sciences, Pedatadepalli, West Godavari District, Tadepalligudem, Andhra Pradesh 534101, India ---------- ----------
8)Nirmala Korukola
Address of Applicant :Professor & HOD, Department of Pharmacognosy, KGRL College of Pharmacy, Bhimavaram, West Godavari District, Andhra Pradesh, 534201, India ---------- ----------

(57) Abstract :
The present invention provides a leaf extract of Achyranthes aspera for treating ovarian dysfunction, wherein the diluting solvent of extract is 0.25%carboxy methylcellulose. The leaf extract of Achyranthes aspera, wherein the route of administration of extract in Letrozole induced PCOD rats is oral route and the test dose used in Letrozole induced PCOD rats is 200 mg/ml, 400 mg/ml and 600mg/ml solution. The leaf extract of Achyranthes aspera, wherein after treatment with 200mg/kg Achyranthes aspera extract in Letrozole induced PCOD rats, estrogen 13.19±0.7151, progesterone 30.12±0.87 and testosterone 11.30±0.9081; wherein after treatment with extract of 400mg/kg, estrogen 11.30±0.4928, progesterone 39.62±1.924 and testosterone 9.46±0.7446 and after treatment with extract of 600mg/kg in Letrozole induced PCOD rats, estrogen 9.075±0.2253, progesterone 42.47±1.904 and testosterone 6.36±0.5181.The process for the preparation of leaf extract of Achyranthes aspera, comprising of collecting and thoroughly washing leaves of Achyranthes aspera; drying in shade leaves on the newspaper for 10 days; powdering the dried leaves in grinder and weighing; extracting the plant material using solvent by Soxhlet extractor at a speed of 5 cycles/1 hour for 16 hours; recovering solvent by simple distillation to obtain crude drug extract. The leaf extracts of Achyranthes aspera show polycystic ovarian disease control in Wistar albino female rats.

No. of Pages : 28 No. of Claims : 10

Bundesrepublik Deutschland

Urkunde

über die Eintragung des
Gebrauchsmusters Nr. 20 2023 106 668

Bezeichnung:

Pharmazeutische Zusammensetzung für orales in-situ Gel von Ranitidin

IPC:

A61K 31/341

Inhaber/Inhaberin:

Atmakuri, Lakshmana Rao, Dr., Gudlavalleru, Andhra Pradesh, IN
Banoth, Bhargav Naik, Hyderabad, Telangana, IN
Kandimalla, Madhavi, Dr., Nandigama, Andhra Pradesh, IN
Kodali, Balaji, Dr., Hanuman Junction, Andhra Pradesh, IN
Korni, Rama Devi, Dr., Visakhapatnam, Andhra Pradesh, IN
Nandyala, Srinivas, Dr., Mallepalli, Andhra Pradesh, IN
Pappula, Nagaraju, Dr., Guntur, Andhra Pradesh, IN
Pashikanti, Shailaja, Dr., Visakhapatnam, Andhra Pradesh, IN
Ponnaganti, Satya Sai Prasanna Kumar, Darsiparru, Andhra Pradesh, IN
Vadithe, Vasu Naik, Dr., Piduguralla, Andhra Pradesh, IN

Tag der Anmeldung:

14.11.2023

Tag der Eintragung:

08.01.2024

Die Präsidentin des Deutschen Patent- und Markenamts

Eva Schewior

München, 08.01.2024

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Bundesrepublik Deutschland

Urkunde

über die Eintragung des
Gebrauchsmusters Nr. 20 2023 106 669

Bezeichnung:

Pharmazeutische Zusammensetzung für die kontrollierte Freigabe von Zafirlukast

IPC:

A61K 31/404

Inhaber/Inhaberin:

Atmakuri, Lakshmana Rao, Dr., Gudlavalleru, Andhra Pradesh, IN
Kavuri, Naga Raju, Dr., Pedaparimi, Andhra Pradesh, IN
Kodali, Balaji, Dr., Hanuman Junction, Andhra Pradesh, IN
Korni, Rama Devi, Dr., Visakhapatnam, Andhra Pradesh, IN
Mamidi, Satya Venkata Sakuntala, Dr., Kakinada, Andhra Pradesh, IN
Pappula, Nagaraju, Dr., Guntur, Andhra Pradesh, IN
Pashikanti, Shailaja, Dr., Visakhapatnam, Andhra Pradesh, IN
Satyavarapu, Veera Venkata Naga Satya Mahalakshmi, Dr., Narsapur, Telangana, IN
Thummala, Udaya Kumar, Dr., Krishna, Andhra Pradesh, IN
Vadithe, Vasu Naik, Dr., Piduguralla, Andhra Pradesh, IN

Tag der Anmeldung:

14.11.2023

Tag der Eintragung:

08.01.2024

Die Präsidentin des Deutschen Patent- und Markenamts

Eva Schewior

München, 08.01.2024

V. V. Institute of Pharmaceutical Sciences
GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences

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Den aktuellen Rechtsstand und Schutzumfang entnehmen Sie bitte dem DPMAregister unter www.dpma.de.

GRANTS RECEIVED

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

LIST OF GRANTS RECEIVED

S. No.	Name of the organization	Name of the sanctioned organization	Amount sanctioned
AY 2022-23			
1	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 36000/-
2	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	Unnat Bharat Abhiyan, National coordinating Institute, IIT Delhi	Rs. 50000/-
		Total amount sanctioned in AY 2022-23	**Rs.86, 000/-**
AY 2021-22			
3	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	AICTE-RPS	Rs. 17,16,666/-
4	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	AICTE MODROB-ASP	Rs. 3,41,500/-
5	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	AICTE-SPICES	Rs. 1,00,000/-
6	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	AICTE-ISTE Sponsored Induction/Refresher Program	Rs. 81,000/-
7	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 22000/-

PRINCIPAL

V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

8	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 22500/-
		Total amount sanctioned in AY 2021-22	**Rs. 22,83,666/-**
AY 2020-21			
9	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 44500/-
		Total amount sanctioned in AY 2020-21	**Rs. 44,500/-**
AY 2019-20			
10	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 44500/-
		Total amount sanctioned in AY 2019-20	**Rs. 44,500/-**
AY 2018-19			
11	V.V. Institute of Pharmaceutical Sciences. Gudlavalleru.	NSS Unit Cell, JNT University Kakinada	Rs. 44500/-
		Total amount sanctioned in AY 2018-19	**Rs. 44,500/-**

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

CONSOLIDATED STATEMENT
FOR THE AMOUNT OF GRANTS SANCTIONED

Academic Year	2022-23	2021-22	2020-21	2019-20	2018-19
Amount Sanctioned	Rs.86, 000/-	Rs. 22,83,666/-	Rs. 44,500/-	Rs. 44,500/-	Rs. 44,500/-

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
eshadri Rao Knowledge Village
UDLAVALLERU - 521 356

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES
NSS Unit Code: 90214611
(Approved by AICTE & PCI, New Delhi, Affiliated to JNTUK, Kakinada)
Sponsored by A.A.N.M & V.V.R.S.R Educational Society
Seshadri Rao Knowledge Village, Gudlavalleru- 521 356, Krishna District, A.P.

UTILIZATION CERTIFICATE
F.Y: 2022-23

This is to certify that NSS Unit -I of the college was received an amount of **Rs. 36,000/-** (Thirty six thousand only) on **28-07-2023** from the **NSS Cell, JNT University Kakinada,** through PFMS for the implementation of Regular Activities and the Unit Level NSS (ZBSA) Account is Jointly operated by the college Principal and the NSS Programme Officer. There is an unspent balance of Rs. **Nil** at the beginning of the financial year.

Thus, out of the received amount **Rs. 36,000/-**, an amount of **Rs. 35,700 /-** (Thirty five thousand seven hundred) has been utilized for the purpose of NSS Regular Activities properly, all the activities bills were settled through PFMS only in accordance with the guidelines of the utilization of NSS Grants and leaving the unspent balance of Rs. 300 /- (Three hundred) for NSS Regular Activities as on **15-08-2023.**

Unit Level NSS Account (ZBSA) Particulars

Account Number: **41755006009**

IFSC Code: **SBIN0001461**

Branch Details: **Gudlavalleru**

Total Amount received for Regular Activities through PFMS: **Rs- 36,000/-**

Total Amount utilized for Regular Activities through PFMS: **Rs- 35,700/-**

Total Amount received for Special Camping Activities through PFMS:

Total Amount utilized for Special Camping Activities through PFMS:

Total Unspent Amount Available in the Unit Level (NSS) PFMS Account: **300/-**

V. L. Vinod Kumar

Signature of the NSS PO
NSS Programme Officer
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356.

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Signature of the Principal
Dr. A. Lakshmana Rao
PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356.

उन्नत भारत अभियान
राष्ट्रीय समन्वय संस्थान
भारतीय प्रौद्योगिकी संस्थान दिल्ली
हौज़ खास, नई दिल्ली-११००१६

UNNAT BHARAT ABHIYAN
NATIONAL COORDINATING INSTITUTE
INDIAN INSTITUTE OF TECHNOLOGY DELHI
Hauz Khas, New Delhi - 110016
Website : http://unnat.iitd.ac.in

उन्नत भारत अभियान
UNNAT BHARAT ABHIYAN

Prof. Virendra K. Vijay
National Coordinator, UBA
Professor CRDT, IITD

Tel. : +91-11-2659 1121/1157 (O)
Fax : +91-11-2659 1121
Email : unnatbharatabhiyaniitd@gmail.com
vkvijay@rdat.iitd.ac.in

Dear Sir/Madam,

Congratulations to all the Participating Institutions (PIs) selected under Unnat Bharat Abhiyan, a flagship program of Ministry of Human Resource Development (MHRD) Government of India through a challenge mode application. The Mission of Unnat Bharat Abhiyan is to enable participating higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India.

As per the programme, educational institutions is primarily to develop linkage with selective rural clusters (preferably of five villages), to get involved in the planning process and to promote the requisite S&T interventions to improvise and expedite the developmental efforts in those clusters. The approach is a departure from the grant oriented method and would see the participation and commitment of faculty and students in this endeavour.

We shall be processing release of Rs. 10000/- per village under the UBA program. The funds are mainly meant for assistance for awareness, Gram Panchayat Development Plan (GPDP) study, need assessment, and contingency expenditure. There are provision of Rs 1.0 lakh for technological intervention/ solution and Rs 0.50/- lakh for customization of a technological solution under the program. Which you can avail of afterwards by submitting proposals with ratification of the Gramsabha. A two-way channel between PIs and National Coordinating Institute (NCI) as well as Subject Expert Groups (SEGs) for project proposal submission and evaluation has been developed and functional on UBA portal. You can use your login credential for uploading proposals on UBA website '**FINANCIAL AIDS** '. The login credentials are same as your registration login credentials.

You are also requested to keep IIT Delhi, the National Coordinating Institute updated about your activities so that the same can be uploaded on the website of UBA.

Regards and best wishes for your institution for contributing to India's development.

With regards

Your Sincerely,

Prof. Virendra K Vijay
National Coordinator,
Unnat Bharat Abhiyan

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

S. No.	Account No.	Amount	Beneficiary Name	Aishe Code
1	01212151008937	50000	R B INSTITUTE OF MANAGEMENT STUDIES	C-269
2	50200025172290	50000	M AND N VIRANI SCIENCE COLLEGE GIA	C-1000
3	67130200000177	50000	R R INSTITUTE OF TECHNOLOGY	C-1378
4	136210011005005	50000	SRI VENKATESWARA COLLEGE SOCIETY ACCOUNT	C-6369
5	0162010100014620	50000	PRINCIPAL MAITREYI COLLEGE	C-6391
6	2848101000002	50000	PRINCIPAL HANS RAJ COLLEGE	C-6425
7	919020045582036	50000	ACHARIYA COLLEGE OF ENGINEERING TECHNOLOGY	C-6516
8	915020065609537	50000	SRI VENKATESHWARAA MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE	C-6536
9	915020065790662	50000	INDIRANI COLLEGE OF NURSING	C-6563
10	221910110005472	50000	THE KNSBL ARTS AND COMMERCE COLLEGE KHERALU UGC	C-6774
11	753310000791	50000	PRINCIPAL M M CHAUDHARI ARTS COLLEGE RAJENDRANAGAR	C-6789
12	911010026939964	50000	AMAN BHALLA INSTITUTE OF ENGINEERING AND TECHNOLOGY	C-10371
13	62560100001337	50000	ASIET PRINCIPAL	C-11745
14	2910010100161217	50000	DEVELOPMENT FUND AC AN COLLEGE	C-12939
15	2258987236	50000	CHAIRMAN HILLS COLLEGE OF TEACHER EDUCATION	C-16289
16	6006516775	50000	THE PRINCIPAL ARUNAI ENGINEERING COLLEGE	C-16610
17	6544323791	50000	SITE FUNDING PROJECT	C-17929
18	861210110003534	50000	THE PRINCIPAL AND NSS PRO OFFICER DIET NSS UNIT	C-17948
19	25560100007322	50000	VIKAS SAMITI GOVT GIRLS COLLEGE BARAN	C-19442
20	0606201022030	50000	NSS UNIT GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY	C-19593
21	085411011101526	50000	LORDS INSTITUTE OF ENGINEERING AND TECHNOLOGY	C-19616
22	0196002100038075	50000	MIET KUMAON	C-21279
23	0275010200000101	50000	PRINCIPAL GOVERNMENT DEGREE COLLEGE KHANSAHIB	C-21447
24	435738352	50000	ABHYUDAYA EDUCATIONAL SOCIETY	C-24905
25	183610100006685	50000	SRI GCSR COLLEGE RAJAM	C-24922
26	1402150011	50000	DIRECTOR NATIONAL INSTITUTE OF AYURVEDA	C-26217
27	0138000027938	50000	MOHAMED SAHAK ENGINEERING COLLEGE ONLINE ACCOUNT	C-26795
28	737253625	50000	CSIRCECRI	C-26800
29	828120110000227	50000	THENI KAMMAVAR SANGAM COLLEGE OF TECHNOLOGY	C-26802
30	815821110000010	50000	THE PRINCIPAL P S R ENGINEERING COLLEGE	C-27082
31	0903101081963	50000	DR UMAYAL RAMANATHAN COLLEGE FOR WOMEN	C-28518
32	2808101019836	50000	PRINCIPAL SYED HAMEEDHA ARTS AND SCIENCE COLLEGE KILAKARAI	C-28531

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33	913020019601707	50000	AMAN BHALLA COLLEGE OF NURSING	C-29247
34	036801000009094	50000	DR N ALLIMUTHU PRINCIPAL MOTHER TERESA COLLEGE OF EDUCATION	C-33093
35	20156300031	50000	PRINCIPAL G S COLLEGE OF COMMERCE AND ECONOMICS JABALPUR	C-33353
36	31400100015442	50000	PRINCIPAL KLE SOCIETYS ARTS COMMERCE COLLEGE GADAG	C-35524
37	89330100008902	50000	PRINCIPAL SM COLLEGE	C-35548
38	1143115000020790	50000	VALLUVAR COLLEGE OF SCIENCE AND MANAGEMENT	C-35803
39	219901000016135	50000	THE CORRESPONDENT AND THE PRINCIPAL	C-36520
40	520101017621026	50000	THE PRINCIPAL G T N ARTS COLLEGE	C-36527
41	8610101020338	50000	SAC MEDICAL INSTITUTE OF MEDICLSCIENC	C-40144
42	11072191009090	50000	INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY	C-41681
43	512101011000329	50000	VIDYA PRATISHTHANA KAMALNAYAN BAJAJ INSTITUTE OF ENGINEERING AND TECH	C-41689
44	00000020137636009	50000	MODERN COLLEGE OF ARTS SCIENCE AND COMMERCE SHIVAJINAGAR PUNE	C-42103
45	50100133515093	50000	DR D Y PATIL INSTITUTE OF MANAGEMENT AND RESEARCH	C-42109
46	20218300033	50000	PRINCIPAL CHHATRAPATI SHIVAJI KALA MAHAVIDYALAYA AESGAON PURNA	C-42994
47	557120041	50000	PRINCIPAL NSS COLLEGE OF ENGINEERING	C-43771
48	397010100044785	50000	NISTARINI COLLEGE PURULIA	C-44760
49	200020110000682	50000	ASIA PACIFIC INSTITUTE OF HOTEL MANAGEMENT	C-45251
50	88951010000465	50000	GREATER NOIDA INSTITUTE OF TECHNOLOGY	C-46231
51	912020016307795	50000	GROUPNET EDUCATION WELFARE SOCIETY	C-47676
52	870920110000362	50000	DIRECTOR INSTITUTE OF FORENSIC NAGPUR	C-49799
53	14131131004094	50000	GRAMIN KANYA MAHAVIDYALAYA	C-50193
54	1608104000014997	50000	PCTS A P SHAH INSTITUTE OF TECHNOLOGY	C-50450
55	915020065609508	50000	SRI VENKATESHWARAA COLLEGE OF ENGINEERING AND TECHNOLOGY	C-52225
56	595120110000007	50000	JAMINI KANT BED COLLEGE	C-54649
57	1813010074740	50000	TTAADC POLYTECHNIC INSTITUTE	C-55746
58	07350210001707	50000	PRINCIPAL RRSD COLLEGE OF ENGINEERING	C-55747
59	090211100001468	50000	RANA BED COLLEGE	C-56631
60	6576210555	50000	THE PRINCIPAL VYASA ARTS AND SCIENCE COLLEGE FOR WOMEN	C-58003
61	110202000001420	50000	PURATCHI THALAIVAR DR M G R EDUCATIONAL AND WELFARE TRUST ARTS AND SCI	C-59050
62	6559532695	50000	PALAR AGRICULTURAL COLLEGE	C-60407
63	10920100196226	50000	THE PRINCIPAL KPR COLLEGE OF ARTS SCIENCE AND RESEARCH	C-62373
64	915020065609511	50000	SRI VENKATESHWARAA DENTAL COLLEGE	C-62503
65	687801700343	50000	COMPTROLLER AGRICULTURE UNIVERSITY KOTA	C-62549

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66	919020065087964	50000	NAGARATHINAM ANGALAMMAL ARTS AND SCIENCE COLLEGE	C-63059
67	12272191030820	50000	VISVESVARAYA COMMUNITY COLLEGE	C-63476
68	828120110000239	50000	THE PRINCIPAL BHARATH NIKETAN POLYTECHNIC COLLEGE SRI GOWRI NAGAR THIM	S-12742
69	187901000000001	50000	MAULANA AZAD NATIONAL URDU UNIVERSITY	U-0023
70	007201026854	50000	MANIPAL ACADEMY OF HIGHER EDUCATION MANIPAL	U-0234
71	912010004617629	50000	JAYPEE UNIVERSITY OF ENGINEERING TECHNOLOGY	U-0275
72	911010003251649	50000	SIKKIM MANIPAL UNIVERSITY	0431
73	8453101006078	50000	DR MGR EDUCATIONAL RESEARCH INSTITUTE	U-0461
74	911010033371991	50000	AMITY UNIVERSITY MADHYA PRADESH	U-0604
75	321201000157	50000	THE GLOCAL UNIVERSITY	U-0645
76	006201000073000	50000	DEAN DR MGR FISHERIES COLLEGE AND RESEARCH INSTITUTE THALAINAYERU	C-59432 / U-0665
77	880501711000005	50000	APEX PROFESSIONAL UNIVERSITY	U-0712
78	914010001166425	50000	VIVEKANANDA GLOBAL UNIVERSITY JAIPUR	U-0748
79	749402010001243	50000	B N UNIVERISTY	U-0836
80	31868488488	50000	THE PRINCIPAL AND CHAIRMAN HIRASUGAR INSTITUTE OF TECHNOLOGY	C-1409
81	10836428657	50000	DIRECTOR NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH	C-6172
82	11866496444	50000	ISWAR CHANDRA VIDYASAGER COLLEGE BELONIA	C-9599
83	11429618634	50000	PRINCIPAL SRI SAI COLLEGE OF ENGINEERING AND TECHNOLOGY	C-10353
84	11429618511	50000	SRI SAI IQBAL COLLEGE OF MANAGEMENT INFORMATION TECHNOLOGY	C-10503
85	57008127347	50000	SAINTGITS COLLEGE OF APPLIED SCIENCES	C-11746
86	31235764720	50000	JPM ARTS AND SCIENCE COLLEGE	C-11826
87	36563615699	50000	JEEVAN COLLEGE OF EDUCATION	C-14538
88	31400434716	50000	PRINCIPAL VALLABHANENI VENKATADRI INTITUTE OF PHARMACEUTICAL SCIENCES	C-17946
89	30465870201	50000	PRINCIPAL KAKINADA INSTITUTE OF ENGINEERING AND TECHNOLOGY	C-17992

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ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
Nelson Mandela Marg, Vasant Kunj,
New Delhi-110070

AQIS ID:1-932477598

RPS - Sanction Letter

File No. 8-170/FDC/RPS(Rural)/POLICY-1/2021-22

Date:_____

The Drawing and Disbursing Officer
All India Council for Technical Education
Nelson Mandela Marg,
Vasant Kunj, New Delhi-110070,

Sub: **Release of a sum of Rs. 1502082/- being the 1st installment of the total grant of Rs. 1716666/- for conduct of Project under Research Promotion Scheme (RPS) during the financial year 2021-22.**

Sir,

With reference to the proposal submitted by the institute, this is to convey the sanction of the Council for payment of **Rs. 1502082/- (Rupees Fifteen Lakh Two Thousand EightyTwo Only)** as 1st installment out of a total approved grant-in-aid of **Rs. 1716666/-** for conduct of a Project under the Research Promotion Scheme (RPS), as per details given below:-

I.	Name and address of the Beneficiary Institution (University / College / Institution)	:	**Registrar / Director / Principal, VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, KRISHNA, NEAR RAILWAY STATION, GUDLAVALLERU- 521356, ANDHRA PRADESH**
II.	Principal Investigator's Name & Dept./Course	:	**Mr. SRIKANTH KARUMANCHI (PHARMACEUTICAL ANALYSIS)**
III.	Co-Principal Investigator's Name & Dept.	:	**AMINA BEE SHAIK (PHARMACOLOGY)**
IV.	Grant-in-aid Sanctioned	:	Rs. 1716666/- (Rs.1287499/- for non-recurring and Rs.429167/ for recurring expenditure)
V.	**Amount to be Released during the year 2021-22 (as 1st installment)**	:	**Rs. 1502082/-** (Rs. 1287499/- Full amount of non-recurring & Rs.214583/- recurring i.e. 50 % of total sanctioned recurring grant)
VI.	Project Duration	:	**3 Years**
VII.	Title of the Project	:	**THIOPHENE, FURAN AND PYRIDINE BEARING NOVEL SUBSTITUTED THIAZOLIDINEDIONES: DESIGN, SYNTHESIS, MOLECULAR DOCKING AND BIOLOGICAL EVALUATION**

I. Release of funds:

1. The amount of the grant shall be drawn by the Drawing and Disbursing Officer (DDO), All India Council for Technical Education, New Delhi on the Grants-in-aid bill and shall be disbursed to and credited to the account of **VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, KRISHNA, NEAR RAILWAY STATION, GUDLAVALLERU- 521356, ANDHRA PRADESH** through **PFMS**.
2. The sanctioned grant-in-aid is debitable to the **Major Head "601.12.a (RPS Plan)" Gen.** and is valid for payment during the financial year 2021-22.
3. The sanction issues in exercise of the powers delegated to the Council. It is also certified that grant-in-aid is being released in conformity with the rules and principles of the Scheme.
4. The grant-in-aid is being released in conformity with the Terms & Conditions as well as norms of the scheme as already communicated and also being communicated in this letter.

II. Maintenance of account by the Institute/PI:

1. Funds covered by this grant shall be kept separately and would not be mixed up with other funds so as to know the amount of interest accrued on the grant.
2. The grant is intended to cover items of expenditure/equipment approved by AICTE.
3. Acknowledgement of receipt of grant and letter of acceptance of terms and conditions is to be submitted to AICTE **within 15 days** from the receipt of the grant to the following address:

Director (Faculty Development Cell), AICTE, Nelson Mandela Marg, Vasant Kunj, New Delhi-110070

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Contd...2/-

4. The accounts of the grantee will be opened for test check by the Council or Comptroller & Auditor General of India or by ar officer designated by them.

5. The Principal and PI of the institute are requested to verify the correctness of the undermentioned ban account/RTGS/PFMS details submitted by them alongwith the Proposal, in which the grant is being released. In case of an omission, the same should be reported to AICTE immediately along with refund of entire grant:

Institute Pan No.	Bank Name	Bank Branch	Bank Branch Add.	Account Holder Name	Account Type	Account Number	IFSC Code
AABAV96 17N	STATE BANK OF INDIA	GUDLAV ERU	Beside Post Office, Gudlavalleru Post, Krishna dist. 521356	PRINCIPAL, VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES	Current Account	62215595946	SBIN002 307

6. The grantee Institution shall observe all financial norms and guidelines as prescribed by the AICTE/Government of India from time to time. Grantee institution must follow GFR guidelines in procuring the sanctioned items and maintain an audited record of assets acquired wholly or substantially out of the grant-in-aid and a register for assets shall be maintained by the Institute in the prescribed form i.e. GFR-19.

7. **Interest accrued on the sanctioned grant-in-aid will be reported and refunded to AICTE and not adjusted against the subsequent installment.**

III. General Instructions:

1. It should be ensured that no RPS project in favour of the same P.I. has been sanctioned during the last 03 years before utilizing this amount and the matter be brought to the notice of this Council immediately in case a faculty is sanctioned multiple RPS Projects.

2. The duration of Project is 03 years and the **date of release of the grant by AICTE shall be taken as the date of commencement of the project**. The **Registrar/Director/Principal** shall intimate about the receipt of the grant to AICTE. Any Expenditure, incurred prior to issuance of this Sanction Order, would not allowed to be adjusted in the grant and if the University/Institution do not take-up the project work **within 6 months** of the receipt of the grant, approval shall *ipso facto* lapse **and the Institute has to necessarily refund the entire grant to AICTE along with interest within a month. In case the grant is not refunded within said duration 18% interest will be levied on it.** The grant has to be refunded to AICTE, through RTGS as per details given below:

Account Number	**55113199952**
Name of the Account Holder	**Member Secretary, AICTE, New Delhi**
Bank Name	**State Bank of India**
Branch Name	**Shashtri Bhawan, New Delhi**
IFSC Code	**SBIN0050203**

3. The Institute may constitute a Project Monitoring Committee (PMC). The composition of the PMC shall be as under:
   i. Principal/Director of the institution (Chairperson)
   ii. Two HODs from institute (Members)
   iii. In case of private institute one subject expert from government institute, not below the rank of Associate Professor (Member)
   iv. Coordinator of the project (Member Secretary)

4. The grant shall be utilized strictly for the purpose as specified in the sanction letter. Re-appropriation of funds from one Head to another is strictly not permitted viz. Recurring and non-recurring Heads. Further, the equipment(s)/item(s) purchased should be as per the specifications and individual item-wise costs sanctioned by AICTE, and not taking the total grant sanctioned as one entity. Item-wise purchase cost shall be matched with the sanctioned cost, and the cost of item purchased below the sanction cost shall be restricted as actual cost. If the item purchase cost is higher than its sanctioned cost, the cost shall be restricted to the sanctioned cost and the additional amount shall be met by the Institute from its own resources.

5. Similarly, the recurring grant can be used for the items (non-recurring) sanctioned by the AICTE. No money be used for going abroad to attend Conference / seminars. However, for presenting a Paper in a Seminar / Conference **within the country,** the travel expenses may be met from the recurring grant.

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Contd...3/-

7. No request for additional grant over and above the sanctioned grant shall be considered by the AICTE. The addition amount, if any, expended beyond the sanctioned grant shall be met by the Institute from its own resources.

8. The institute/University shall not charge any overheads on this Project and will provide all the administrative support an **timely release of grant to PI** for completion of the Project.

9. The grantee shall utilize grants only on approved items as per list of equipment attached. However, if the grantee wishes t recast the Project, approval of Council must be obtained for the revised item of expenditure and they will maintain prope accounts of the expenditure as per the norms/procedures of AICTE/Government of India. **The revised proposal should be within the total grant sanctioned and duly supported with reasons and recommendations of the Project Monitoring Committee (PMC).**

10. The assets acquired wholly or substantially out of All India Council for Technical Education's grant shall not be disposed or encumbered or utilized for the purpose other than those for which the Grant was given without proper sanction of the All India Council for Technical Education.

11. Each project sanctioned by AICTE is assigned a specific Reference Number, which is given on pre-page. All correspondence address to AICTE regarding the project must quote this number alongwith year of sanction of the project, otherwise correspondence may not be entertained.

12. The grantee shall follow the terms and conditions of Research Promotion Scheme (RPS) as laid down by the Council from time to time.

IV. Submission of documents by the institute/PI to AICTE:

A. Documents to be submitted within one month of completion of each financial year:

i. Annual Progress Report, indicating therein the number of patents, publications or any other achievement.

ii. Utilization Certificate, Audited Utilization Certificate, Receipt & Payments, Statement of Expenditure.

iii. Audited record of assets acquired wholly or substantially out of the grant-in-aid and a register for assets in the prescribed form i.e. GFR-19.

iv. Separate Bills/vouchers related to Non-recurring and recurring expenditures duly signed & stamped by the PI & Head of the institution.

v. Stock entry register duly verified by the Store-in-charge and PI & counter signed by Head of institution.

B. Documents to be submitted within two month of completion of the Project:

i. The consolidated Utilization Certificate (UC) and Receipt & Payment Account for the Project duration, duly audited.

ii. Consolidated audited statement of expenditure, to the effect that the grant has been utilized for the purpose for which it has been sanctioned. It should contain the head-wise break up of expenditure made from the grant-in-aid provided by the Council.

iii. Project Completion Report duly signed & stamped by the PI & Head of the institution and Project Evaluation Committee (PEC) Members.

iv. Principal Investigator/institute to submit the Feed Back Form in AICTE format.

v. The prescribed formats for submission of necessary mandatory documents and Terms & Conditions may please be downloaded from **www.aicte-india.org/schemes/research-innovations-development-schemes.**

Note: Any deviation from the above said time schedule will cause serious action against the institute.

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Contd.....4/-

V. Approved List of Items under Non-recurring grant:

S. No.	Approved Items (As per proposal)	No. of Units	Amount recommended (in Rs.)
A.	Non-recurring		
i)	FT-IR spectrophotometer	1	Rs.1287499/-
ii)	Microwave synthesizer	1	
iii)	Rotary evaporator	1	
B.	Recurring i.e. 50% of total approved recurring grant) for Contingencies & Consumables only		Rs.214583/-
	Grand Total (A) + (B)		Rs.1502082/-

Copy forwarded for information and necessary action to:

1. REGISTRAR / DIRECTOR / PRINCIPAL,

   VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES,
   SESHADRI RAO KNOWLEDGE VILLAGE, KRISHNA, NEAR RAILWAY STATION, GUDLAVALLERU- 521356,
   ANDHRA PRADESH

2. NAME OF PRINCIPAL INVESTIGATOR,

   Mr. SRIKANTH KARUMANCHI, (PHARMACEUTICAL ANALYSIS)
   VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES,
   SESHADRI RAO KNOWLEDGE VILLAGE, KRISHNA, NEAR RAILWAY STATION, GUDLAVALLERU- 521356, ANDHRA PRADESH

3. OFFICE OF DIRECTOR GENERAL OF AUDIT
   GENERAL REVENUES, AGCR BUILDING,
   I.P. ESTATE, NEW DELHI-110002

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4. GUARD FILE

27 JAN 2022

(Col. B. Venkat)
Director (FDC)

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg, Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

MODROB ASPIRATIONAL - Sanction Letter

F.No.9-81/IDC/MOD- ASP/Policy-1/2021-22

Date 10.01.2021

10.01.2021

To

The Drawing and Disbursing Officer,
All India Council for Technical
Education, Nelson Mandela Marg,
Vasant Kunj, New Delhi - 110070

Sub: Release of a sum of **Rs.273200/- (Rupees Two lakh Seventy Three Thousand Two Hundred Only)** being the 1st installment **Grant-in-Aid** under the scheme **(MODROB- ASP)** for the year **2021-2022** payable during the current financial year **2021-2022**- reg.

Sir/ Madam,

With reference to the proposal submitted by the institute, this is to convey the sanction of the Council for payment **Rs.341500/- (Rupees Three lakh Forty One Thousand Five Hundred Only)** as sanctioned Grant-in-Aid under the **odernization and Removal of Obsolescence Aspirational (MODROB- ASP)** scheme, as per details given below:

1.	Name and address of the Beneficiary Institution:	Director/ Principal/ Registrar. **VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, Andhra Pradesh**		
2.	Title of Project:	Modernization of Pharmacology lab		
3.	Name of Coordinator:	AMINA BEE SHAIK		
4.	Duration of the project:	2 years		
5.	Total Project Cost:	Rs.441500/-		
6.	Contribution from AICTE, Industry & Institute:	**AICTE**	**Industry**	**Institute**
		Rs.341500/-	Rs.0/-	Rs.100000/-
7.	Total Sanctioned Grant-in-aid from AICTE:	**Non-Recurring(85%):**	**Recurring (15%):**	**TOTAL**
		Rs.290275/-	Rs.51225/-	Rs.341500/-
8.	Amount to be released during the year 2021-22:	**Non-Recurring(85%):**	**Recurring (15%):**	**TOTAL**
		Rs.232220/-	Rs.40980/-	Rs.273200/-
9.	Sanctioned grant-in-aid is debatable to:	**Major Head 601.18(a) Gen. (Plan Head)**		

he contributions from industry and institute (as mentioned in the row 6 of Table above) must reflect in the Receipt & enditure Statement in respect of this project, failing which AICTE may not consider proposals under the Scheme in re.

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The amount of the Grant shall be drawn by the Drawing and Disbursing Officer, All India Council for Technical Education on the Grant-in-Aid bill and shall be disbursed to and credited to the account of Director/ Principal/ Registrar of the Institute through RTGS/ PFMS.

This Grant-in-Aid is being released in conformity with the terms & conditions as well as norms of the scheme as already communicated, and also being communicated in this letter.

The instructions/guidelines to be followed by University/Institution

I. **Release of funds**

a. The Principal/ Director of the institute and the Coordinator of the project are hereby requested to verify the correctness of the undermentioned bank account/ RTGS details submitted by them along with the Proposal, in which the grant is being released:

Institute Pan No.	Bank Name	Bank Branch Name	Bank Branch Address	Account Holder Name	Account Type	Account Number	Ifsc Code
AABAV9617N	STATE BANK OF INDIA	GUDLAVALLERU	POST OFFICE ROAD, GUDLAVALLERU	PRINCIPAL, VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES	Current Account	62215595946	SBIN0021307

In case of any omission the same should be reported to AICTE immediately.

b. The sanction is issued in exercise of the powers delegated to the council and other terms & conditions laid down in the guidelines of the scheme.

c. 80% grant of the sanctioned amount is being released to institution as first installment followed by 20% as reimbursement after Utilization Certificate (UC) and other requisite documents as specified in terms & conditions of MODROB scheme.

II. **Maintenance of accounts**

a. The institute shall strictly follow the provisions laid down in the scheme document and this sanction letter. All correspondences related to the project must contain this number along with year of sanction of the project; failing which correspondence will not be entertained.

b. Funds covered by this grant shall be kept separately and would not be mixed up with other funds, so as to know the amount of interest accrued on the grant from AICTE.

c. The University/ College/ Institute shall maintain proper accounts of the expenditure out of the grants, which shall be utilized only on approved items of expenditure (list enclosed).

d. The Council or its nominee shall have the right to check/ verify the account to satisfy that the fund has been utilized for the purpose for it was sanctioned.

e. The date of release of the grant by AICTE shall be taken as the date of commencement of the project. The Principal/ Director/ Registrar shall intimate about the receipt of the grant to AICTE. Any expenditure incurred prior to the issuance of the sanction letter will not be allowed to be adjusted in the grant and if the Institution/ University does not take the project work within one month of the receipt of the grant, the approval shall ipso fact lapse.

f. After receipt of the grant from AICTE, the institute shall send a confirmation to AICTE within 2 months of receipt of grant that the sanctioned project has been started/is in progress.

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III. **Refund of grant by way of a demand draft in favour of Member Secretary, AICTE, New Delhi**

a. If the college/ institute does not have the Letter of Approval (LOA) or Extension of Approval issued by AICTE for the academic year 2021-22, the fund released should be immediately refunded to AICTE with interest accrued thereon.

b. If project is not started within six months of the issuance of this Sanction Letter, the released amount, along with interest accrued thereon, has to be necessarily returned to AICTE.

c. It may be ensured that the project is completed within the stipulated time. If the project is not completed in

time, no further extension will be granted in any case and institute has to refund the entire amount to AICTE.

d. As AICTE needs adequate time for depositing the Demand Draft in the bank, the same be immediately dispatched to avoid any lapse of the validity period.

IV. **Submission of documents by college/institution after completion of Project/Subsequent years.**

The following mandatory relevant documents are required to be submitted by the college/institution within one month of the completion of the project: -

a. Feedback form in the prescribed proforma.

b. The **Annual Progress Report (APR)** in the prescribed format along with the original Statement of actual Expenditure in the prescribed proforma duly signed by the Head of the institution and shall be submitted to AICTE not later than one month after completion.

c. The **Utilization Certificate (UC)** supported by Audited Statement of Expenditure to the effect that the grant has been utilized for the purpose for which it has been sanctioned shall be furnished to the AICTE immediately after completion of the project. It should contain the head-wise break up of expenditure made from the grant-in-aid provided by the Council. Audited Statement of Expenditure indicating expenditure incurred in the total duration of the project in the prescribed format and GFR-19 shall be submitted to the Council.

d. In case of self-financing/private institutions, Statement of actual Expenditure & Utilization Certificate are required to be audited & signed by a Chartered Accountant (with membership no., full address & stamp). Photocopies of formats are enclosed.

e. **Program Evaluation Committee (PEC)** is required to be constituted at Institutional level. The constitution of the PEC shall be as under:

(i) Principal/Director/Registrar of the Institution(Chairperson)
(ii) Two HODs and one subject expert(Members).
(iii) Coordinator of the project (Secretary).

The minutes of the meetings are to be submitted to the Council at end of the project along with other mandatory documents.

f. Project completion report project indicating the activities undertaking, number of students benefited, laboratory works photographs of students, together with their views is to be submitted.

g. Attested photocopies of supporting vouchers/bills of expenditure incurred for the completion of Project.

h. Photographs of equipment/ items purchased.

i. The balance amount of the grant will be reimbursed to the university/institution only on submission of the above documents. On receipt of these documents, the total amount of balance of financial assistance, admissible as per the norms, shall be worked out and grant-in-aid shall be released, as second installment, in favour of the beneficiary institution.

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General instructions

a. The amount of interest accrued on the grant should be treated as part of the grant to be utilized for that particular project. However, the interest amount accrued along with grant disbursed should not exceed the total grant sanctioned for the project. The Institute receiving the grant should reflect the same in the audited statement of accounts/ utilization certificate and may either refund the interest amount to AICTE or AICTE shall adjust the same in the next installment of grant before its released.

b. Any unavoidable circumstantial change in the project with respect to name of Project Coordinator for the MODROB project would mandatorily require prior approval of the Council. All such requests should be addressed to AICTE, in advance, recording the specific reasons for proposed changes, failing which the offer for the grant already issued would be treated as automatically withdrawn and the financial assistance released in favour of the beneficiary institution shall be refunded immediately to the Council.

c. The grantee shall maintain an audited record of assets acquired wholly or substantially out of the Grant-in-Aid and a register of assets shall be maintained by the Institute in the prescribed form i.e. GFR-19.

d. The College/ Institute receiving grant under MODROB is expected to put up a plaque at the main entrance of the Lab/ Department, which has been modernized using the grant. All the equipment procured through the project should be superscribed with AICTE project file number.

e. The assets acquired wholly or substantially out of grant shall not be disposed or encumbered or utilized for the purpose other than those for which the Grant was given without proper sanction of the AICTE and should at any time the institution cease to function, such assets shall revert to the AICTE.

f. When the institute ceases to function, it shall take action with respect to equipment/ items procured through AICTE grants as follows:

i. It shall be ensured that the project has been completed and all mandatory documents have been submitted for utilization of grant and file has been closed under which the equipment has been procured.
ii. The equipment/ items in unserviceable condition are to be disposed off by the institute as per the Government of India rules and the sale proceeds if any, should be sent by Demand Draft in favor of Member Secretary, AICTE, New Delhi.
iii. The equipment/ items in working/ serviceable condition shall be transferred in preferential order to:
   - Institute under the same society/ trust/ management.
   - Nearby AICTE approved Government (Degree/ Diploma) institute/ College.
iv. The transportation charges for shifting of equipment/ items be borne by borrowing institute.
v. AICTE shall be intimated regarding handover/ takeover of the equipment/ items.

g. The grantee Institution shall observe all financial norms and guidelines as prescribed by the AICTE/ Government of India from time to time. GOI GFR rules (@https://doe.gov.in/order-circular/general-financial-rules2017) should be followed during utilization of grant.

h. The department/ institute is expected to utilize these equipment/ items alongwith others in offering student internship also by registering on the AICTE Internship Portal (@https://internship.aicte-india.org). The internships can be offered to students of other institutions also.

i. As mentioned in the scheme document, the institute must register in I-STEM (Indian Science, Technology & Engineering Facilities Map) (@https://www.istem.gov.in).

List of Equipment/ Items approved:

List of Equipment/ Items
UV Trans illuminator
Biochemistry analyzer
Gel Electrophoresis
Lagendorff System

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Yours sincerely,

Dr. Neeraj Saxena
Advisor - I (IDC)

Copy forwarded for information and necessary action to:

1. **Name and Address of the Coordinator,**
   AMINA BEE SHAIK
   VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES,
   SESHADRI RAO KNOWLEDGE VILLAGE

All India Council for Technical Education
(A Statutory body under Ministry of HRD, Govt. of India)
Nelson Mandela Marg, Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

SPICES - Sanction Letter

F.No. 10-207/AICTE/IDC/SPICES/2020-21 Dated: 05.03.2021

To

The Drawing and Disbursing Officer
All India Council for Technical Education
Nelson Mandela Marg, Vasant Kunj,
New Delhi-110070.

Subject: Release of a sum of Rs. 1,00,000/- (Rupees One lakh only) as Grant-in-Aid under **AICTE-SPICES** for the year 2021-22 payable during the current financial year 2020-21-reg.

Madam/Sir,

With reference to the proposal submitted by the institute, this is to convey the sanction of the Council for payment of Rs. **1,00,000/-** (Rupees One lakh only) to support the student club/chapter/society **(hereinafter referred to as 'Club')** under the **"Scheme for Promoting Interests, Creativity and Ethics among Students (SPICES)"**, as per details given below:

1.	Name and address of the Beneficiary Institute:	**VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, GUDLAVALLERU, 521356, KRISHNA, Andhra Pradesh**
2.	Permanent ID of Institute:	1-8947251
3.	Name of student club:	PHARMA INNOVATION AND ETHICS CLUB
4.	Name of Coordinator:	**Dr. Lakshmana Rao Atmakuri**
5.	Name of Co-coordinator	Bhargavabhushanrao Pathange
6.	Grant-in-aid Sanctioned:	Rs. **1,00,000/-** (Rupees One Lakh only)
7.	Amount to be released during the year 2020-21	Rs. **1,00,000/-** (Rupees One Lakh only)
8.	Sanctioned grant-in-aid is debitable to:	**Major Head 602.22 (a) General (Non-Plan Head)**

- The amount of the grant shall be drawn by the Drawing and Disbursing Officer, All India Council for Technical Education, New Delhi on the Grant-in-aid bill and shall be disbursed to and credited to the account of Registrar/ Director/ Principal of the institute through RTGS.
- This grant-in-aid is being released in conformity with the terms & conditions as well as norms of the Scheme as already communicated and also being communicated in this letter.

V.V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356

The instructions/ guidelines to be followed by college institution

I. Release of funds

a. The Principal/ Director of the institute and the Coordinator of the student club is hereby requested to verify the correctness of the undermentioned bank account/ RTGS details submitted by them alongwith the proposal, against which the grant is being released:

Institute PAN No.	Bank Name	Bank Branch Name	Bank Branch Address	Account Holder Name	Account Type	Account Number	IFSC Code
AABAV9617N	STATE BANK OF INDIA	GUDLAVALLERU	POST OFFICE ROAD, GUDLAVALLERU	PRINCIPAL, VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES	Current Account	62215595946	SBIN0021307

In case of any omission the same should be reported to AICTE within 7 (Seven) days.

b. The full amount of the grant sanctioned is being released as advance to the College/ Institute.
c. This sanction is issued in exercise of the powers delegated to the Council and other terms and condition laid down in the guidelines of the Scheme.

II. Limit of Funding

a. The grant from AICTE will be Rs. **1,00,000/-** (Rupees One lakh only) and the institute is required to make a contribution of **Rs. (100001 to 200000)** to the club (as committed by the institute in the proposal), non-compliance of which shall invite penal action.

III. Utilization of funds

a. Funds once released/sanctioned for supporting the particular student club cannot be utilized for any other programme/ student club.
b. Students on roll in the institute shall be the member of the club.
c. The grant can be utilized for supporting Interests/Hobbies, Creativity/ Imagination/ Innovation and Ethics/ Value through a range of student activities and meeting the cost of registration and travel (up to 40% of the total grant) of students of the beneficiary club, participating in outstation activities.
d. Ex-students and ex- faculty members and other officials of the institute shall not be the member of club.
e. The clubs must be encouraged to reach out alumni and industries for fund-raising for their events.
f. Coordinator will maintain an electronic record of activities, participants etc..

IV. Maintenance of accounts

a. The institute shall strictly follow the provisions laid down in the Scheme document and this sanction letter. All correspondence related to the project must contain the number of this letter alongwith year of sanction of the project failing which correspondence will not be entertained.
b. The institute shall maintain proper accounts of the expenditure out of the grant and the Council or its nominee shall have the right to check/verify the account to satisfy that the fund has been utilized for the purpose for it was sanctioned.
c. Funds covered by this grant shall be kept separately and would not be mixed up with other funds, so as to know the amount of interest accrued on the grant.

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU

V. Refund of grant to AICTE (by way of a demand draft in favour of Member Secretary, AICTE, New Delhi)

a. The grant shall be refunded to AICTE if the Letter of Approval/ Extension of Approval is not issued by AICTE to the institute for the academic year 2021-22.
b. Interest accrued on the grant released, shall be refunded to AICTE.
c. No payment is permissible against the activities **already conducted** by club
d. As AICTE needs adequate time for depositing the Demand Draft in the bank, the same be immediately dispatched to avoid any lapse of the validity period.

VI. Documents to be uploaded on AICTE Dashboard/ Portal

a. On receipt of grant:

i. The Acceptance Letter within 7 days from the date of receipt of the Sanction Letter duly signed and seal affixed by Coordinator and Head of the Institutions.

b. After completion of every quarter (from the date of receipt of grant)

i. Upload the list of activities /events /participation date-wise brief description, achievement and 4–5 pictures.

c. After completion of the project (after one year):

Institute has to fill up and update information on AICTE Dashboard/ Portal and upload following documents:

i. Photographs showing various activities, events organized by club.
ii. Feed-back of members of the club.
iii. Identify 3 other clubs which the institution proposes to develop on the lines of club benefited under SPICES.

VII. Submission of documents by institute for project closure (after one year)

The following documents must be submitted to AICTE within a period of one month, after completion of one year, to stay eligible for receiving further grants from AICTE:

a. Utilization Certificate and Statement of Accounts in prescribed format duly audited by the Chartered Accountant in the case of a private institution and by the Finance Officer/Account Officer in respect of government/government- aided institution.
b. Supporting bills/documents on account of expenses incurred for the purpose duly attested by the Head of the Institute.
c. Proof of the amount made available by the institution approved by the Council/ University/ State Government and other sources.
d. Soft copy of final report submitted on AICTE Dashboard/ Portal as mentioned above (in section VI).

VIII. General instructions

a. The assets acquired wholly or substantially of the grants from AICTE shall not be disposed or encumbered or utilized for the purposes other than those for which it was given without proper sanction of the Council and should, at any time the Institution ceased to function, such assets shall revert to the AICTE.

b. The beneficiary institute will make best efforts to promote the scheme by mentioning the sponsorship/ support from AICTE, carrying the Logo of AICTE in club activities and other means.

c. The beneficiary institution shall observe all financial norms and guidelines as prescribed by the AICTE/ Government of India from time to time. GOI GFR rules (@https://doe.gov.in/order-circular/general-financial-rules2017-0) should be followed during utilization of grant.

d. This Sanction Letter may be treated as Offer Letter for all purposes.

Yours sincerely

9/3/2

(Dr. Neeraj Saxena)
Adviser (IDC)

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
GUDLAVALLERU - Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Copy forwarded for information and necessary action to:

1. **Dr. Lakshmana Rao Atmakuri,**
   VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, GUDLAVALLERU, 521356, KRISHNA, Andhra Pradesh.
2. **The Registrar / Director / Principal,**
   VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES, SESHADRI RAO KNOWLEDGE VILLAGE, GUDLAVALLERU, 521356, KRISHNA, Andhra Pradesh.
3. **Guard File.**

FW: AICTE-ISTE Sponsored Induction/Refresher Programs - regarding

Prof. Vijay D. Vaidya
Executive Secretary, ISTE

ISTE/AICTE-ISTE Induction-Refresher Program/2021-22 November 12, 2021

Dear Sir/Madam,

Sub : AICTE-ISTE Sponsored Induction/Refresher Programs - regarding

Ref. : 1. Our letter dated 21-09-2021
2. Your willingness to conduct the program.

- - -

First of all, we appreciate you for showing your willingness to conduct the AICTE-ISTE Induction/Orientation program at your institution. In this regard you have already submitted your convenient date options for the conduction of the program. Now we have prepared a calendar of programs which ensures uniform distribution of programs and is approved by AICTE. While finalising the schedule we have to make certain modifications in the dates submitted to ensure uniform distribution of programs.

As per the schedule approved from AICTE the sanction date of commencement of your program is **25/01/2022 to 31/01/2022 in online mode** on the topic **Role of Artificial Intelligence in Drug Discovery and Development.** In case, the above date is not suitable for you please communicate with us with proper justification for shifting of schedule dates. In that case you may have to conduct program in the month of February 2022.

You are further requested to go ahead with the schedule and start necessary preparations for organising the program. Meanwhile we will be sending you Rs. 81,000/- (max permissible) as the first instalment so that it will be convenient for you to plan and execute the program in a more efficient way. **Balance payment of Rs.12,000/- will be sent only after successful completion of the program and submission of all relevant documents.**

We are enclosing herewith the Instruction (SOP) for your reference and guidance. Please ensure that it is strictly followed during execution of the program. In addition, you have to collect feedback from participants in a google form which will be made available to you shortly.

For any queries please feel free to contact me personally and office to the mobile nos. WhatsApp No. : 9422046567; Mob: 9373666492; 9968296318, 9911146329 or by email to: vijayvaidya09@gmail.com with a copy to official mail : istedhq@isteonline.org.

Please note that we are confirming the dates as mentioned above in our program schedule.

Assuring you all support from our side and expecting your full cooperation for smooth and effective conduct of the program.

With Regards,

Institute of Pharmaceutical Sciences GUDLAVALLERU V V

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Yours

(Prof. Vijay Vaidya)

To
Dr. LAKSHMANA RAO ATMAKURI
(Coordinator)
Principal
VALLABHANENI VENKATADRI INSTITUTE OF PHARMACEUTICAL SCIENCES
SESHADRI RAO KNOWLEDGE VILLAGE, GUDLAVALLERU POST, KRISHNA DISTRICT

Indian Society for Technical Education
Shaheed Jeet Singh Marg
New Delhi – 110 016
Phone : 011-26963431, 26513542, Email : istedhq@isteonline.org

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

Dr. A. Lakshmana Rao

M.Pharm., Ph.D., FIC, FAGE.

Principal

Date: 28th April, 2022.

NATIONAL SERVICE SCHEME

UTILIZATION CERTIFICATE

(Regular activities Grant of Rs. 22,000/-)

2021-22

This is to Certified that an amount of Rs. 22,000/- (Rupees twenty two thousand only) Received from the Registrar, JNTU University, Kakinada, **NEFT-bulk posting** towards college level NSS regular activity grants for the year of 2021-22, has been utilized for the NSS regular activities and there is no balance is left as per the bank statements.

NSS Unit: 90214611

Signature of the

NSS PO

NSS Programme Officer
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
Gudlavalleru - 521 356

Signature of the

PRINCIPAL

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E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

Dr. A. Lakshmana Rao

M.Pharm., Ph.D., FIC, FAGE.

Principal

Date: 28th April, 2022.

NATIONAL SERVICE SCHEME

UTILIZATION CERTIFICATE

(Special camp activities Grant of Rs. 22,500/-)

2021-22

This is to Certified that an amount of Rs. 22,500/- (Rupees twenty two thousand five hundred only) Received from the Registrar, JNTU University, Kakinada, **NEFT-bulk posting** towards college level NSS Special camp activity grants for the year of 2021-22, has been utilized for the NSS Special camp activities and there is no balance is left as per the bank statements.

NSS Unit: 90214611

Signature of the

NSS PO
NSS Programme Officer
V.V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
Gudlavalleru - 521 356

Signature of the

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V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
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Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

Date: 21th April, 2021.

NATIONAL SERVICE SCHEME

UTILIZATION CERTIFICATE

(Regular activities / Special camp Grant of Rs. 44,500/-)

2020-21

This is to Certified that an Rs. 44,500/- (Rupees forty four thousand five hundred only) Received from the Registrar, JNTU University, Kakinada, **NEFT-bulk posting** towards college level NSS regular activity grants for the year of 2020-21, has been utilized for the NSS regular activities and there is no balance is left as per the bank statements.

NSS Unit: 90214611

Signature of the

NSS PO
NSS Programme Officer
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356.

Signature of the

PRINCIPAL
V. V. Institute of
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Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

Dr. A. Lakshmana Rao

M.Pharm., Ph.D., FIC, FAGE.

Principal

NATIONAL SERVICE SCHEME

UTILIZATION CERTIFICATE

(Regular activities / Special camp Grant of Rs. 44,500/-)

2019-20

Certified that an amount of Rs. 44,500/- (Rupees forty four thousand five hundred only) Received from the Registrar, JNTU University, Kakinada, vide DD/Cheque for the amount of Rs. 44,500/- bearing DD/Cheque No.397320 (which is the part of 2019-20 regular and special camp fund) dated 27-05-2020 towards college level NSS Regular/Special camp for the year 2019-20 has been utilized for the purpose.

NSS Unit: 90214611

12/6/2020

Signature of the

NSS PO
NSS Programme Officer
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356.

12/6/2020

Signature of the

PRINCIPAL
V. V. Institute of
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V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

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E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

Dr. A. Lakshmana Rao

M.Pharm., Ph.D., FIC, FAGE.

Principal

NATIONAL SERVICE SCHEME

UTILIZATION CERTIFICATE

(Regular activities / Special camp Grant of Rs. 44,500/-)

2018-19

Certified that an amount of Rs. 44,500/- (Rupees forty four thousand five hundred only) Received from the Registrar, JNTU University, Kakinada for the academic year 2018-19 amount of Rs. 31,500/- vide DD/Cheque amount was unexpectedly withdrawn by V. V. Institute of Technology, Guntur because of similarity in the college name. The above stated amount was received by us from the VVIT, Guntur as per the directions of JNTUK NSS cell. Further the amount of Rs. 13,000/- bearing the DD/Cheque No.397320 (which is the part of 2018-19 fund) dated 27-05-2020 towards college level NSS Regular/Special camp for the year 2018-19 has been utilized for the purpose.

NSS Unit: 90214611

12/6/2020

Signature of the

NSS PO

NSS Programme Officer
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356.

12/6/2020

Signature of the

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
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Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

BOOKS & BOOK CHAPTERS

V. V. INSTITUTE OF PHARMACEUTICAL SCIENCES

Seshadri Rao Knowledge Village, GUDLAVALLERU - 521 356, Krishna District, A.P.

(Approved by AICTE & PCI, New Delhi and Affiliated to JNTUK, Kakinada)

Sponsored by A.A.N.M. & V.V.R.S.R. Educational Society

Phone : 08674-274649, Fax : 08674-274441

E-mail : venkatadripharmacy@gmail.com, Website : www.vvipsgudlavalleru.ac.in

3.3.2 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five year

S. No.	Description	Publisher	Year
TEXT BOOKS & BOOK CHAPTERS PUBLISHED			
1	Title: Interactions Between Microbes and Plants: Environmental Challenges. Authors: **Sk. Aminabee,** V.Adithya, V.Deepthi, S.Hari Babu, A.Lakshmana Rao. Book Title: Recent Studies on Environment, Plants and Microbes. ISBN: 978-93-9362-2150	Innovation Online Training Academy Publishers	2022
2.	Title: Interactions Between Microbes and Plants: Environmental Challenges. Authors: Sk. Aminabee, V.Adithya, V.Deepthi, S.Hari Babu, **A.Lakshmana Rao**. Book Title: Recent Studies on Environment, Plants and Microbes. ISBN: 978-93-9362-2150	Innovation Online Training Academy Publishers	2022
3	Title: A Glimpse on Pharmacology. Authors: **Sk. Aminabee,** A.Lakshmana Rao. ISBN: 978-93-5451-389-3	Nirali Prakashan, Pune.	2022
4.	Title: A Glimpse on Pharmacology. Authors: Sk. Aminabee, **A. Lakshmana Rao**. ISBN: 978-93-5451-389-3	Nirali Prakashan, Pune.	2022
5.	Title: Anti arthritic activity of *Myxopyrum smilacifolium* & *Pambus missionis* Authors: **P. Raveesha** ISBN: 978-6139-57811-5	Lambert Academic Publishing	2022
6.	Title: Social and Preventive Pharmacy. Authors: K. Ravi Shankar, M. Sridevi, **A.Lakshmana Rao**. ISBN: 978-93-89354-94-2	BSP Books Pvt Ltd., Hyderabad.	2020

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
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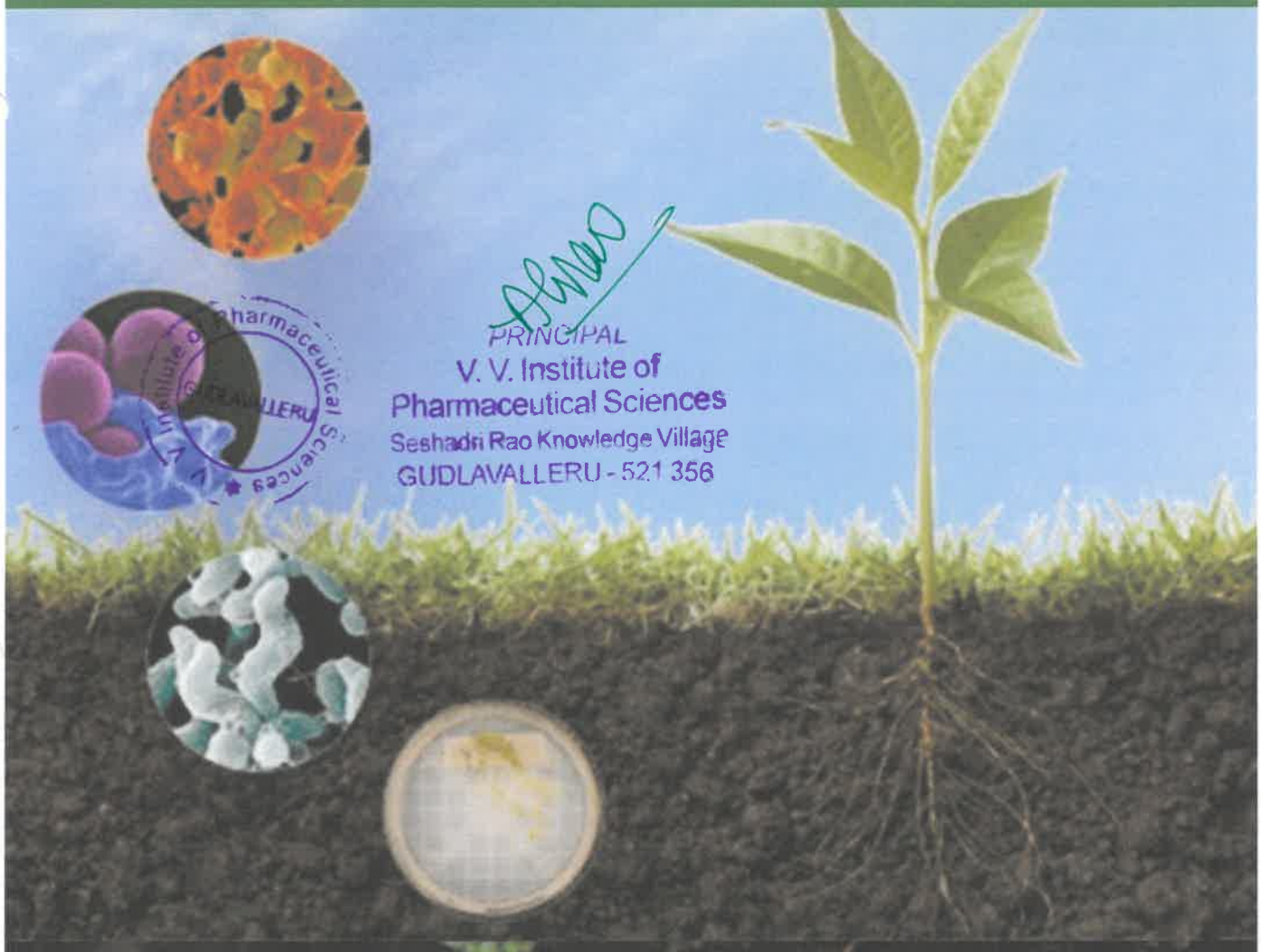
eshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

First Edition

Recent Studies on Environment, Plants and Microbes

Ms. R. Rajalakshmi



Publisher
Innovation Online Training Academy Publishers

Title: **Recent Studies on Environment, Plants and Microbes**

Editor – **Ms. R. Rajalakshmi**

Edition: **First Edition**

First Published - **November, 2022**

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visit us at www.iotacademy.in for further information

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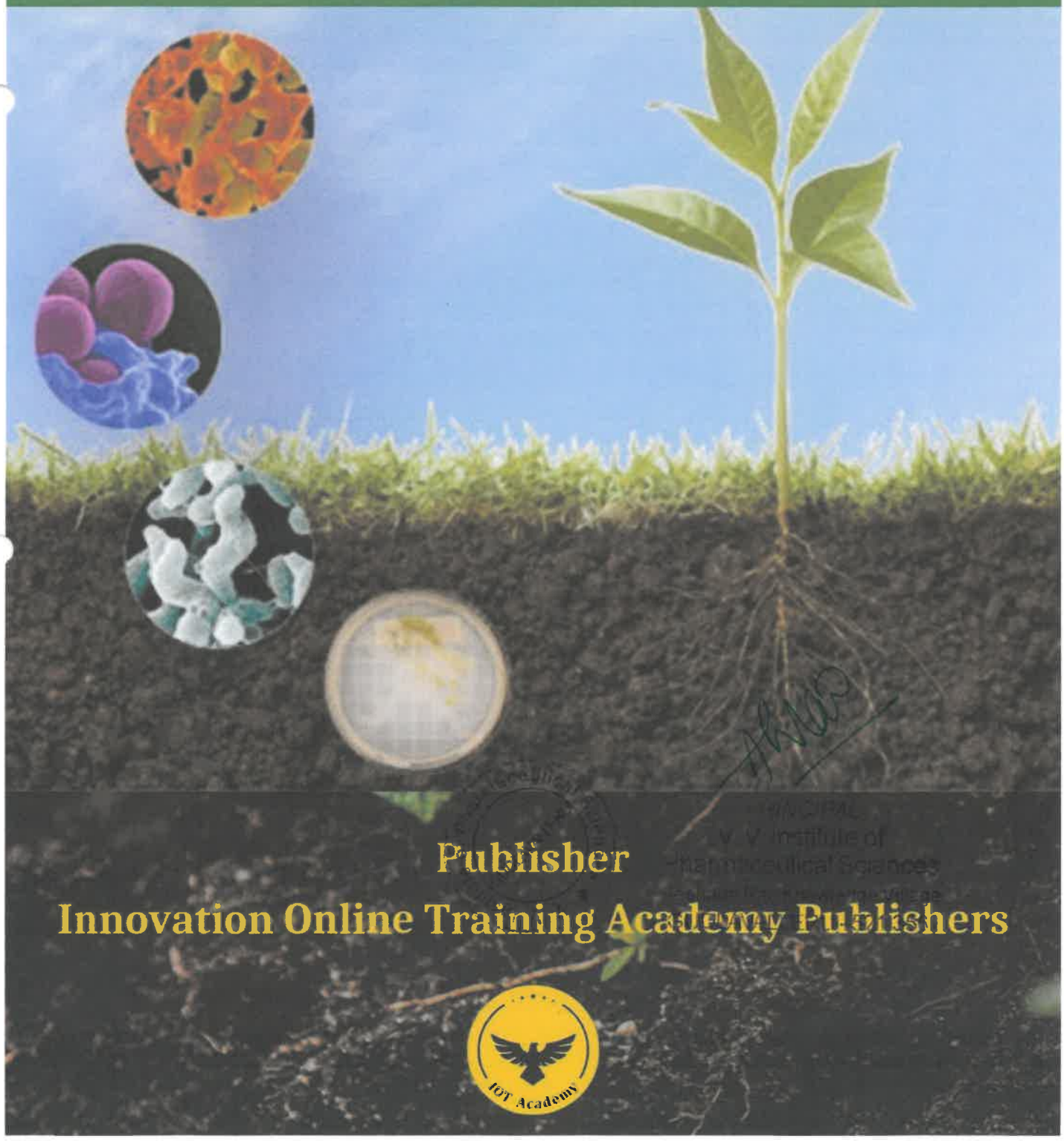
First Edition

Recent Studies on Environment, Plants and Microbes

Ms. R. Rajalakshmi



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Editor – **Ms. R. Rajalakshmi**

Edition: **First Edition**

First Published - **November, 2022**

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Coimbatore-1,
Tamilnadu.
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Contents

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

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GUDLAVALLERU - 521 356

About the Authors

Dr. Sk. Aminabee received her Bachelor's of Pharmacy from Acharya Nagarjuna University, Nagarjuna Nagar and Master's Degree in Pharmacology from Andhra University, Visakhapatnam. She completed Doctorate Degree from Jawaharlal Nehru Technological University, Hyderabad. She is presently working as Associate Professor in the Department of Pharmacology in V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Andhra Pradesh. She has 11 years of teaching and research experience. She has participated in 38 National and International Conferences and presented about 21 papers. She acted as Co-ordinator, Co-convener and Convener for various International and National Conferences. She published 28 articles in reputed journals. Gave 3 guest lectures. She received Association of Pharmacy Professionals (AOPP) Best Faculty Award 2017, OPF Oscar Teacher Award of the year 2018, Dr. APJ Abdul Kalam Award for Young Scientist 2019, Young Educator & Scholar Award 2020 and Associate Fellow Award 2021 from Academy of Sciences. She is a Life member of professional societies like IPA, APTI, ISTE, APP, OPF.

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A GLIMPSE ON PHARMACOLOGY

Dr. Sk. AMINABEE
Prof. Dr. A. LAKSHMANA RAO

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Myxopyrum smilacifolium and Pamburus missionis were used to treat for ailments in ancient system of medicine. This book contains the pharmacognostical findings of both the plants to establish standardization. The plants were evaluated for antioxidant, antiinflammatory and antiarthritic activity. Further parameters were studied. Results were analyzed statistically which shown both the plants are potent against arthritis.

Myxopyrum & Pamburus

RAVEESHA PEERIGA
KOTHAPALLI BANNOTH CHANDRASEKHAR

Antiarthritic Activity of Myxopyrum smilacifolium & Pamburus missionis

Assessment of Myxopyrum smilacifolium B. and Pamburus missionis S. for Antiarthritic Activity

My interest on natural products paved to investigate on phytoconstituents against autoimmune disorders like arthritis. During this research journey, the knowledge is cherished in technical aspects and lead to the novel findings in pharmacognosy and phytochemistry.

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Social and Preventive Pharmacy

About the Authors

K. Ravi Shankar obtained his Bachelor and Master of pharmacy degree in pharmacology specialization from Andhra University. He obtained his Doctor of philosophy from Acharya Nagarjuna University. He is enriched with 28years of teaching and professional experience. Presently he is working as Principal and Professor in Aditya College of Pharmacy, Surampalem. He published several research papers in Pharmacology and Pharmacy practice in various reputed journals and acts as reviewer for many journals. Several students have obtained their research degrees under his guidance and 4 more students are perusing their research studies. He is an author of "Clinical Pharmacy and Pharmacotherapeutics", "Pharmacology- A Comprehensive Approach" and "Pharmacology- a companion handbook with illustrations" published by Pharma Med press.

Sridevi Medapati completed M. Pharmacy in Pharmacology form Andhra University. She is working as Senior Assistant Professor in Aditya College of Pharmacy, enriched with good teaching experience. She is the topper in M. Pharm Pharmacology and secured Prathibha award from Government of Andhra Pradesh in the year 2014. She has published few research articles in reputed scientific journals.

A. Lakshmana Rao obtained his Bachelor degree from Acharya Nagarjuna University, Master degree from Andhra University. He obtained his Ph.D. from Acharya Nagarjuna University. He is working as Principal and Professor in V. V. Institute of Pharmaceutical sciences, Gudlavalleru enriched with 20years of teaching experience. He published several research papers in various reputed journals. He is the member of several professional bodies and plays a key role in various professional activities. He guided many students who have pursued Ph.D. programme in various universities and several students with specialization in pharmaceutical chemistry and pharmaceutical analysis and quality assurance have completed Master degree thesis, Ph.D. projects under his guidance. He is also reviewer of various research journals.

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Ravi Shanker
Sridevi
Lakshmana Rao

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K. Ravi Shanker
M. Sridevi
A. Lakshmana Rao

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Dr. K. Ravi Shankar, M. Sridevi and A. Lakshmana Rao

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Prevention and Control of Diseases

CHAPTER 4

National Health Programs

CHAPTER 5

Health Care of the Community

RECOGNITION AS BOS CHAIRPERSON/MEMBER

KRISHNA UNIVERSITY
MACHILIPATNAM

PROCEEDINGS OF THE VICE-CHANCELLOR
Present: Prof. G. Gnana Mani

KRU/AAC/Re-Constitution of BoS/2023-7 Dt.08.09.2023

Sub: KRU – DOAA – Re-constitution of Board of Studies Members for PG Board of Studies in Pharmaceutical Sciences in Krishna University - Reg.

Ref: Vice-Chancellors Note Orders Dt.08.09.2023

***

ORDERS:

In partial modifications of the earlier proceedings, the honourable Vice-Chancellor has re-constitution of Board of Studies members for PG Board of Studies in Pharmaceutical Sciences under University Constituent Colleges of Krishna University. Details are given below:

PG BOARD OF STUDIES IN PHARMACEUTICAL SCIENCES		
S.NO	**Name of the Faculty**	**Designation**
1	**Prof. Y. Rajendra Prasad,** Dept. of Pharmacy College of Pharmaceutical Sciences, Andhra University, Visakhapatnam Ph: 9440132537, Email: aucpsprincipal@andhrauniversity.edu.in	**Chairperson**
2	**Head of the Department**	**Member**
3	**Prof. Duraiswamy Dhachinamoorthi** Principal QIS College of Pharmacy, Ongole Ph:9866268129 Email:principal@qiscp.edu.in	**Member**
4	**Prof. M.V. Basaveswara Rao** Krishna University Mobile: 9346234562, Email: vbrmandava@yahoo.com	**Member**
5	**Prof. S. Kavimani, HoD** Dept. of Pharmacology Mother Therasa post graduate & Research institute of health sciences, Poducherry Ph:9443085956 Email:drskavimani@yahoo.co.in	**Member**
6	**Prof. V. Gopal,** Dept. of Pharmacognosy Mother Theresa Post Graduate & Research Institute of Health Sciences, Puducherry Ph:9894832221 Email:gopalveni@yahoo.com	**Member**

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7	**Dr. Ramalingam Peraman** National Institute of Pharamceutical Education &Reasearch (NIPER) Hajipur, Bihar, India Ph:9581294478 Email:drramalingamp@gmail.com	**Member**
8	**Dr. A. Lakshmana Rao** Professor & Principal, VV Institute of Pharmaceutical Sciences, Gudlavalleru Ph:08674 - 274649 Email:dralrao@gmail.com	**Member**
9	**Dr. A. Suneetha** Principal, KVSR Siddhartha College of Pharmaceutical Sciences, Vijayawada Ph:9949185566 Email:drasuneetha@gmail.com	**Member**
10	**Dr.Yeswanth Allamneni,** AGM, SP Accure Labs Pvt. Ltd, Hyd Ph: 9052485546, Email:	**Member –Industry**
11	**To be identified by the chairperson from the P.G. Final year merit list**	**Meritorious final year PG students representatives-Two members**

(By Order)

Krishna University 521 004 A.P. Machilipatnam

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MACHILIPATNAM - 521 004
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Rudravaram, Machilipatnam – 521003 (A.P) INDIA.

Prof. K. Krishna Reddy
REGISTRAR

Ph. & Fax: +91 08672-225964
Mobile: 9542487999
Email: registrarku@gmail.com

Proc.No.KRU/AAC/UG/Board of Studies/ Paramedical Science /3.18/2020 Date: 30.12.2020

Sub: KU – Academic Audit – The constitution of the UG Board of Studies (BoS) members in Paramedical Science for the approval of the revised Under Graduation (UG) CBCS syllabus w.e.f 2020-21(APSCHE-AC- Revision of syllabus under CBCS with effect from 2020-21 syllabus) – Reg

Ref: Note Order's of the Vice – Chancellor, dt: 30.12.2020

ORDER:

In accordance with the provisions contained by the Krishna University act No. 29 of 2008 of A.P Govt, Hon'ble Vice – Chancellor is pleased to appoint the Board of Studies in Faculty of Paramedical Science with the following members.

UG BOARD OF STUDIES FOR PARAMEDICAL SCIENCE		
S.No	Name of the Faculty	Designation
1	Dr. P. Raveesha V. V. Institute of Pharmaceutical Sciences Gudlavalleru Mobile: 8297509909, Email:	Chairperson
2	Dr. Nirmala Jyothi Bollineni Professor & Principal NRI College of Nursing Chinakakani (V) – 522503 Guntur Mobile No:9110371503, 9963327555, Email:bnjyothi30@gmail.com	Member
3	Dr. Krishna Vaishnavi Pachipulusu Professor Gitam Institute of Nursing, Gandhi Nagar Vishakapatnam – 530 045 Mobile No.: 9010833707, Email: ksathras@gitam.edu	Member
4	Dr. Uppu. Jayalakshmi Associate Professor NRI College of Nursing Chinakakani (V) – 522503, Guntur Mobile No.: 9000566334, Email: jayaram007@gmail.com	Member
5	Sri. A.V. Krishna Raju Scientist (R&D) Laila Nutraceuticals, JRD TATA Institutional Estate, Kanuru, Vijayawada-520 007 Mobile No.: 8331015059, E-mail: avkr@lailanutra.in	Member
6	Dr. K. Suresh Babu Scientist Division of Natural Product Chemistry CSIR-Indian Institute of Chemical Technology Hyderabad – 500007 Mobile No.: 9963999220, E-mail: suresh@iict.res.in	Member

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7	Dr. Pedapalli Latha Theresa Associate Professor NRI College of Nursing Chinakakani (V) – 522503, Guntur Mobile No.:9848752954, Email: lathabhanu897@gmail.com	Member
8	G. Chandralekha Associate Professor, Gitam Institute of Nursing, Gandhi Nagar Vishakapatnam – 530 045 Mobile No.:9703430511, Email:cgopalak@gitam.edu	Member
9	Dr. Sk. Aminabee Associate Professor V. V. Institute of Pharmaceutical Sciences, Gudlavalleru Mobile No.: 9908037622, Email: draminask@gmail.com	Member
10	To be identified by the Chairperson from the UG Final year Merit list.	Meritorious final year UG Boy student representative
11	To be identified by the Chairperson from the UG Final year Merit list	Meritorious final year UG Girl student representative

The term of office of all the members including the chairman of Board of studies shall be for a period of two years with effect from the date of the order or till the new boards of studies constituted.

These orders shall come in to force with immediate effect.

(By Order)

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All Directors and Pfincipals of the University and Constituent Colleges/Units
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GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Higher Education - Universities – Constitution of the Executive Council of Jawaharlal Nehru Technological University, Kakinada for a period of three (3) years – Notification – Issued.

HIGHER EDUCATION (UE) DEPARTMENT

G.O.MS.No.80 **Dated:01.09.2023**

Read :

The Jawaharlal Nehru Technological University Act, 2008 (Andhra Pradesh Act No.30 of 2008)

****

ORDER:-

The following Notification will be published in the Andhra Pradesh Gazette:-

NOTIFICATION

In exercise of the powers conferred under clauses (i) to (vi) under Class- II of sub-section (1) of section 11 of the Jawaharlal Nehru Technological Universities Act 2008 (Andhra Pradesh Act No.30 of 2008), as subsequently amended from time to time, the Government of Andhra Pradesh hereby reconstitute the Executive Council of the Jawaharlal Nehru Technological University, Kakinada with the following persons for a period of 3 (three) years (subject to para-2 below) as Members:-

S.No	Category	Name & Designation
1	One senior Professor of the University Colleges to be nominated by the Government	Dr. U.V. Ratna Kumari Professor of ECE University College of Engineering Kakinada, JNTU Kakinada Ph:99899 01433
2	One Principal of the University Colleges to be nominated by the Government	Dr. MHM Krishna Prasad Principal, University College of Engineering, Kakinada
3	One Principal of the Affiliated Colleges to be nominated by the Government	Prof. V. Krishna Reddy Principal Krishna Chaitanya Inst. of Technology & Sciences, Markapuram Ph: 9441681902
4	One Teacher from among the Teachers of the University Colleges to be nominated by the Government	Dr. D. Haritha Professor, Dept. of Computer Science Engineering, JNTU UCE Kakinada Ph: 9440810901

5	One Teacher from among the Teachers of the Affiliated Colleges, if any, to be nominated by the Government	Dr.Sk. Aminabee Professor of Pharmachology VV Institute of Pharma Sciences, Gudlavalleru Ph: 9908037622
6	Four Eminent persons representing Industry, Research and Development, Engineering and Technology, Physical and Social Sciences and Public Life etc., to be nominated by the Government	B.V.V.Satya Narayana Sarpanch, Thimmapuram Ph: 9848443334
		Sri B. Mallikharjuna Rao General Manager - Learning & Development RELIANCE INDUSTRIES LTD, Ph: 9000436667
		Dr. N. Satish Reddy Vice President Aditya Academy, Kakinada Ph: 98661 76667
		Sankurathri Chandra Sekhar Founder, Sankurathri Foundation Kakinada, Andhra Pradesh Ph: 9441200944, 9618200944

2. The Members of the Executive Council nominated in para (1) above, shall hold Office during the pleasure of the Governor under sub-section (7)(a) of Section 11 of Jawaharlal Nehru Technological Universities Act, 2008 (Andhra Pradesh Act No.30 of 2008).

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

J.SYAMALA RAO
PRINCIPAL SECRETARY TO GOVERNMENT

To
The Commissioner of Printing, Stationery and Stores Purchase,
Vijayawada- for publication in the A.P.Gazette.
The individuals concerned through the Registrar,
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The Registrar, Jawaharlal Nehru Technological University, Kakinada.
The Secretary, University Grants Commission,
Bahadur shah Zafar Marg, New Delhi
The Principal Secretary to Governor, Raj Bhavan, Vijayawada.
The Chairman, A.P. State Council of Higher Education, Mangalagiri.
The P.S. to Prl.Secy. to Govt., Finance (FMU-Edu)Deptt.

Copy to:
The P.S to Spl C.S to Chief Minister
The OSD to Minister for Education.
P.S. to Principal Secretary to Government, H.E. Dept.,
SF/SCs

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//FORWARDED :: BY ORDER//

SECTION OFFICER

PHD GUIDESHIP & DETAILS OF RESEARCH SCHOLARS

Ph.D. Projects Guided

Number of Ph.D. Projects Guided: 12

S. No.	Research Scholar	Title	Guides	University	Dates
1.	Dr. Peda.S.R.CH.N.P. Varma.D (Part-Time) Faculty: Medicine Subject: Pharmacy	Development and Validation of Stability Indicating Analytical Methods for Some Selected Drugs in Bulk and Pharmaceutical Dosage Forms	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.S.C.Dinda	Berhampur University, Berhampur	Admission: 26-08-2009 Submission: 18-02-2013 Awarding: 21-09-2013
2.	Dr. T.Raja (Full-Time) Faculty: Pharmacy Subject: Pharmaceutical Sciences	Development and Validation of Novel HPLC and HPTLC Methods for the Estimation of Some Selected Drugs in Bulk and Pharmaceutical Dosage Form	Supervisor: Dr.A.Lakshmana Rao	Acharya Nagarjuna University, Nagarjuna Nagar	Admission:- 10-01-2010 Submission: 10-03-2013 Awarding: 31-12-2013
3.	Dr. V.Bhaskara Raju (Part-Time) Faculty: Pharmacy Subject: Pharmaceutical Sciences	Development and Validation of Novel HPLC Methods for the Estimation of Selected Drugs in Bulk Samples and Pharmaceutical Formulations	Supervisor: Dr.A.Lakshmana Rao	Acharya Nagarjuna University, Nagarjuna Nagar	Admission: 21-11-2009 Submission: 06-02-2013 Awarding: 31-12-2013

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4.	Dr. B.Raja (Part-Time) Faculty: Biotechnology Subject: Pharmaceutical Sciences	Development and Validation of Novel HPLC Methods for the Simultaneous Determination of Some Selected Drugs and Their Pharmaceutical Formulations	Supervisor: Dr.A.Lakshmana Rao	Acharya Nagarjuna University, Nagarjuna Nagar	Admission: 15-10-2009 Submission: 06-10-2015 Awarding: 10-06-2016
5.	Dr. B.Mohan Gandhi (External) Faculty: Pharmaceutical Sciences	Development and Validation of Novel Analytical Methods for the Determination of Selected Drugs in Bulk and Pharmaceutical Formulations in Human Plasma	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.J.Venkateswara Rao	JNTUH, Hyderabad	Admission: 23-10-2012 Submission: 16-09-2016 Awarding: 25-05-2017
6.	Dr. G.Raveendra Babu (External) Faculty: Pharmaceutical Sciences	Development and Validation of New RP-HPLC and LC-MS Methods for the Determination of Selected Drugs in Pharmaceutical Dosage Forms	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.J.Venkateswara Rao	JNTUH, Hyderabad	Admission: 23-10-2012 Submission: 28-11-2016 Awarding: 25-05-2017
7.	Dr. Sk.Aminabee (External)	Preliminary Phytochemical and	Supervisor: Dr.A.Lakshmana Rao	JNTUH, Hyderabad	Admission: 16-11-2012

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	Faculty: Pharmaceutical Sciences	Pharmacological Screening Methods on Selected Indigenous Plants	Co-Supervisor: Dr.M.China Eswariah		Submission: 31-10-2016 Awarding: 01-07-2017
8.	Dr. K.Hanumantha Rao (External) Faculty: Pharmaceutical Sciences	Development and Validation of Novel Analytical Methods for the Determination of Selected Drugs in Pharmaceutical Formulations by using HPLC and Spectrophotometry	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.K.B.Chandrasekhar	JNTUA, Anantapur	Admission: 21-08-2012 Submission: 10-11-2017 Awarding: 24-02-2018
9.	Dr. K.Srikanth Kumar (Part-Time) Faculty: Pharmacy Area of Research: Pharmaceutical Chemistry	Synthesis, Biological Evaluation and Molecular Docking Studies of Novel Substituted Thiazolidinedione Analogues	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.D.Rama Sekhara Reddy	KRU, Machilipatnam	Admission: 11-04-2015 Submission: 11-02-2020 Awarding: 22-06-2020
10.	Dr. P.Jaya Preethi (Part-Time) Faculty: Pharmacy Area of Research: Pharmaceutical Chemistry	Design and Synthesis of Novel Prodrugs for Selected Drug Moieties	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.M.V.Basaveswara Rao	KRU, Machilipatnam	Admission: 17-12-2014 Submission: 16-06-2020 Awarding: 17-04-2021

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11.	Dr. P. Venkateswara Rao (External) Faculty: Pharmacy Area of Research: Pharmaceutical Analysis	Development and Validation of Novel HPLC and LC-MS Methods for the Determination of Selected Drugs in Pharmaceutical Dosage Forms and Biological Matrices	Supervisor: Dr.A.Lakshmana Rao Co-Supervisor: Dr.S.V.U.M.Prasad	JNTUK, Kakinada	Admission: 12-02-2016 Submission: 12-03-2021 Awarding: 19-01-2022
12.	Mr. K.Md. Ismail (Part-Time) Faculty: Pharmacy Area of Research: Pharmaceutical Analysis	Quality Assurance Aspects and Development of Modern Analytical Methods for Assay of Some Drugs in Pure and Pharmaceutical Dosage Forms	Supervisor: Dr.A.Lakshmana Rao	KRU, Machilipatnam	Admission: 17-12-2014 Submission: 16-06-2020 Awarding: 03-03-2023

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Jawaharlal Nehru Technological University Kakinada, Kakinada – 533 003, Andhra Pradesh.

The Research scholars selected in the academic year 2015-16 may please note the list of Supervisors / Co-supervisors eligible to supervise / Co-supervise the research work is enclosed herewith.

List of Eligible Supervisors from Affiliated Institutions for the Year 2015-16

S.No.	No. of Selected Candidates	Name of the Faculty	Address & Email address	Area of Interest
Pharmacy				
56	1	Dr.G.Pratap Kumar	M.R.R. College of Pharmacy, Near DSP office, Madhira Road, Nandigama, Krishna District, A.P.-521185. Mob. No.-8977777710	Pharmaceutics
57	2	Dr.Subhranshu Panda	Vikas College of Pharmacy, Putrela Road, Vissannapeta, Krishna District, A.P.-521215. Mob. No.-9998516901,8763013826 drsubhran@gmail.com	Pharmaceutics
58	3	Dr.T.E.Gopala Krishna Murthy	Bapatla College of Pharmacy, Bapatla, Guntur District, A.P.-522101. Mob. No.-9912342094 gopalakrishnatalasila@yahoo.com	Pharmaceutics
59	4	Dr.Dillip Kumar Sahoo	Avanthi Institute of Pharmaceutical Sciences, Cherukupally, Bhogapuram, Vizianagaram District, A.P.-531162. Mob. No.-9963456623 sahoo4@gmail.com	Analytical Chemistry
60	5	Dr.Biswa Mohan Sahoo	Vikas College of Pharmacy, Putrela Road, Vissannapeta, Krishna District, A.P.-521215. Mob. No.-9133055582	Pharmacology
61	6	Dr.A.Lakshmana Rao	Principal, V. V. Institute of Pharmaceutical Sciences, Gudlavalleru Post, Krishna District, A.P.-521356. Mob. No.-9848779133 drallrao@gmail.com	Pharmaceutical Analysis and Pharmaceutical Chemistry

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, ANDHRA PRADESH, INDIA

Dr. S. Srinivas Kumar
Professor & Director (Research & Development)

Sub: J N T University-Admissions to Research Programs - 2015-16

1. You are provisionally selected for admission into Ph.D programme (Pharmacy)

2. Details of the Candidate : Mr. P. Venkateswara Rao,
   Name & Address : S/o Shri Koteswara Rao,
   Dosullapalem, Pulluru Post,
   Mylavaram Mandl, Krishna Dist
   Mobile: 9949963007
   E-mail: venkats0425@gmail.com

   Official Address : Assistant Professor
   Department of Pharmaceutical Analysis,
   Vikas College of Pharmacy, Vissannapeta, Krishna District

3. Faculty in which admitted : Pharmacy

4. Supervisor Name, Designation and Address:
   Dr. A. Lakshmana Rao,
   Principal,
   V. V. Institute of Pharmaceutical Sciences,
   Seshadrirao Knowledge Village, Gudlavalleru
   Contact: 9848779133
   E-mail: dralrao@gmail.com

5. Co-Supervisor Name, Designation and Address:
   Dr. S. V. U. M. Prasad,
   Programme Director,
   Pharmacy Courses,
   JNT University, Kakinada
   Contact: 9912338946
   E-mail: prasadjntukphar.2009@rediffmail.com

6. Area of Research : Pharmaceutical Analysis

7. Topic of Research : Development and Validation of Novel HPLC and LC – MS Methods for the Determination of Selected Drugs in Pharmaceutical Dosage forms and Biological Matrices

8. Roll No : 15022PPH06

From Second year onwards for each year you will have to pay an amount of Rs. 30,000/- (Rupees thirty thousand only) towards one year fee on or before 31st January and obtain receipt. Otherwise, You have to pay Rs. 2, 000/- fine during first six months delay. Later Rs. 4, 000/- fine per year delay in paying the tuition fee.

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DIRECTOR

Director, Research
Jawaharlal Nehru Technological University Kakinada
Kakinada - 533 003, Andhra Pradesh, India

Copy to the Supervisor / Co-Supervisor
Copy to the Director (R & D)
Copy to the Director of Evaluation

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
ANANTAPUR 515002(A.P)

Dr. P.R.BHANUMURTHY
Director i/c, Admissions.

Lr. No.JNTUA/DA/Ph.D/M.Phil/Admns/Pharmacy /2012-13
Dt:21.08.2012

Sub: JNTUA-DA-Admissions in Ph.D/M.Phil Programmes – 2012-13

Dear Applicant,

You are provisionally selected for the admission in to Ph.D program in the faculty of Pharmaceutical Sciences and you are requested to report at the office of the Director i/c, Admissions, JNTUA, Anantapur on **31.08.2012 (Friday)** and submit the following at the time of admission:

a) **Original Degree Certificate of UG Course**
b) **Original Degree Certificate of PG Course**
c) **Original service Certificate of the Supervisor from Competent Authority as a documentary Proof of having 5 years Teaching/Research Experience as mentioned in the earlier Notifications (if not submitted earlier)**
d) **Joining report of the candidate in the prescribed format countersigned by the research supervisor(s)**

The candidates have to bring a Demand Draft for ₹ 20,850 /- (₹ 20,000/-annual fee + ₹ 500/- Caution deposit + ₹ 200/- admissions fee + ₹ 150/- towards identity card) drawn in favour of " The Registrar, JNTUA, Anantapur" payable at SBI, JNTUEC Branch, Anantapur (Code:2723).

Regular JNTUA employees have to pay an amount of ₹ 350/- only towards the admission fee and identity card fee in the form of DD and they shall submit a Service Certificate from their Head of the institution at the time of reporting for admission.

Details of the Proposed Research Work :

Research work Title	Supervisor's Name & Designation with Address	Co-Supervisor's Name & Designation with Address
Development & Validation of Novel Analytical Methods for the Determination of Selected Drugs in Pharmaceutical Formulations by using HPLC and Spectrophotometry.	Dr.A.Lakshmana Rao, Principal & Professor, Vallabhaneni Venkatadri Institute of Pharmaceutical Sciences, Gudlavalleru-521356 Krishna District.	Dr.K.B.Chandrasekhar Professor of Chemisty, JNTUA, Anantapur-515002.

All the research scholars have to pay an amount of ₹ 20,000/- per annum by 31st July of every year or in two spells of ₹ 10,000/- each by 31st of July and 31st January of every year. Nonpayment of prescribed fee in the time may lead to the cancellation of admission.

DIRECTOR i/c , Admissions

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
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GUDLAVALLERU - 521 356

To

Hanumantha Rao.Kandukuri
S/o Sreenivasa Rao,
Rajampalli (Vl&Po),Darsi-523247

Copy to The Supervisor concerned.
Copy to The Co-Supervisor concerned.
Copy to file.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY HYDERABAD 500 085

ADMISSION LETTER

DR. S.V.KONER RAO
DIRECTOR, ADMISSIONS

Lr.No.DA/R3/Ph.D/M.Phil/NS/Admn(EX)/2012
Dt.16.12.2012

SUB : JNTUH - Admissions to External Research Programmes - 2012

1. You are provisionally selected for admission into Ph.D. programme in PHARMACEUTICAL SCIENCES faculty subject to available of vacancy at the guide and/or coguide.

2. You are requested to report to the Director, Research & Development Cell, JNTUH, Kukatpally, Hyd.-85 as per schedule available at JNTUH website www.jntuh.ac.in (Copy of schedule is enclosed) and submit the following

(i) P.G.Degree Certificate in Original (Provisional Certificate is not admissable)
(ii) Transfer Certificate in original
(iii) Fees:

A Demand Draft drawn on any nationalized bank for Rs.20,700/- (Rs.20,000/- one year fee + Rs.500/- caution deposit + Rs.200/- admission fee) in favour of The Registrar, JNTUH, Hyderabad payable at Hyderabad.
Regular University employees have to pay of Rs.200/- towards the admission fee.

(iv) Joining Report of the candidate, countersigned by the Research Supervisor(s) indicating the place where the Research work will be carried out.
(v) NO Objection Certificate from the Head of the Organisation.
(vi) Ratification Certificate of the Research Supervisor(s) of Private Affiliated Colleges of JNTUH
(vii) Latest Four passport size photographs.

3. Details of the Candidates:

(i) Name & Address:

SHAIK AMINABEE
D NO 21/275-1
OLD RAILPET
NOBLE COLONY
MACHILIPATNAM, KRISHNA DIST

Supervisor(s) Name
Designation and Address
DR A LAKSHMANA RAO
PRINCIPAL & PROFESSOR
VELLANKIMENI VENKATADRI INSTITUTE OF
PHARMACEUTICAL SCIENCES
GUDLAVALLERU POST, KRISHNA DIST-521 356

Co_Supervisor(s) Name
Designation and Address
DR M CHINNA ESWARAIAH
PRINCIPAL
ANURAG PHARMACY COLLEGE
ANANTHAGIRI ROAD, KODAD
NALGONDA DIST-508 206

Topic of Research:
PHYTOCHEMICAL AND PHARMACOLOGICAL SCREENING METHODS ON INDIGENIOUS PLANTS

4. From second year onwards for each year you will have to pay an amount of Rs.20,000/- (Rupees twenty thousand only) towards yearly fee before July 31 and obtain receipt.

To
130142
SHAIK AMINABEE

DIRECTOR, ADMISSIONS

Copy to:
(1) The Director, R&D Cell, JNT University, Kukatpally, Hyderabad-85
(2) Supervisor are requested to check the list of candidates admitted under them till last year and then accept newly admitted candidate only if the no.of candidates under them are less than eight. Submit your list of eight candidates along with acceptance letter to Director R&D Section,JNTUH. After verifying the no.of candidates the admission of new candidate will be approved.
(3) Co-Supervisor with a request to accept only if the no.of candidates are less than eight.

Note: The candidate should collect copy of guidelines & academic regulations from the Director, R&D Cell, JNT University, Kukatpally, Hyderabad-85

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Dr.R.Kiran Kumar
M.Tech,Ph.D
Coordinator

CENTRE FOR RESEARCH STUDIES (CRS)
KRISHNA UNIVERSITY, Machilipatnam, India - 521001
Fax : + 91-8672-225677
Mobile : + 91-9440872455
E-mail : crskru@gmail.com
Website : www.krishnauniversity.ac.in

No.KRU/CRS/Supervisor Information/2016 Dt.18.06.2016

To
Srikanth Kumar Karumanchi (Regd. No. 1403PH101010)
Research Scholar-Ph.D (PT)
Department of Pharmacy

Sir/Madam,

SUB: CRS-KRU-Supervisor Information, 2014-15-reg.
Ref: Vice-Chancellor Proceedings dated 15-06-2016

*****

I am, by direction to inform you that you are allotted to **Dr.A.Lakshmana Rao,Principal V.V.Institute of Pharmaceutical Sciences, Gudlavalleru.**Recognized research supervisor in the **Department of Pharmacy.** You are requested to report to your research supervisor soon after receiving this letter and submit details of your research topic hard copy duly signed by your research supervisor to the undersigned on or before 30-06-2016.

Yours sincerely

(R.KIRAN KUMAR)
COORDINATOR
Centre for Research Studies
KRISHNA UNIVERSITY
MACHILIPATNAM - 521 001

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Coordinator, Department of Pharmacy
ACHARYA NAGARJUNA UNIVERSITY
NAGARJUNA NAGAR, GUNTUR- 522 510 INDIA

Date: 23 -10-2009

MEMORANDUM

This to inform you that you have been provisionally selected for admission leading Ph.D under Part-time /~~Full-time~~/ ~~Extramura~~l category. Hence forth you are directed to appear before the Coordinator , Department of Pharmacy on the date mentioned the following :

1.Joining report format(five copies) duly signed by the research guide along with seal (rubber stamp) with all the concerned original certificates and another two sets of Xerox copies besides
2. No objection certificate from the Head of the organization where the research guide is working
3. Five pass port size photographs

The fee schedule: Rs2800/- for full time / Rs 2835/- for part time / Rs 10,500/- for extramural
This memorandum is purely a provisional and will not at all give any guarantee for your admission.
No request for change of interview date will be entertained.

Coordinator, Department of Pharmacy
Prof. B. Syama Sundar, Ph.D.,
Co-ordinator, Department of Pharmacy
Acharya Nagarjuna University
NAGARJUNA NAGAR-522 510.

Name of the candidate : Narra Venkata Subbaiah

Date of Interview: 21-11-2009 9.00 AM

Name of the Guide allotted with address: Dr. A. Lakshmana Rao

Shri Vishnu College of Pharmacy

Bhimavaram

Institute of Pharmaceutical Sciences GUDLAVALLERU

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GUDLAVALLERU - 521 356

(127

Coordinator, Department of Pharmacy
ACHARYA NAGARJUNA UNIVERSITY
NAGARJUNA NAGAR, GUNTUR- 522 510 INDIA

Date: 23-10-2009

MEMORANDUM

This to inform you that you have been provisionally selected for admission leading Ph.D under Part-time /~~Full-time~~/ ~~Extramura~~l category. Hence forth you are directed to appear before the Coordinator , Department of Pharmacy on the date mentioned the following :

1. Joining report format(five copies) duly signed by the research guide along with seal (rubber stamp) with all the concerned original certificates and another two sets of Xerox copies besides
2. No objection certificate from the Head of the organization where the research guide is working
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The fee schedule: Rs2800/- for full time / Rs 2835/- for part time / Rs 10,500/- for extramural
This memorandum is purely a provisional and will not at all give any guarantee for your admission.
No request for change of interview date will be entertained.

Coordinator, Department of Pharmacy
Prof. B. Syama Sundar, Ph.D.,
Co-ordinator, Department of Pharmacy
Acharya Nagarjuna University
NAGARJUNA NAGAR-522 510.

Name of the candidate : Narra Venkata Subbaiah

Date of Interview: 21-11-2009 9.00 AM

Name of the Guide allotted with address

Dr. A. Lakshmana Rao
Shri Vishnu College of Pharmacy
Bhimavaram

Institute of Pharmaceutical Sciences GUDLAVALLERU

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GUDLAVALLERU - 521 356

BERHAMPUR UNIVERSITY

BHANJA BIHAR

BERHAMPUR - 760 007 (ORISSA)

No_____/Acad/BU/11 Date_____

From

Dr.Sabuji Samal,
Programme Coordinator(Acad),
Berhampur University.

To

P.S.R.Ch.N.P.Verma D,
S/O. D.R.K.Subba Raju
H.No.26-10-5/5, 33 Ward,
Kopallevari Thota, Balusumudi
Bhimavaram-534202, West Godavari District
(Andra Pradesh)

Sub: Registration for Ph.D. Degree in Pharmacy regarding.

Sir/Madam,

With reference to your application for Registration of Ph.D. Degree on the above subject, I am to inform you that on the recommendation of the research committee, the Vice-Chancellor / Syndicate has been pleased to permit you to register for Ph.D. in Pharmacy under Berhampur University, subject to fulfillment of the conditions laid down in this behalf in the relevant statutes and regulations. You have been allotted with Registration No.267/09 with effect from 26.8.2009 You are required to work under the guidance of Dr.A.L.Rao, Head Department of Pharmaceutical Analysis, S.V.College of Pharmacy, Vishnupur, Bhimavaram(A.P.) and Prof. S.C.Dinda, S.P.E & R., Berhampur University on the following topic:

"Development and Validation of Stability Indicating Analytical Methods for Selected Drugs in Bulk and Pharmaceutical Dosage Forms"

Yours faithfully,

Programme Coordinator(Acad).

Memo No 7732 (4) /Acad/BU/11 Date 22/8/11

Copy forwarded to:-

1. Dr.A.L.Rao, Head, Department of Pharmaceutical Analysis, S.V.College of Pharmacy, Vishnupur, Bhimavaram(A.P) and Prof.S.C.Dinda, S.P.E & R., Berhampur University and guide(s) of the candidate for information and necessary action.

2. The Director, S.P.E & R, Berhampur University for information and necessary action.

3. The Controller of Examinations, Berhampur University along with the application forms for registration and other related documents of the candidate for information and necessary action.

Programme Coordinator(Acad)

V.V. Institute of Pharmaceutical Sciences GUDLAVALLERU

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BERHAMPUR UNIVERSITY BHANJA BIHAR, BERHAMPUR-760007, ODISHA

Website: www.buodisha.edu.in email-controller@buodisha.edu.in

NOTIFICATION

No. 4503 /Exam. Conf. Unit-II/BU/13

Date: 09. Oct. 2013

It is for information of all concerned that basing on the recommendations of the Board of Examiners and the Examination Committee, the Syndicate vide Res. No.512 dt 5th Oct. 2013 has been pleased to resolve that the following candidate as detailed below be declared to have qualified for the Degree of Doctor of Philosophy (Ph.D.) D.Litt. / D.Sc./LL.D. in the subjects mentioned against each. The degree will be conferred on them at the next Annual Convocation of the University.

1.	Peda. S.R.Ch. N.P. Verma S/O- D. R .K. Subba Raju H. no. 26-10-5/5, 33 Ward Kopallevaritotha Balusumudi Bhimavaram- 534202 (AP)	267/09	**Faculty:** Medicine **Subject:** Pharmacy **Topic:** Development & Validation of stability indicating Analytical Methods for some selected drugs in Bulk & Pharmaceutical Dosage Forms	Dr. A. Lakshmana Rao V V Institute of Pharmaceutical Sc. Gudlavalleru-521356 (AP) DR. S C Dinda S P E & R Berhampur University	Ph. D	---
2.	Himansu Bhusan Panigrahy S/O- Raghaba Panigrahy At- New Street, Bhejiput Po- Bhnajanagar- 761126	86/08	**Faculty:** Science **Subject:** Environmental Science **Topic:** Studies on the effect of Environmental Factors on Nitrogen Uptake & Assimilation in the Red Seaweed Gracilaria Verrucosa (Huds.) & Kappaphycus Alvarezii (Doty) Doty ex. P. Silva	Prof. Saila Bala Padhi (Retd) At- Gajapati Nagar, 1st Lane Berhampur-760010	Ph.D.	---

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GUDLAVALLERU-521 356

ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar 522 510

Prof. P.N. Rao
Co-ordinator
Research Cell

Guntur District, Andhra Pradesh
Tel: 0863 2346123, 2346512
Mobile: +91 9440756008
E-mail: anu.research@yahoo.com

Ref. No. ANU/RC/Ph.D./Pharmacy/TR/908/June,2013

Date: 31.12.2013

NOTIFICATION

It is hereby notified that the Vice-Chancellor, on the recommendations of the examiners appointed to adjudicate the Ph.D. thesis entitled **"DEVELOPMENT AND VALIDATION OF NOVEL HPLC AND HPTLC METHODS FOR THE ESTIMATION OF SOME SELECTED DRUGS IN BULK AND PHARMACEUTICAL DOSAGE FORM"** submitted by **RAJA TANNERU,** Research Scholar under the guidance of **Prof. A. Lakshmana Rao,** Research Director for the award of the Ph.D. Degree in Pharmacy has ordered that he/she be declared qualified for the **award of the Degree of Doctor of Philosophy (Ph.D.) in Pharmacy in the Faculty of Pharmacy.**

CO-ORDINATOR

To
T. Raja
Resaearch Scholar,
Department of Pharmacy, A.N.U.

Copies to:
The Adjudicators (3)
1. Prof. Elisha Philip, Union University School of Pharmacy, Jackson
2. Prof. S.P. Dhanabal, J.S.S. University, Tamilnadu
3. Dr. K. Suresh Babu, Indian Institute of Chemical Technology, Hyderabad

Prof. A. Lakshmana Rao, Research Director, Department of Pharmacy
The Head/Coordinator, Department of Pharmacy, A.N.U.
The Principal, University College of Sciences, A.N.U.
The Finance Officer, A.N.U.
The Librarian, Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi
The Director, Information and Library Network Centre, An Inter University Centre of University Grants Commission, Infocity, Gandhinagar 382007.
The Librarian, University Library, University College, A.N.U.
The Chief Editor, University Newsletter, A.N.U. Campus.
The Coordinator, NAAC, A.N.U Campus.
P.A. to Vice-Chancellor, and P.A. to Registrar, A.N.U.
The Editors, Andhra Prabha, Andhra Jyothi, Andhra Bhoomi, Sakshi, Eenadu, Vaartha, The Hindu, Indian Express – for favour of publication as NEWS ITEM

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Vishnu Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
VISHNUPURI, DUDI AVALLERU - 521 356

ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar 522 510

Prof. P.N. Rao
Co-ordinator
Research Cell

Guntur District, Andhra Pradesh
Tel: 0863 2346123, 2346512
Mobile: +91 9440756008
E-mail: anu.research@yahoo.com

Ref. No. ANU/RC/Ph.D./Pharmacy/VBR/931/July,2013 Date: 31.12.2013

NOTIFICATION

It is hereby notified that the Vice-Chancellor, on the recommendations of the examiners appointed to adjudicate the Ph.D. thesis entitled **"DEVELOPMENT AND VALIDATION OF NOVEL HPLC METHODS FOR THE ESTIMATION OF SELECTED DRUGS IN BULK SAMPLES AND PHARMACEUTICAL FORMULATIONS"** submitted by **BHASKARA RAJU VATCHAVAI,** Research Scholar under the guidance of **Prof. A. Lakshmana Rao,** Research Director for the award of the Ph.D. Degree in Pharmacy has ordered that he/she be declared qualified for the **award of the Degree of Doctor of Philosophy (Ph.D.) in Pharmacy in the Faculty of Pharmacy.**

31/12/14

CO-ORDINATOR

To
V. Bhaskara RAju
Resaearch Scholar,
Department of Pharmacy, A.N.U.

Copies to:
The Adjudicators (3)
1. Prof. Ashok Philip, Union University of Pharmaceutical Sciences, Jackson
2. Dr. Ch. V. Rao, National Botanical Research Institute, Uttar Pradesh
3. Prof. Y. Rajendra Prasad, Andhra University

Prof. A. Lakshmana Rao, Research Director, Department of Pharmacy
The Head/Coordinator, Department of Pharmacy, A.N.U.
The Principal, University College of Sciences, A.N.U.
The Finance Officer, A.N.U.
The Librarian, Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi.
The Director, Information and Library Network Centre, An Inter University Centre of University Grants Commission, Infocity, Gandhinagar - 382 007.
The Librarian, University Library, University College, A.N.U.
The Chief Editor, University Newsletter, A.N.U Campus.
The Coordinator, NAAC, A.N.U Campus.
P.A. to Vice-Chancellor, and P.A. to Registrar, A.N.U.
The Editors, Andhra Prabha, Andhra Jyothi, Andhra Bhoomi, Sakshi, Eenadu, Vaartha, The Hindu, Indian Express – for favour of publication as NEWS ITEM

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar, Guntur - 522 510, Andhra Pradesh, India.

Ref. No. ANU/RC/Ph.D./Biotech/
BR/1610/Nov., 2015.

Date : 10-06-2016

NOTIFICATION

It is hereby notified that the Vice-Chancellor on the recommendations of the examiners appointed to adjudicate the Ph.D. thesis entitled **"DEVELOPMENT AND VALIDATION OF NOVEL HPLC METHODS FOR THE SIMULTANEOUS DETERMINATION OF SOME SELECTED DRUGS AND THEIR PHARMACEUTICAL FORMULATIONS"** submitted by **BADAVATHU RAJA,** Research Scholar under the guidance of **Prof. A. LAKSHMANA RAO** has ordered that he/she be declared qualified for the award of the Degree of **Doctor of Philosophy (Ph.D.)** in **BIOTECHNOLOGY** in the Faculty of **NATURAL SCIENCES.**

22/6/16

CO-ORDINATOR
RESEARCH CELL

To
BADAVATHU RAJA
Research Scholar,
Department of Biotechnology,
Acharya Nagarjuna University.

Copies to:
The Adjudicators (3)
1 Dr. T.R.R. Kurup, National University of Singapore, Singapore.
2 Prof. P.K. Manna, Annamalai University, Tamil Nadu.
3 Prof. K. Bharathi, Sri Padmavathi Mahila University, Tirupati.
Prof. A. LAKSHMANA RAO, Research Director, Dept. of Biotechnology, A.N.U.
The Head/Coordinator, Department of Biotechnology, A.N.U.
The Principal, University College of Sciences, A.N.U.
The Finance Officer, A.N.U.
The Librarian, Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi
The Director, Information and Library Network Centre, Inter University Centre of University Grants Commission, Infocity, Gandhinagar - 382 007.
The Librarian, University Library, University College, A.N.U.
The Chief Editor, University Newsletter, A.N.U Campus.
The Coordinator, NAAC, A.N.U Campus.
P.A. to Vice-Chancellor, and P.A. to Registrar, A.N.U.
The Editors, Andhra Prabha, Andhra Jyothi, Andhra Bhoomi, Sakshi, Eenadu, Vaartha, The Hindu, Indian Express – for favour of publication as NEWS ITEM.

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Web : www.jntuh.ac.in
Email : dephd@jntuh.ac.in

Phone: Off: +91-40-23156113
Fax: +91-40-23158668

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by JNTU Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

Dr. B. ANJANEYA PRASAD
M.Tech.,Ph.D.,FIE.,MISTE,M.C.I.,MSESI.,MASME
Professor of Mechanical Engg. &
DIRECTOR OF EVALUATION

Ref: P7/Ph.D./16244/11-07/MGB/PH/2016
Dt : 13.06.2017

NOTIFICATION

Sub: Award of **Ph.D.** Degree in **Pharmaceutical Sciences** to **Mr. Mohan Gandhi Bonthu, (HT. No.1203PH2296).**

*****

The thesis entitled **"Development and Validation of Novel Analytical Methods for the Determination of Selected Drugs in Bulk and Pharmaceutical Formulations in Human Plasma"** submitted by **Mr. Mohan Gandhi Bonthu** has been accepted by the University on the recommendations of the panel of examiners. **Mr. Mohan Gandhi Bonthu** is provisionally declared and qualified for the award of **Doctor of Philosophy** in the faculty of **Pharmaceutical Sciences.**

//By order//

DIRECTOR OF EVALUATION

1. **Mr. Mohan Gandhi Bonthu** – through the Director, DRD, JNTUH, Kukatpally, Hyderabad.
2. Dr. A. Lakshmana Rao, Professor & Principal, V.V. Inst. of Pharm. Sciences, Gudlavalleru, Krishna Dist. - 521 356, Andhra Pradesh. **[Supervisor]**
3. Dr. J. Venkateswara Rao, Professor & Principal, Bharat School of Pharmacy, Ibrahimpatnam, R.R.Dist. - 501 510, Telangana State. **[Co-Supervisor]**
4. Dr. Y.V.D. Nageswar, Academic Advisor, National Institute of Pharmaceutical Education & Research (NIPER), Balanagar, Hyderabad - 500 037, Telangana State. **[External Examiner]**
5. PA to Vice-Chancellor, Administrative Building, JNTUH, Kukatpally, Hyderabad.
6. PA to Registrar, Administrative Building, JNTUH, Kukatpally, Hyderabad.
7. The Director, Directorate of Research & Dev., JNTUH, Kukatpally, Hyderabad.
8. The Director, Academic and Planning, JNTUH, Kukatpally, Hyderabad.
9. The Controller of Examinations, JNTUH, Kukatpally, Hyderabad.
10. The Director, Association of Indian Universities, Rouse Avenue, New Delhi.
11. The Public Relations Officer, Administrative Building, JNTUH, Kukatpally, Hyderabad.

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Sesharadri Rao Knowledge Village
GUDLAVALLERU - 521 356

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

HYDERABAD - 500 085, TELANGANA STATE, INDIA.

317000640

Sl. No. PC 00811428

PROVISIONAL CERTIFICATE

Hall Ticket No.: 1203PH2296

This is to certify that Mr. MOHAN GANDHI BONTHU

son of Mr. SATYANARAYANA

has satisfied all the requirements for the award of Doctor of Philosophy

in the faculty of PHARMACEUTICAL SCIENCES

of this University, held in May, 2017 for the thesis entitled,

"Development and Validation of Novel Analytical Methods for the Determination of Selected Drugs in Bulk and Pharmaceutical Formulations in Human Plasma".

Verified by

Hyderabad - T.S.

Date: 13 June 2017

Director of Evaluation

PRINCIPAL

V V Institute of Pharmaceutical Sciences

Seshadri Rao Knowledge Village

GUDLAVALLERU - 521 356

Web : www.jntuh.ac.in
Email : dephd@jntuh.ac.in

Phone: Off: +91-40-23156113
Fax: +91-40-23158668

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by JNTU Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

Dr. V KAMAKSHI PRASAD
M.Tech., Ph.D.(IIT – Madras), FIE., MCSI
Professor of Computer Science and Engineering &
DIRECTOR OF EVALUATION

Ref: P7/Ph.D./1706/01-06/SA/PH/2017
Dt : 20.07.2017

NOTIFICATION

Sub: Award of **Ph.D.** Degree in **Pharmaceutical Sciences** to **Ms. Shaik Aminabee (HT. No.1203PH22H5).**

****

The thesis entitled **"Preliminary Phytochemical and Pharmacological Screening Methods on Selected Indigenous Plants"** submitted by **Ms. Shaik Aminabee** has been accepted by the University on the recommendations of the panel of examiners. **Ms. Shaik Aminabee** is provisionally declared and qualified for the award of **Doctor of Philosophy** in the faculty of **Pharmaceutical Sciences.**

//By order//

DIRECTOR OF EVALUATION

1. **Ms. Shaik Aminabee**– through the Director, DRD, JNTUH, Kukatpally, Hyderabad.
2. Dr. A Lakshmana Rao, Professor & Principal, VV Inst. of Pharm .Sciences, Gudlavalleru - 521 356, Krishna Dist., Andhra Pradesh. **[Supervisor]**
3. Dr. M Chinna Eswaraiah, Professor & Principal, Anurag Pharmacy College, Kodad - 508 206, Nalgonda, Telangana State. **[Co-Supervisor]**
4. Dr. Dilip Kumar Pal, Associate Professor, Institute of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya (Central University), Koni, Bilaspur - 495 009, Chattisgarh. **[External Examiner]**
5. PA to Vice-Chancellor, Administrative Building, JNTUH, Kukatpally, Hyderabad.
6. PA to Registrar, Administrative Building, JNTUH, Kukatpally, Hyderabad.
7. The Director, Directorate of R & D, JNTUH, Kukatpally, Hyderabad.
8. The Director, Academic and Planning, JNTUH, Kukatpally, Hyderabad.
9. The Controller of Examinations, JNTUH, Kukatpally, Hyderabad.
10. The Director, Association of Indian Universities, Rouse Avenue, New Delhi.
11. The Public Relations Officer, Administrative Building, JNTUH, Kukatpally, Hyderabad.

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

HYDERABAD - 500 085, TELANGANA STATE, INDIA.

517000691

Sl. No. PC 00811479

PROVISIONAL CERTIFICATE

Hall Ticket No.: 1203PH22H5

This is to certify that Ms. SHAIK AMINABEE

daughter of Mr. SHAIK MAHABOOB

has satisfied all the requirements for the award of Doctor of Philosophy

in the faculty of PHARMACEUTICAL SCIENCES

of this University, held in July-2017 for the thesis entitled,

"Preliminary Phytochemical and Pharmacological Screening Methods on Selected Indigenous Plants".

Verified by

Hyderabad - T.S.
Date: 20 July 2017

Director of Evaluation

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Sarvepalli Radhakrishnan Knowledge Village
GUDLAVALLERU-521 356

REGISTRAR

Web : www.jntuh.ac.in
Email : dephd@jntuh.ac.in

Phone: Off: +91-40-23156113
Fax: +91-40-23158668

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
(Established by JNTU Act No. 30 of 2008)
Kukatpally, Hyderabad – 500 085, Telangana (India)

Dr. B. ANJANEYA PRASAD
M.Tech.,Ph.D.,FIE.,MISTE,M.C.I.,MSESI.,MASME
Professor of Mechanical Engg. &
DIRECTOR OF EVALUATION

Ref: P7/Ph.D./1713/01-13/RBG/PH/2017
Dt : 13.06.2017

NOTIFICATION

Sub: Award of **Ph.D.** Degree in **Pharmaceutical Sciences** to **Mr. Raveendra Babu Gudimitla (HT. No.1203PH2271).**

*****

The thesis entitled **"Development and Validation of New RP-HPLC and LC-MS Methods for the Determination of Selected Drugs in Pharmaceutical Dosage Forms"** submitted by **Mr. Raveendra Babu Gudimitla** has been accepted by the University on the recommendations of the panel of examiners. **Mr. Raveendra Babu Gudimitla** is provisionally declared and qualified for the award of **Doctor of Philosophy** in the faculty of **Pharmaceutical Sciences.**

//By order//

DIRECTOR OF EVALUATION

1. **Mr. Raveendra Babu Gudimitla** – through the Director, DRD, JNTUH, Kukatpally, Hyderabad.
2. Dr. A Lakshmana Rao, Professor & Principal, V.V. Inst. of Pharmaceutical Sciences, Gudlavalleru – 521 356, Krishna Dist., Andhra Pradesh. **[Supervisor]**
3. Dr. J. Venkateswara Rao, Principal, Bharat School of Pharmacy, Mangalpalli (V), Ibrahimpatnam R.R.Dist. - 501 510, Telangana State. **[Co-Supervisor]**
4. Dr. V. Girija Sastry, Professor, University College of Pharmaceutical Sciences, Andhra University, Visakhapatnam - 530 003, Andhra Pradesh. **[External Examiner]**
5. PA to Vice-Chancellor, Administrative Building, JNTUH, Kukatpally, Hyderabad.
6. PA to Registrar, Administrative Building, JNTUH, Kukatpally, Hyderabad.
7. The Director, Directorate of Research & Dev., JNTUH, Kukatpally, Hyderabad.
8. The Director, Academic and Planning, JNTUH, Kukatpally, Hyderabad.
9. The Controller of Examinations, JNTUH, Kukatpally, Hyderabad.
10. The Director, Association of Indian Universities, Rouse Avenue, New Delhi.
11. The Public Relations Officer, Administrative Building, JNTUH, Kukatpally, Hyderabad.

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Gandhi Puram, Knowledge Village
GUDLAVALLERU - 521 356

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

HYDERABAD - 500 085, TELANGANA STATE, INDIA.

317000638

Sl. No. PC 00811426

PROVISIONAL CERTIFICATE

Hall Ticket No.: 1203PH2271

This is to certify that Mr. RAVEENDRA BABU GUDIMITLA

son of Mr. TATAIAH

has satisfied all the requirements for the award of Doctor of Philosophy

in the faculty of PHARMACEUTICAL SCIENCES

of this University, held in May, 2017 for the thesis entitled,

"Development and Validation of New RP-HPLC and LC-MS Methods for the Determination of Selected Drugs in Pharmaceutical Dosage Forms".

Verified by

Hyderabad - T.S.
Date: 13 June 2017.

Director of Evaluation

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Gudlavalleru

REGISTRAR

Grams: "TECHNOLOGY"
Web Site: www.jntua.ac.in

Ph: Off: +91-9000551419
Fax: 08554-272442

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
ANANTHAPURAMU – 515 002 (A.P.) – INDIA.

Prof. K.RAMA NAIDU
Director of Evaluation

Lr. No.503/Ph.D/PS-60/HRK/PS/2017 dt. 03.03.2018.

NOTIFICATION

Sub:- Award of **Ph.D**-Degree in **Pharmaceutical Sciences** to **Mr. HANUMANTHA RAO KANDUKURI.**

****

The thesis entitled **"DEVELOPMENT AND VALIDATION OF NOVEL ANALYTICAL METHODS FOR THE DETERMINATION OF SELECTED DRUGS IN PHARMACEUTICAL FORMULATIONS BY USING HPLC AND SPECTROPHOTOMETRY"** submitted by **Mr. HANUMANTHA RAO KANDUKURI, [H.T.No.12Ph1303]** has been accepted by the University on the recommendation of the panel of examiners. **Mr. HANUMANTHA RAO KANDUKURI** is provisionally declared and qualified for the award of **Doctor of Philosophy**, in the faculty of **Pharmaceutical Sciences**. The viva voce examination is conducted on **24.02.2018**.

Date: **03.03.2018**.

//By Order//

Director of Evaluation

1. **Mr. HANUMANTHA RAO KANDUKURI** – through the Director, R&D, JNTUA, Ananthapuramu.
2. **Dr. A. LAKSHMANA RAO,** Principal, Vallabahneni Venktadri Institute of Pharmaceutical Sciences, Sheshadri Rao Village, Gudlavalleru, Krishna Dist. **[Supervisor]**
3. **Prof. K.B. Chandra Sekhar,** Professor of Chemistry & Director, O.T.P.R.I., JNTUA, Anathapuramu. **[Co-Supervisor]**
4. **Dr.J.Suresh,** Professor & Head, Dept of Pharmacy, JSS College of pharmacy, JSS University, Ooty. **[External Examiner]**
5. PA to Vice-Chancellor, Administrative Building, JNTUA, Ananthapuramu.
6. PA to Rector, Administrative Building, JNTUA, Ananthapuramu.
7. PA to Registrar, Administrative Building, JNTUA, Ananthapuramu.
8. The Director, R&D, Administrative Building, JNTUA, Ananthapuramu.
9. The Director, Academic and Planning, Administrative Building, JNTUA, Ananthapuramu.
10. The Controller of Examinations, Examination Branch, JNTUA, Ananthapuramu.
11. The Director Association of Indian Universities, Rouse Avenue, New Delhi.
12. The Public Relations Officer, Administrative Building, JNTUA, Ananthapuramu.

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

ANANTHAPURAMU - 515 002, ANDHRA PRADESH, INDIA

Adm. No. 12PH1303

Sl. No. PC 0252971

Aadhaar No:586513803154

PROVISIONAL CERTIFICATE

This is to certify that Mr. **HANUMANTHA RAO KANDUKURI**

Son of Sri **SREENIVASA RAO** *&* *Smt* **K DHANA LAKSHMI,**

has satisfied all the requirements for the award of

***** DOCTOR OF PHILOSOPHY *****

in the faculty of ***** Pharmaceutical Sciences *****

for the Thesis entitled,

" DEVELOPMENT AND VALIDATION OF NOVEL ANALYTICAL METHODS FOR THE DETERMINATION OF SELECTED DRUGS IN PHARMACEUTICAL FORMULATIONS BY USING HPLC AND SPECTROPHOTOMETRY "

(Date of Viva Voce : 24.02.2018)

Thursday, 15 March, 2018.

DIRECTOR OF EVALUATION

V.V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

REGISTRAR

KRISHNA UNIVERSITY

Tel. No: 08672-225900
Fax. No: 08672-225902
e mail : krucoe2020@gmail.com

All official letters, packages, etc., should be addressed to the Controller of Examinations by designation and not by the name

No. KRU/EXP102/Ph.D/2020

Dt: 22-06-2020

NOTIFICATION
AWARD OF RESEARCH DEGREE
In
PHARMACEUTICAL SCIENCES

It is hereby notified that the Vice-Chancellor having considered the reports of the following examiners appointed to adjudicate and report on the thesis entitled "SYNTHESIS, BIOLOGICAL EVALUATION AND MOLECULAR DOCKING STUDIES OF NOVEL SUBSTITUTED THIAZOLIDINEDIONE ANALOGUES".

01. Dr. K. Suresh Babu, Centre for Natural Products & Traditional Knowledge, Indian Institute of Chemical Technology (CSIR Unit),Uppal road, Tarnaka, Hyderabad, Telangana-500007.

02. Dr. Dilip Kumar, pal Institute of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalay (Central University), Koni, Bilaspur, Chhatrisgarh.

03. Dr. A. Sreedevi, Department of Pharmaceutical Chemistry, Institute of Pharmaceutical Technology , Tirupathi.

On the recommendation of the following examiners who have conducted the Viva-Voce examination, the Vice-Chancellor is pleased to order that Sri. K. SRIKANTH KUMAR be declared qualified for the Degree of Doctor of Philosophy (Ph.D.) in PHARMACEUTICAL SCIENCES.

01. Dr. A.Sridevi	-	External Indian Examiner
02. Dr. A. Prameela Rani	-	Chairman P.G. BOS
03. Dr. D. Rama Sekhara Reddy	-	Head of the Department
04. Dr. V.Venkataramu	-	Dean of Faculty
05. Dr.A. Lakshmana Rao	-	Research Director & Convener
06. Dr. D. Rama Sekhara Reddy	-	Joint Research Director

(BY ORDER)

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Central Administrative Office,
Machilipatnam.
Dt. 22.06.2020

(Dr. D. RAMA SEKHARA REDDY)
CONTROLLER OF EXAMINAIONS

Controller of Examinations
Krishna University

(P.T.O)

000033

KRISHNA UNIVERSITY
కృష్ణా విశ్వవిద్యాలయం

Ref. No. KRU/EXP 102/Ph.D/2020

PROVISIONAL CERTIFICATE

This is to Certify that *Reg. No.* 1403PH101010

Sri /Smt./Kum. SRIKANTH KUMAR KARUMANCHI

S/o./D/o. SIVANARAYANA KARUMANCHI

has qualified himself/herself for the award of the Degree of Doctor of Philosophy by Research for the Thesis submitted by him/her entitled "SYNTHESIS, BIOLOGICAL EVALUATION AND MOLECULAR DOCKING STUDIES OF NOVEL SUBSTITUTED THIAZOLIDINEDIONE ANALOGUES "

and that he/she has done all that is necessary for the formal presentation for the Degree of Doctor of Philosophy in PHARMACEUTICAL SCIENCE

in the Faculty of PHARAMACEUTICAL SCIENCES

with effect from 22/06/2020

The Degree has been awarded in accordance with UGC Regulations 2009.

Initials of the Clerk who Prepared : Verified :

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL 25/06/2020

CONTROLLER OF EXAMINATIONS

V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

Date : 25/06/2020

Machilipatnam,
Andhra Pradesh.

KRISHNA UNIVERSITY

Tel. No: 9154281370
: 9154281371
: 9154281372
E.mail : krucoe2020@gmail.com

All official letters, packages, etc., should be addressed to the Controller of Examinations by designation and not by the name

No. KRU/EXP105/Ph.D/2021

Dt:31-03-2021

NOTIFICATION
AWARD OF RESEARCH DEGREE
In
PHARMACEUTICAL SCIENCES

It is hereby notified that the Vice-Chancellor having considered the reports of the following examiners appointed to adjudicate and report on the thesis entitled **"DESIGN AND SYNTHESIS OF NOVEL PRODRUGS FOR SELECTED DRUG MOIETIES".**

01.Dr.Ch.V.Rao,Ethno pharmacology Division,National Botanical Research Institute,(CSIR Unit), Ranapratap Marg,Lucknow 226001,

02.Dr.V.D.Ranagari,Institute of Pharmaceutical Sciences,Guru Ghasidas Vishwavidyalay (Central University),Koni,Bilaspur,Chatrisgarh-495009

03.Dr.V.Gopal,College of Pharmacy,Mother Theresa Post Graduate & Research Institute of Health Sciences,Indira Nagar, Gorimedu,Pudcherry-605006.

On the recommendation of the following examiners who have conducted the Viva-Voce examination, the Vice-Chancellor is pleased to order that **Ms.JAYA PREETHI PEESA (1403MP101004)** be declared qualified for the Degree of Doctor of Philosophy (Ph.D.) in **PHARMACEUTICAL SCIENCES.**

01. Dr.V.Gopal	-	**External Indian Examiner**
02. Dr. A. Prameela Rani	-	**Chairman P.G. BOS**
03. Prof.Y.AVASAN.Maruthi	-	**Head of the Department**
04. Prof.Y.AVASAN.Maruthi	-	**Dean of Faculty**
05. Dr.A.Lakshmana Rao	-	**Research Director & Convener**

(BY ORDER)

Central Administrative Office,
Machilipatnam.
Dt. 31.03.2021

V. V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V. V. Institute of Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

(Dr. D. RAMA SEKHARA REDDY)
CONTROLLER OF EXAMINATIONS
Controller of Examinations
Krishna University
Machilipatnam - 521 001

Sl.No. 00060

14PHD[illegible]

KRISHNA UNIVERSITY

కృష్ణా విశ్వవిద్యాలయం

H T No 1403MP101004
Aadhar No 587389843602

Faculty of Pharmaceutical Sciences

Jaya Preethi Peesa

S/o / D/o : V Thammaji Rao
&
Peesa Girija Kumari

Having Fulfilled the academic requirements in March-2021 has this day been admitted by the Executive Council to the Degree of

Doctor of Philosophy

In

PHARMACEUTICAL SCIENCE

For the Thesis entitled,

" DESIGN AND SYNTHESIS OF NOVEL PRODRUGS FOR SELECTED DRUG MOIETIES".

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
GUDLAVALLERU - 521 356

Date of Viva-Voce : 31/03/2021

Given under the Seal of the University

Dt. 06/11/2021

Machilipatnam,
A.P., India.
Pin: 521004

Vice-Chancellor

KRISHNA UNIVERSITY

Tel. No : 08672-259212
: 8897019580
E.mail : krucoe2020@gmail.com

All official letters, packages, etc., should be addressed to the Controller of Examinations by designation and not by the name

No. KRU/Ph.D/KMDI/2023

Dt: 03-03-2023

NOTIFICATION
AWARD OF RESEARCH DEGREE
In
PHARMACY

It is hereby notified that the Vice-Chancellor having considered the reports of the following examiners appointed to adjudicate and report on the thesis entitled **"QUALITY ASSURANCE ASPECTS AND DEVELOPMENT OF MODERN ANALYTICAL METHODS FOR ASSAY OF SOME DRUGS IN PURE AND PHARMACEUTICAL DOSAGE FORMS".**

01. **Prof. G. Somasekhar, Professor & Principal, SKU College of Pharmaceutical Sciences, SKU-Anantapuramu-515003.**
02. **Dr. Shubhini A. Saraf, Dept. of Pharmaceutical sciences, Babasaheb Bhimrao Ambedkar University (Central University) Lucknow, UP.**
03. **Dr.P.V.Bharatam, Dept. of Medicinal chemistry, NIPER, Mohali, S.A.S.Nagar.**

On the recommendation of the following examiners who have conducted the Viva-Voce examination held on 17.02.2023, the Vice-Chancellor is pleased to order that **Mr.K.M.D.Ismail (1308PH101011)** be declared qualified for the Degree of Doctor of Philosophy (Ph.D.) in **PHARMACY** under the Faculty of **PHARMACEUTICAL SCIENCES.**

01. Prof. G. Somasekhar	-	**External Indian Examiner**
02. Prof.A.Prameela Rani	-	**Chairman P.G. BOS**
03. Prof.A.Prameela Rani	-	**Dean of Faculty**
04. Dr. P. Rambabu	-	**Head of The Department**
05. Dr. A. Lakshmana Rao	-	**Research Director & Convener**

V.V. Institute of Pharmaceutical Sciences GUDLAVALLERU

PRINCIPAL
V.V. Institute of
Pharmaceutical Sciences,
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

(BY ORDER)

Central Administrative Office,
Machilipatnam.
Dt. 03.03.2023

3/3/23

(Dr. L. SUSEELA)
CONTROLLER OF EXAMINAIONS

Controller of Examinations
Krishna University (P.T.O)
Rudravaram
Machilipatnam - 521 004

CC345192

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA - 533 003, ANDHRA PRADESH, INDIA

Mr. Venkateswara Rao P

S/o. Koteswara Rao Pallepogul

having fulfilled the academic requirements in January 2022

has this day been admitted by the executive council to the degree of

Doctor of Philosophy

(PHARMACY)

Topic: DEVELOPMENT AND VALIDATION OF NOVEL HPLC AND LC-MS METHODS FOR THE DETERMINATION OF SELECTED DRUGS IN PHARMACEUTICAL DOSAGE FORMS AND BIOLOGICAL MATRICES

Given under the Seal of the University

HTNo : **15022PPH06**

Date: 09-03-2022

PRINCIPAL
V. V. Institute of
Pharmaceutical Sciences
Seshadri Rao Knowledge Village
GUDLAVALLERU - 521 356

VICE CHANCELLOR

Sl.No. 000190

KRISHNA UNIVERSITY
కృష్ణా విశ్వవిద్యాలయం

Ref. No. KRU/Ph.D/NOTIFICATION/2023

PROVISIONAL CERTIFICATE

This is to Certify that Reg. No. 1308PH101011

Sri /Smt./Kum. KMD ISMAIL

S/o./D/o. KG MAHABOOB

has qualified himself/herself for the award of the Degree of Doctor of Philosophy by Research for the Thesis submitted by him/her entitled " QUALITY ASSURANCE ASPECTS AND DEVELOPMENT OF MODERN ANALYTICAL METHODS FOR ASSAY OF SOME DRUGS IN PURE AND PHARMACEUTICAL DOSAGE FORMS".

and that he/she has done all that is necessary for the formal presentation for the Degree of Doctor of Philosophy in PHARMACY

in the Faculty of PHARMACEUTICAL SCIENCES

with effect from 03/03/2023

The Degree has been awarded in accordance with UGC Regulations 2009.

Initials of the Clerk who Prepared : Examined :

PRINCIPAL

CONTROLLER OF EXAMINATIONS

Date : 12/04/2023

Machilipatnam
Andhra Pradesh.

Registrar

Sl.No. 000190

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కృష్ణా విశ్వవిద్యాలయం

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Date : 12/04/2023

Machilipatnam
Andhra Pradesh.

Registrar