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3
Research Innovations & Extensions

3.3.1
Number of research papers published per teacher in the Journals

Links to the papers published in journals listed in UGC CARE list

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3

Research Innovations & Extensions

3.3.1

Number of research papers published per teacher in the Journals

Links to the papers published in journals

listed in UGC CARE list

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FACULTY PUBLICATION DATA FROM 2017-18

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Pharmaceutical Cocrystal of piroxicam: Design, Formulation and Evaluation	G R Shendarkar Prabhakar Panzade	Pharmacognosy	Advance Pharmaceutical Bulletin	2017	2258-5881	https://www.ncbi.nlm.nih.gov/pmc/journals/2246/	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5651061/
Pharmaceutical Cocrystal: an antique and multifaceted approach	G R Shendarkar Prabhakar Panzade	Pharmacognosy	Current Drug Delivery, Bentham Science Publication	2017	1875-5704	https://pubmed.ncbi.nlm.nih.gov/	https://pubmed.ncbi.nlm.nih.gov/27758692/
Software based approaches for drug designing and development: A systematic review on commonly used software and its applications	Mahavir H. Ghante, P G. Jamkhande	Pharmaceutical Chemistry	Bulletin Of Faculty Of Pharmacy, Cairo University	2017	1110-0931	https://www.sciencedirect.com/journal/bulletin-of-faculty-of-pharmacy-cairo-university https://www.sciencedirect.com/	https://www.sciencedirect.com/science/article/pii/S1110093117300467

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FACULTY PUBLICATION DATA FROM 2018-19

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Optimization of stress conditions of forced degradation Study by UV spectrophotometer	A B Roge, Dr. G R Shendarkar.	Pharmaceutical Chemistry	Indo American Journal of Pharmaceutical Research	2018	1509-1516	http://iajpr.com	http://iajpr.com/archive/volume-8/aug-2018#
Development of validated UV spectrophotometric stability indicating method for estimation of gallic acid in bulk form	A B Roge and G R Shendarkar	Pharmaceutical Chemistry	International Journal of Pharmacy and Biological Sciences	2018	2230-7605	https://www.ijpbs.com	ijpbs_5be55c7736acd.pdf
Superior Solubility and Dissolution of Zaltoprofen via Pharmaceutical Cocrystals	Prabhakar PANZADE*, Giridhar SHENDARKAR	Center for Research in Pharmaceutical Sciences	Turk J Pharm Science	2018	16(3):310-316	https://www.ncbi.nlm.nih.gov/	https://pubmed.ncbi.nlm.nih.gov/32454729/

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FACULTY PUBLICATION DATA FROM 2019-20

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Anti-mycobacterial, antimicrobial, antioxidant activities and *in silico* PASS investigations of root fractions and extract of Cordiadichotoma Forst	PG Jamkhande, M H. Ghante, S Barde& B R. Ajgunde	Pharmaceutical Chemistry	Oriental Pharmacy and Experimental Medicine,	2019	E ISSN 2662-4060 Print ISSN 2662-4052	https://www.springer.com/journal/13596	https://doi.org/10.1007/s13596-019-00399-5
Role of Pentacyclic Triterpenoids in Chemoprevention and Anticancer Treatment: An Overview on Targets and Underling Mechanisms	Mahavir H. Ghante, Prasad G. Jamkhande	Pharmaceutical Chemistry	J Pharmacopuncture	2019	P ISSN 2093-6966 E ISSN 2234-6856	https://www.journal-jop.org/main.html	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6645347/
Development of Validated UV Spectrophotometric Stability Indicating Method for Estimation of Desloratadine from Its Tablet Dosage Form.	. A B Roge*, G R Shendarkar1, M H Ghante and N B Ghiware	Pharmaceutical chemistry	International Journal of Pharmacy and Biological Sciences	2019	E ISSN: 2230-7605, P ISSN: 2321-3272	www.ijpbs.com	https://ijpbs.com/ijpbsadmin/upload/ijpbs_5deb8804945e7.pdf
Anti-hyperglycaemic Evaluation of Extracts of *Spinacia oleracea* Linn. And *Acacia nilotica* Linn. in Alloxan induced diabetic Rats	SK. Sarje, NB. Ghiware, Sachin Bhosale, Payal Chavan,	Pharmacology	International Journal of Pharmacy and Biological Sciences	2019	E ISSN: 2230-7605, P ISSN: 2321-3272	www.ijpbs.com	https://www.ijpbs.com/ijpbsadmin/upload/ijpbs_5ce0ffffd9e34.pdf
Formulation and Optimization of Floating Microspheres of Ivabradine Hydrochloride by 32 Factorial Design Approach	**Sagar N Firke***, Pritam R Siraskar, Dhiraj H Nagore and Nitin B Ghiware	Pharmaceutics	International Journal of Pharmacy and Biological Sciences	2019	E ISSN: 2230-7605, P ISSN: 2321-3272	www.ijpbs.com	https://ijpbs.com/ijpbsadmin/upload/ijpbs_5d8358abc9f75.pdf

Design and Preparation of Zaltoprofen-Nicotinamide Pharmaceutical Cocrystals via Liquid Assisted Grinding Method	Prabhakar Panzade, Giridhar Shendarkar	Centre for Research in Pharmaceutical Sciences	Indian Journal of Pharmaceutical Education and Research	| 2019	0019-5464	www.ijpr.com	https://www.researchgate.net/publication/337192833

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FACULTY PUBLICATION DATA FROM 2020-21

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Pharmaceutical cocrystal: a game changing approach for the administration of old drugs in new crystalline form	Prabhakar S. Panzade and Giridhar R. Shendarkar	Center for Research in Pharmaceutical Sciences,	DRUG DEVELOPMENT AND INDUSTRIAL PHARMACY Taylor and Francis	2020	0363-9045	https://www.researchgate.net/publication/343740349	https://doi.org/10.1080/03639045.2020.1810270
Hot Melt Extrusion: an Emerging Green Technique for the Synthesis of High-Quality Pharmaceutical Cocrystals	Prabhakar S. Panzade& Giridhar R. Shendarkar & Deepak A. Kulkarni	Center for Research in Pharmaceutical Sciences	Journal of Pharmaceutical Innovation	2020	1872-5120	Journal of Pharmaceutical Innovation	https://doi.org/10.1007/s12247-020-09512-7

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FACULTY PUBLICATION DATA FROM 2021-22

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Pharmacological screening of mast cell stabilizing, anti-inflammatory and anti-oxidant activity of *Calotropis procera* extracts	Chandrakant P. Rathod, Mahavir H. Ghante*	Pharmaceutical Chemistry	Turkish Journal of Physiotherapy and Rehabilitation;	2021	e-ISSN 1309-4653	https://turcomat.org/index.php/turkbilmat/article/view/11296	**https://turcomat.org/index.php/turkbilmat/article/view/11296/8356**
Neuropharmacological Exploration of Standardized Extract of Annona squamosa (L.) Fruit Pulp in Experimental Animals Section	Kawade Rajendra M, Ghante Mahavir H*, Warokar Amol S	Pharmaceutical Chemistry	Int J Cur Res Rev	2021	ISSN: 2231-2196 (Print) ISSN: 0975-5241 (Online)	https://ijcrr.com/index.php	http://dx.doi.org/10.31782/IJCRR.2021.132325
Formulation, Characterization and Evaluation of Topical Biodegradable Film Loaded with Levofloxacin Solid-Lipid Nano Carriers.	A B Roge, S N Firke, S K Sarje, K V Bhambar, AleshKasliwal	Pharmaceutical Chemistry	Nat. Volatiles & Essent. Oils	2021	5608-5619	**https://www.nveo.org/index.php/journal**	**https://www.nveo.org/index.php/journal/article/view/4783**
Formulation And Characterization Of Polyherbal Topical Cream	Sameer Shafi*, G.R. Shendarkar	Centre for Research in Pharmaceutical Science, Nanded Pharmacy College, Nanded	Journal of Advanced Scientific Research	2021	0976-9595	http://www.sciensage.info	https://sciensage.info/index.php/JASR/article/view/1203
Solid State Characterization and Dissolution Enhancement of Nevirapine Cocrystals	Prabhakar Panzade, Giridhar Shendarkar, Deepak Kulkarni , Santosh Shelke	Centre for Research in Pharmaceutical Science, Nanded Pharmacy College, Nanded	Advance Pharmaceutical Bulletin	2021	2228-5881 eISSN: 2251-7308	Home | Advanced Pharmaceutical Bulletin (tbzmed.ac.ir)	https://apb.tbzmed.ac.ir/Search/T_10.34172/apb.2021.087

Development, Validation of RP-HPLC Method and GC MS Analysis of Desloratadine HCL and It's Degradation Products	Ashish B Roge, Sagar N Firke, Shriniwas K Sarje, Mahaveer H Ghante, Giridhar R Shendarkar, Nitin B Ghiware	Pharmaceutics	Int J Cur Res	2021	2231-2196, 0975-5241	https://ijcrr.com	https://ijcrr.com/uploads/4384_pdf.pdf
Review on medical applications of Titanium dioxide nanoparticles,	S K Sarje	Pharmacology	Asian Journal of Organic & Medicinal Chemistry	2022	ISSN 2456-8937	https://asianpubs.org/index.php/ajomc	https://scholar.google.co.in/scholar?hl=en&as_sdt=0%2C5&as_vis=1&q=Review+on+medical+applications+of+Titanium+dioxide+nanoparticles+SHRINIWAS+SARJE&btnG=
Quantitation of Vitamin C from Marketed Chyawanprash Using UV Spectrophotometer	Ghante Mahavir H, Roge Ashish B, Firke Sagar N and Sarje Shrinivas K	Pharmaceutical Chemistry	Int J Food Nutr Sci;	2022	ISSN PRINT 2319 1775 Online 2320-7876	https://www.ijfans.org/	https://www.ijfans.org/uploads/paper/bce12f3655067cb65910822fb109eb50.pdf
Evaluation of Mast Cell Stabilizing, Anti-inflammatory & Anti-oxidant Activity of Seed Extracts of *Saraca Asoka* (Roxb.), De. Wild	Chandrakant P. Rathod, Mahavir H. Ghante	Pharmaceutical Chemistry	Asian Pacific Journal of Health Sciences	2022	E-ISSN: 2349-0659 P-ISSN: 2350-0964	https://www.apjhs.com/index.php/apjhs/article/view/2571	https://www.apjhs.com/index.php/apjhs/article/view/2571
Antiatherosclerotic Activity of Methanolic Extract of woodfordia	N B Ghiware Vishweshwar Dharashive	Pharmacology	Journasl of Pharmaceutical Research International	2022	ISSN: 2456-9119	https://journaljpri.com/index.php/JPRI	http://eprints.asianrepository.com/id/eprint/3177/1/35951-Article%20Text-63357-

fructicosa Flowers							1-10-20220317.pdf
Cardioprotective Activity of Randia Dumetorum Aginst Doxorubicin induced Cardiotoxicity	N B Ghiware Vishweshwar Dharashive	Pharmacology	Biosciences Biotechnology Research Asia	2022		https://www.biotech-asia.org	https://www.biotech-asia.org/vol19no3/cardioprotective-actvity-of-randia-dumetorum-against-doxorubicin-induced-cardotoxicity/
Synthesis and biological evaluation of 3, 4 - dihydropyrimidinesthiones derivatives	M H Ghante, C P Rathod	Pharmaceutical Chemistry	International Journal of Health Sciences (IJHS)	2022	s ISSN 2550-6978 E-ISSN 2550-696X	https://sciencescholar.us/journal/index.php/ijhs	https://doi.org/10.53730/ijhs.v6nS4.9512
Formulation and Evaluation of Chitosan Based Polyelectrolyte Complex of Levodopa for Nasal Drug Delivery	Sagar Firke, Ashish Roge, Shriniwas Sarje	Pharmaceutical Chemistry	International Journal of Health Sciences	2022	s ISSN 2550-6978 E-ISSN 2550-696X	https://sciencescholar.us/journal/index.php/ijhs	https://media.neliti.com/media/publications/426397-formulation-and-evaluation-of-chitosan-b-e859a596.pdf
Development and modification of the tragacanth solid lipid nanoparticles with natural polymer	Sangita Namdevrao Bhasme* Shriniwas Keshavrao Sarje Ashish Babanrao Roge Sagar Firke	Pharmaceutical Chemistry	International Journal of Health Sciences,2022	2022	s ISSN 2550-6978 E-ISSN 2550-696X	https://sciencescholar.us/journal/index.php/ijhs	https://sciencescholar.us/journal/index.php/ijhs/article/view/9646/6304

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Advanced Pharmaceutical Bulletin

Adv Pharm Bull. 2017 Sep; 7(3): 399–408.
Published online 2017 Sep 25. doi: 10.15171/apb.2017.048

PMCID: PMC5651061
PMID: 29071222

Pharmaceutical Cocrystal of Piroxicam: Design, Formulation and Evaluation

Prabhakar Panzade,[1,*] Giridhar Shendarkar,[1] Sarfaraj Shaikh,[2] and Pavan Balmukund Rathi[2]

Abstract

Purpose: Cocrystallisation of drug with coformers is a promising approach to alter the solid sate properties of drug substances like solubility and dissolution. The objective of the present work was to prepare, formulate and evaluate the piroxicam cocrystal by screening various coformers.

Methods: Cocrystals of piroxicam were prepared by dry grinding method. The melting point and solubility of crystalline phase was determined. The potential cocrystal was characterized by DSC, IR, XRPD. Other pharmaceutical properties like solubility and dissolution rate were also evaluated. Orodispersible tablets of piroxicam cocrystal were formulated, optimized and evaluated using 3^2 factorial design.

Results: Cocrystals of piroxicam-sodium acetate revealed the variation in melting points and solubility. The cocrystals were obtained in 1:1 ratio with sodium acetate. The analysis of Infrared explicitly indicated the shifting of characteristic bands of piroxicam. The X-Ray Powder Diffraction pattern denoted the crystallinity of cocrystals and noteworthy difference in 2θ value of intense peaks. Differential scanning calorimetry spectra of cocrystals indicated altered endotherms corresponding to melting point. The pH solubility profile of piroxicam showed sigmoidal curve, which authenticated the pKa-dependent solubility. Piroxicam cocrystals also exhibited a similar pH-solubility profile. The cocrystals exhibited faster dissolution rate owing to cocrystallization as evident from 30% increase in the extent of dissolution. The orodispersible tablets of piroxicam cocrystals were successfully prepared by direct compression method using crosscarmelose sodium as superdisintegrant with improved disintegration time (30 sec) and dissolution rate.

Conclusion: The piroxicam cocrystal with modified properties was prepared with sodium acetate and formulated as orodispersible tablets having faster disintegration and greater dissolution rate.

Feedback

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Review Curr Drug Deliv. 2017;14(8):1097-1105. doi: 10.2174/1567201813666161018152411.

Pharmaceutical Cocrystal: An Antique and Multifaceted Approach

Prabhakar S Panzade [1], Giridhar R Shendarkar [1]

Affiliations

PMID: 27758692 DOI: 10.2174/1567201813666161018152411

Abstract

Background: Pharmaceutical cocrystal is an emerging approach to tailor physicochemical and mechanical properties of drug substances. Cocrystals are composed of API and pharmaceutically acceptable coformer. It is used to address the solubility, dissolution, mechanical properties and stability of drugs.

Methods: This review discusses introduction to cocrystal, preparation, and characterization, what USFDA says on cocrystal and role of Hansen solubility parameter to predict cocrystal. The effect of cocrystal on drug properties, dependence of cocrystal solubility on pH, concept of drug-drug cocrystal, and aerosil 200 as novel cocrystal former and impact of cocrystal on drug pharmacokinetic has also been presented in this review along with highly selected examples of cocrystals. Finally, how cocrystal offers an opportunity for patents is also delineated.

Results: Pharmaceutical cocrystals have ability to tailor physichochemical and mechanical properties of drug substances. It also provides opportunity for patentable invention. Therapeutic efficacy of drugs may be improved via drug-drug cocrystal.

Conclusion: The pharmaceutical cocrystals are not fully explored and have potential for future development. Successful drug delivery can be achieved through cocrystallization. Pharmaceutical industry will be beneficial through successful cocrystallization of drug substances.

Keywords: Aerosil 200; Hansen solubility parameter; USFDA; cocrystal; coformer; drug drug cocrystal.

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Bulletin of Faculty of Pharmacy, Cairo University
Volume 55, Issue 2, December 2017, Pages 203-210

Software based approaches for drug designing and development: A systematic review on commonly used software and its applications

Prasad G. Jamkhande [a], Mahavir H. Ghante [a], Balaji R. Ajgunde [b]

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https://doi.org/10.1016/j.bfopcu.2017.10.001

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Abstract

Drug discovery include drug designing and development, is a multifarious and expensive endeavor, where least number of drugs that pass the clinical trials makes it to market. Software based drug discovery and development methods have major role in the development of bioactive compounds for over last three decades. Novel software based methods such as molecular modeling, structure-based drug design, structure-based virtual screening, ligand interaction and molecular dynamics are considered to be powerful tool for investigation of pharmacokinetic and pharmacodynamic properties of drug, and structural activity relationship between ligand and its target. Computational approaches such as docking confer interaction of small molecules with structural macromolecules and thereby hit identification and lead optimization. These methods are faster, and accurately provide valuable insights of experimental findings and mechanisms of action. In addition, appropriate implementation of these techniques could lead to a reduction in cost of drug designing and development. Currently in biomedicine sciences these software are exhibiting imperative role in the different phases of drug discovery. The review discusses working principle and successful applications of most commonly used software for drug designing and development.

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Varsha Rajkumar Jamakhandi, M S Kalshetti
Department of Quality Assurance, College of Pharmacy, Solapur, Maharashtra, India.

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3 DESIGN AND DEVELOPMENT OF SIMVASTATIN FLOATING TABLETS FOR CONTROLLED RELEASE

N. G. Raghavendra Rao1*, M. Laharika2
[1]*GRD [PG] Institute of Management and Technology, Rajpur, Dehradun – 248009, Uttarakhand, India.*
[2]*Graviti Pharmaceutical Private Limited, IDA Pashamylaram, Hyderabad - 502307, Telangana, India.*

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4 OPTIMIZATION OF STRESS CONDITIONS OF FORCED DEGRADATION STUDY BY UV SPECTROPHOTOMETER

Mr. A B Roge, Dr. G R Shendarkar*
CRPS, Nanded Pharmacy College, Nanded.

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Forced degradation study (FDS) is an emerging trend, requisite to be performed and reported while filing abbreviated new drug application (ANDA) and investigational new drug application (IND) application. Modern analytical instruments like HPLC, UPLC, and LC-MS etc. are commonly used throughout the intact study. These methods are more specific, accurate but also costly and time consuming. Optimization of stress conditions is a critical part of study as standard values are not revealed by regulatory authorities. The objective of this work is to explore role of UV spectrophotometer in FDS and to overcome above problems. In this study, FDS of Gallic acid has been carried out using UV spectrophotometer. Gallic acid was exposed to different stress conditions like acidic and alkaline hydrolysis, oxidation, dry heat and photolytic degradation. UV spectrum of sample subjected to stress conditions was recorded and compared with standard spectrum. It was found that Gallic acid has undergone degradation in acidic (HCl), alkaline (NaOH) and oxidative media (H2O2). However, it was found stable at thermal and photolytic stress conditions. The present study explains usefulness of UV-Visible spectrophotometer in FDS which helps to save time and expenditure required for study.

5 A PROSPECTIVE OBSERVATIONAL STUDY ON NON ALCOHOLIC FATTY LIVER DISEASE

K. Maneesha[1], P. Kishore[1], Y. Ravalika[2], Narasimha Reddy[3], D. Sudheer Kumar[4], R. Deepthi[1*]
[1,2] *Department of Pharmacy Practice, Care College of Pharmacy, Warangal, Telangana.*
[3]*PNR GUT& LIVER CLINIC, Hanumakonda, Warangal, Telangana.*
[4]*Department of Pharmaceutics, Care College of Pharmacy, Warangal, Telangana.*

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DEVELOPMENT OF VALIDATED UV SPECTROPHOTOMETRIC STABILITY INDICATING METHOD FOR ESTIMATION OF GALLIC ACID IN BULK FORM

A B Roge* and G R Shendarkar[1]

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[1]Research Guide, Center for Research in Pharmaceutical Sciences, Nanded Pharmacy College, Nanded

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ABSTRACT

A novel simple, reliable, rapid and accurate UV spectrophotometric stability indicating method (SIM) was developed for estimation of gallic acid from bulk powder. The study was carried out at 220 nm. Gallic acid has shown linear absorbance over the concentration range of 4-20 µg/Ml with R^2 value 0.999. This $y = 0.061x + 0.016$ was used for determination of concentrations of test solution. The proposed method was validated as per ICH Q2 (R1) guidelines for various parameters eg. Prcision, accuracy, limit of detection (LOD), limit of quantification (LOQ) and linearity and range. Results of validation study has shown compliance with criteria of ICH guidelines. Relative standard deviation was found less than 2% and recovery was found in range 98.6- 100.63 %. Method was very sensitive as LOD and LOQ were found to be 0.147 µg/mL and 0.447 µg/mL respectvely. Stability indicating potential was studied by anlysing sample subjected to various stress conditions like hydrolysis, oxidation, photodegradation and thermal degradtions. Proposed method reveals that gallic acid was found to be unstable at hydrolytic and oxidative stress conditions.

KEY WORDS

Gallic acid, ICH guidelines, Stability indicating method, Stress conditions, Validation

INTRODUCTION:

All pharmaceutical substances un-avoidably contain impurities and the role of ethical pharmaceutical industry is to define an impurity profile that is acceptable for the intended use of a given drug, without compromising its therapeutic safety and efficacy [1,2]. The stability of a drug product or a drug substance is a critical parameter which may affect purity, potency and safety. Changes in drug stability can risk patient safety by formation of a toxic degradation product(s) or deliver a lower dose than expected. Therefore, it is essential to know the purity profile and behavior of a drug substance under various environmental conditions which could be possible by stability testing [3,4].

ICH defined stability indicating assay methods (SIAM) as, quantitative analytical methods that are based on structural, chemical or biological properties of each active ingredient of a drug product and that will distinguish each active ingredient from its degradation products so that the active ingredient content can be accurately measured [5,6].

SIAM can also be defined as "An analytical method that accurately quantitates the active ingredients without interference from the degradation products, process impurities, excipients or other potential impurities" [5]. Validation of a method indicates to establish documented evidence that the system is doing what its purpose to do. Validation is necessary when a method or a procedure is going to be used by a manufacturing

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Turk J Pharm Sci 2019;16(3):310-316
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ORIGINAL ARTICLE

Superior Solubility and Dissolution of Zaltoprofen via Pharmaceutical Cocrystals

Farmasötik Cocrystal ile Zaltoprofen'in Üstün Çözünürlük ve Çözünmesi

Prabhakar PANZADE*, Giridhar SHENDARKAR

Center for Research in Pharmaceutical Sciences, Nanded Pharmacy College, Opp. Kasturba Matruseva Kendra, Sham Nagar, Nanded, India

ABSTRACT

Objectives: Pharmaceutical cocrystals are a promising tool to enhance the solubility and dissolution of poorly soluble drugs. Zaltoprofen (ZFN) is nonsteroidal anti-inflammatory drug with a prevalent solubility problem. The present study was undertaken to enhance the solubility and dissolution of ZFN through pharmaceutical cocrystals by screening various coformers.

Materials and Methods: Cocrystals of ZFN were prepared in 1:1 and 1:2 ratio of drug:coformer by the dry grinding method. The melting point and solubility of the crystalline phase were determined. The potential cocrystals were characterized by differential scanning calorimetry (DSC), infrared spectroscopy, and powder X-ray diffraction (PXRD). Cocrystals were subjected to dissolution rate and stability study.

Results: ZFN-nicotinamide (NIC) cocrystals demonstrated deviation in melting point and solubility. The cocrystals were obtained in both 1:1 and 1:2 ratios with NIC. The infrared analysis noticeably indicated the shifting of characteristic bands of ZFN. The crystallinity of the cocrystals was evident from the XRPD pattern and notable difference in the 2θ values of intense peaks. The DSC spectra of the cocrystals exhibited altered endotherms analogous to melting point. The cocrystals showed a faster dissolution rate and a 55% increase in the extent of dissolution compared to pure drug. The cocrystals were stable at room temperature and accelerated conditions.

Conclusion: The prepared cocrystals exhibited greater solubility and dissolution compared to the pure drug and were stable at room temperature and accelerated conditions.

Key words: Pharmaceutical cocrystal, zaltoprofen, solubility, dissolution

ÖZ

Amaç: Farmasötik kokristal, zayıf çözünür ilaçların çözünürlüğünü ve çözünmesini arttırmak için umut veren bir araçtır. Zaltoprofen (ZFN) yaygın çözünürlüğe sahip nonsteroid antiinflamatuvar ilaçtır. Bu çalışma, çeşitli koformerlerin taranması yoluyla farmasötik kokteyli aracılığıyla ZFN'nin çözünürlüğünü ve çözünmesini arttırmak için üstlenilmiştir.

Gereç ve Yöntemler: Kuru öğütme yöntemi ile 1:1 ve 1:2 oranında ilaç:koformer oranında ZFN kristalleri hazırlanmıştır. Erime noktası ve kristalin fazın çözünürlüğü belirlenmiştir. Potansiyel kristaller differansiyel tarama kalorimetrisi (DSC), kızılötesi spektroskopi ve toz X ışını kırınımı (PXRD) ile karakterize edilmiştir. Kokristaller çözünme hızına ve stabilite çalışmasına tabi tutulmuştur.

Bulgular: ZFN-nikotinamid (NIC) kokristal erime noktasında ve çözünürlükte sapma göstermiştir. Kristaller, NIC ile hem 1:1 hem de 1:2 oranında elde edilmiştir. Kızılötesi analizi, ZFN karakteristik bantlarının kaymasını belirgin bir şekilde göstermiştir. Kristallerin kristallenmesi XRPD paterninden belirgin olarak görülmüştür ve 2θ değerindeki yoğun zirvelerdeki kayda değer farklılıklar gözlenmiştir. Kristallerin DSC spektrumları, erime noktasına benzer değiştirilmiş endotermler sergilemiştir. Kristaller, daha hızlı çözünme oranı ve saf ilaçla karşılaştırıldığında çözünme derecesinde % 55 artış göstermiştir. Kristaller, oda sıcaklığında ve hızlandırılmış koşullarda kararlı bulunmuştur.

Sonuç: Hazırlanan kristaller, saf ilaca kıyasla daha fazla çözünürlük ve çözünme sergilemiş ve oda sıcaklığında ve hızlandırılmış koşullarda sabit bulunmuştur.

Anahtar kelimeler: Farmasötik kokristal, zaltoprofen, çözünürlük, çözünme

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Research Article | Published: 01 October 2019

Antimycobacterial, antimicrobial, antioxidant activities and in silico PASS investigations of root fractions and extract of *Cordia dichotoma* Forst

Prasad Govindrao Jamkhande ✉, Mahavir H. Ghante, Sonal Ramrao Barde & Balaji R. Ajgunde

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Abstract

Indian cherry (*Cordia dichotoma* Forst.) is a medicinally important plant widely consumed as an indigenous remedy for several ailments in the India. Although it is widely used plant by the population, there are no studies on root proving these medicinal claims. The present study was designed to investigate antimicrobial, antimycobacterial and antioxidant activities of *Cordia dichotoma* Forst. roots and in silico biological activities prediction using PASS. Methanolic extract was prepared and further fractions were obtained by liquid–liquid partitioning. Agar well diffusion assay and disc diffusion method were selected for antimicrobial activity. Antimycobacterial activity was estimated

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against *Mycobacterium tuberculosis*. For antioxidant activity, DPPH and hydrogen peroxide (H_2O_2) radical scavenging assay were employed. All the tested samples exhibited diverse pattern of sensitivity for tested strains. The value of MIC, MMC and MIC index showed that *P. vulgaris* and *K. pneumonia* were the most sensitive for ME and CF, whereas *A. fumigates* and *V. myditis* were sensitive to CF and AF. Microorganism susceptible index was 100 for *P. vulgaris* and *K. pneumonia* bacteria, and *A. fumigates* and *V. myditis* fungi. CF exhibited best activity against *M. tuberculosis* with lowest MIC of 30 mg/ml and highest activity index of 0.85. Dose dependent antioxidant activity was observed in both the assay. This data provides evidence that *Cordia dichotoma* Forst. roots have potent antibacterial, antimycobacterial, antioxidant, and moderate antifungal activity and a potential cure for infectious diseases like tuberculosis.

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Review Article

Role of Pentacyclic Triterpenoids in Chemoprevention and Anticancer Treatment: An Overview on Targets and Underling Mechanisms

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Key Words

cancer, pentacyclic triterpenoids, apoptosis, anti-angiogenic, isoprene, antiproliferative

Abbreviations

DNA: Deoxyribonucleic acid, BRCA1: Breast cancer gene 1, BRCA2: Breast cancer gene 2,WHO: World Health Organization, Nrf2: Nuclear factor erythroid 2 [NF-E2]-related factor 2 , NF-κB: Nuclear factor kappa-light-chain-enhancer of activated B cells, MDR: Multidrug resistance, AP-1: Activator protein 1, ROS: Reactive oxygen species, MAPK: Mitogen-activated protein kinase, SAPK: Stress-activated protein kinases, JNK: Jun amino-terminal kinases, HL-60: Human promyelocytic leukemia cells, HeLa: Immortal cell line, Bcl-2: B-cell lymphoma 2, R-HepG2: Resistant human hepatoma, bFGF or FGF: fibroblast growth factor, VEGF: Vascular endothelial growth factor, NSCLC: Non-small cell lung cancer, ROS: Reactive oxygen species, STAT: Signal transducer and activator of transcription, AMPK: AMP-activated protein kinase, R: Receptor, Apaf-1: Apoptic activating protease factor-1, IL-1β: Interleukin-1β, CREB: Cyclic AMP-responsive element-binding protein 1, ERK: Extracellular signal–regulated kinases, PKC: Protein kinaseC, BID: BH3interacting-domain, S-G2/M: Cell cycle checkpoints, ↑p21/WAF1: Cyclin-dependent kinase inhibitor 1 or CDK-interacting protein 1, Cdc2: Cell division cycle protein 2, Cdc25C: Cell Division Cycle 25 Homolog C, Bax: BCL 2 associated X protein, ERK: Extracellular signal–regulated kinases, IKK: I kappa B kinase, VEGFR: Vascular endothelial growth factor receptor, GR: Growth receptor, NO: Nitric oxide

Abstract

The incidences of cancer are continuously increasing worldwide, affecting life of millions of people. Several factors associated with the internal and external environment are responsible for this deadly disease. The key internal determinants like abnormal hormonal regulation, genetic mutations and external determinants such as lifestyle and occupational factors enhances onset of cancer. From the ancient time, plants were remained as the most trusted source of medicine for the treatment of diverse disease conditions. Extensive studies have been performed for the discovery of effective anticancer agent from the plant and still it is going on. Pentacyclic triterpenoids are biologically active phytochemicals having a different range of activities such as anti-inflammatory, hepatoprotective, anti-hypertensive, antiulcerogenic and anti-tumor. These compounds generally contain ursane, oleanane, lupane and friedelane as a chief skeleton of pentacyclic triterpenoids which are generally present in higher plants. Isoprene unit, phytochemical, with good antitumor/anticancer activity is required for the bio

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Development of Validated UV Spectrophotometric Stability Indicating Method for Estimation of Desloratadine from Its Tablet Dosage Form

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Abstract
A novel simple, reliable, rapid and accurate UV spectrophotometric stability indicating method (SIM) was developed for estimation of Desloratadine from its tablet dosage form. The study was carried out at 242 nm. Desloratadine has shown linear absorbance over the concentration range of 5-30 µg/mL with R^2 value 0.999. The slope and intercept equation y = 0.045x + 0.013 were used for determination of concentrations of test solution. The proposed method was validated as per ICH Q2 (R1) guidelines for various parameters e.g. precision, accuracy, limit of detection (LOD), limit of quantification (LOQ) and linearity and range. Results of validation study have shown compliance with criteria of ICH guidelines. Relative standard deviation was found less than 2% and recovery was found in range 99.12 – 99.90 %. Method was very sensitive as LOD and LOQ were found to be 0.121 µg/mL and 0.366 µg/mL respectively. Stability indicating potential was studied by analyzing sample subjected to various stress conditions like hydrolysis, oxidation, photo degradation and thermal degradations. Proposed method reveals that Desloratadine was found unstable at hydrolytic and oxidative stress conditions.

Keywords
Stability indicating method, Desloratadine, Validation, ICH guidelines, stress conditions

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INTRODUCTION:

Need for Study:

All pharmaceutical substances un-avoidably contain impurities and the role of ethical pharmaceutical industry is to define an impurity profile that is acceptable for the intended use of a given drug, without compromising its therapeutic safety and efficacy (1-2). The stability of a drug product or a drug substance is a critical parameter which may *affect purity, potency and safety. Changes in drug* stability can risk patient safety by formation of a toxic degradation product(s) or deliver a lower dose than expected. Therefore, it is essential to know the purity profile and behavior of a drug substance under

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Anti-Hyperglycemic Evaluation of Extracts of *Spinacia oleracea* Linn. and *Acacia nilotica* Linn. in Alloxan induced Diabetic Rats

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Abstract

Aim of the study- The study was designed to investigate the Anti-hyperglycemic activity of extracts of *Spinacia oleracea* Linn. and *Acacia nilotica* Linn. in Alloxan induced diabetic Rats. **Material and Methods**- The leaves of *Spinacia oleracea* Linn. were extracted using petroleum ether, chloroform, ethyl acetate and methanol and pods of *Acacia nilotica* Linn. were extracted using petroleum ether, chloroform, ethyl acetate and ethanol, all the extracts were screened for presence of various phytoconstituents. Diabetes was induced by single dose of intraperitoneal injection of Alloxan monohydrate 120 mg/kg. The test extract were given from day 0 to 21 and on day 0,7,14 and 21 blood glucose and body weight was checked. **Results**- on day 21 standard drug Glimepiride treated rats showed highly significant $p<0.001$ while *Spinacia oleracea* leaves extracts and *Acacia nilotica* pods extracts showed significant reduction in blood glucose level from day 7 onwards over diabetic control. **Conclusion**- the antihyperglycemic activity of the extracts may be through its insulinogenic effects as it may have the ability to enhance the activity of insulin within the body.

Keywords

Alloxan, Spinacia oleracea leaves and Acacia nilotica pods extracts, Diabetic rats.

*****

INTRODUCTION

Diabetes mellitus also known as simply diabetes is a group of metabolic diseases in which high blood sugar levels over a prolonged period can be seen. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes.

Several pathogenic processes are involved in the development of diabetes; these ranges from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. Deficient action of insulin on target tissues and hyperglycemia are the basis of the abnormalities in carbohydrate, fat, and protein metabolism, causing diabetes characteristic clinical features.

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Formulation and Optimization of Floating Microspheres of Ivabradine Hydrochloride by 3^2 Factorial Design Approach

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Abstract

The Present study is an attempt to design and formulate floating microsphere of Ivabradine Hydrochloride to achieve its release in a controlled manner and to avoid its repetitive administration thereby, to improve the bioavailability. Ivabradine floating microspheres were prepared by multiple emulsion solvent evaporation technique (w/o/w) using Ethyl Cellulose as polymer, Dichloro Methane as solvent for polymer and tween 80 was used as emulsifying agent. The Formulation was optimized by 3^2 factorial design, by means of polymer concentration and stirring speed as an independent variables and drug loading, particle size and % drug release was selected as a response along with other micromeritic properties such as particle size, bulk density, tapped density and flow ability. Formulation prepared by using 400 mg of Ethyl cellulose gives the highest yield of 89.10±10 %, 91.5±0.10 % of drug loading, 162.55 µm of average particle size,78.20±0.27 percent of drug release in 8 hours and 92.10±0.26 of Buoyancy. The optimized formulation was found suitable to be dispensed as a single unit dosage form in the form capsules.

Keywords
Ethyl Cellulose, Floating Microspheres, Ivabradine HCL, Solvent Evaporation technique, Tween 80.

*****

INTRODUCTION

Cardiovascular diseases have now become the leading cause of mortality in India, attributed to cardiovascular disease (CVD). Ischemic Heart diseases like Angina Pectoris and Stroke are the leading cause of deaths in India and are responsible for > 80% of CVD deaths. Ivabradine HCL is a pure heart rate lowering agent, acting by selective and specific inhibition of the cardiac pacemaker I_f current that controls the spontaneous diastolic depolarization in the sinus node and regulates heart rate. The absolute bioavailability is around 40% due to first-pass effect in the gut and liver, elimination Half half-life of 2 hours[1]. The patient diagnosed with Angina Pectoris needs special attention in the treatment; since the Angina attack may be impulsive at the night or in the early morning hours[2-4]. This can be treated by maintaining therapeutic level of drug in plasma over the period of time, with sustained release formulation of Ivabradine.

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Original Article

Design and Preparation of Zaltoprofen-Nicotinamide Pharmaceutical Cocrystals via Liquid Assisted Grinding Method

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ABSTRACT

Introduction: Pharmaceutical cocrystal is an endowed approach to augment solubility and dissolution of drugs with limited aqueous solubility. Zaltoprofen is a nonsteroidal anti-inflammatory drug with prevailing solubility problem. The present study deciphers preparation of cocrystals of lipophilic drug zaltoprofen to improve the solubility and dissolution by screening various coformers. **Methods:** Cocrystals of zaltoprofen were prepared in 1:1 and 1:2 molar ratio of drug: coformer by liquid assisted grinding method. The crystalline phase was subjected to evaluation by melting point and solubility. The potential cocrystals were characterized by differential scanning calorimetry (DSC), infrared spectroscopy (IR), powder X-ray diffraction (PXRD) and scanning electron microscopy (SEM). Dissolution rate and stability of cocrystals was also investigated. **Results:** Zaltoprofen-nicotinamide (ZFN-nicotinamide) cocrystals revealed variation in melting point and solubility. Two cocrystals were obtained in 1:1 and 1:2 ratios with nicotinamide. IR spectrum distinctly showed the shifting of typical absorption bands of zaltoprofen. Crystallinity of cocrystals was clear from the PXRD pattern and noteworthy difference in 2θ value of intense peaks. DSC spectra of cocrystals revealed altered endotherms analogous to melting point. Cocrystals exhibited rapid dissolution rate and 56% increase in the extent of dissolution compared to pure drug. The cocrystals were found stable at stability conditions. SEM revealed difference in the crystal morphology. **Conclusion:** Hence, it can be concluded that ZFN-nicotinamide cocrystal could present an improved drug design approach to surmount dissolution and bioavailability related challenges linked with lipophilic drug zaltoprofen.

Key words: Cocrystal, Zaltoprofen, Liquid assisted grinding, Solubility, Dissolution.

INTRODUCTION

The crucial task in the development of drug product is searching appropriate solid form of an Active Pharmaceutical Ingredient (API) with desired physicochemical properties. The rational approach is a use of solid forms with greater solubility to improve dissolution and bioavailability.[1-5] Amorphous solids, hydrates/solvates, polymorphs and salts have been used conventionally to improve solubility and dissolution. However, amorphous solids or metastable polymorphs of an API possess greater solubility but are thermodynamically unstable in solid state. Hence, erratic product quality and therapeutic performance may be observed. Therefore, conventional solid forms may not fulfill the need for development of successful product.[6-11]

Pharmaceutical cocrystals have emerged as a way of modifying solubility, dissolution, bioavailability and other physicochemical and pharmacokinetic properties of drug substances, keeping their molecular structure intact. Cocrystal is a stoichiometric multicomponent system connected by non-covalent interactions containing two

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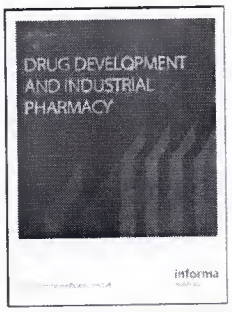

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Pharmaceutical cocrystal: a game changing approach for the administration of old drugs in new crystalline form

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REVIEW ARTICLE

Hot Melt Extrusion: an Emerging Green Technique for the Synthesis of High-Quality Pharmaceutical Cocrystals

Prabhakar S. Panzade[1,2] · Giridhar R. Shendarkar[1] · Deepak A. Kulkarni[2]

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Abstract
Hot melt extrusion (HME) is emerging as a continuous, single-step, scalable, and industrially feasible process for the production of cocrystals. HME has gained momentum as a continuous and solvent-free process in the manufacturing of cocrystals. The incorporation of the matrix and the use of process analytical tool (PAT) for real-time monitoring further facilitate the process. The advantages and disadvantages of various cocrystal production methods including HME process are provided in the manuscript. Besides, an overview of the HME process and equipment, critical process parameters, and PAT for real-time monitoring of process has been reviewed in this article. Finally, recent literature related to the cocrystal synthesis via HME has been presented critically. This review provides useful information for the synthesis of the cocrystals using HME process.

Keywords Hot melt extrusion · Pharmaceutical cocrystal · Process analytical tool · Solvent-free method · Applications

Introduction

Over the two decades, cocrystallization of active pharmaceutical ingredients (APIs) acquired a remarkable increase. Cocrystals are "multi-component crystalline solids that are neutral homogeneous molecular and/or ionic compounds generally in a stoichiometric ratio, which are neither solvates nor simple salts" [1–3]. Cocrystal composed of the same coformer may exist in distinct stoichiometric configuration [4–6]. The formation of supramolecular homosynthon (e.g., carboxylic acid-carboxylic acid) or supramolecular heterosynthon (e.g., carboxylic acid-amide) approach is used in the design of cocrystals. Nevertheless, supramolecular heterosynthon is the prevalent strategy due to promising interaction between unlike molecules which frequently results in H-bonding and thermodynamically stable cocrystals [2, 7, 8]. The general process depicting the cocrystal product development is demonstrated in Fig. 1.

The enhancement of physical property is of a special concern to the pharmaceuticals as the mainstreams of medicines are delivered in solid forms [5, 9, 10]. Physical properties of the solids in pharmaceutical drug product directly affect the processing, delivery, and, eventually, functioning of the drug product [11, 12]. Conversely, a cocrystal has altered physicochemical, mechanical, and biological properties including intrinsic solubility, dissolution rate, hygroscopicity, melting point, compressibility, and bioavailability [13–15]. This is due to the different crystal structures of a cocrystal than either of the starting materials (drug and coformer) [16, 17]. Consequently, there is a continual rise in the interest of academic and industrial researchers to investigate newer cocrystals. Pharmaceutical cocrystals may lower the expenses of drug discovery and preclinical research due to the previously established thermodynamics and toxicological profile of the molecule, ultimately leading to a short process of formulation development [18, 19]. Moreover, cocrystals offer a substitute for chemical modification of drugs [20, 21]. Another key advantage of the cocrystal is that it provides an opportunity to generate and protect intellectual property beneficial to the pharmaceutical industry [2, 15, 22]. Besides, cocrystals have an enormous commercial potential and became commercial reality due to the launch of cocrystal-based product into the market [2, 23]. Some marketed cocrystal-based products comprise ipragliflozin-proline (Suglat, Astellas Pharma, and Kotobuki Pharmaceuticals) and valsartan-sacubitril (Entresto

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Research Ar cle

Pharmacological screening of mast cell stabilizing, anti-inflammatory and anti-oxidant activity of Calotropis *procera*extracts

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Abstract
Calotropis procera (Ait.) R. Br., a wild growing plant of family Asclepiadaceae, is well known for its medicinal properties which is widely used in traditional medicine to treat various diseases. *C. procera* flowers showed various levels of preliminary phytochemical screening of extract has revealed the presence of carbohydrates, flavonoids, polyphenols, tannins and saponins, alkaloids, proteins and amino acids.Acute toxicity test has done for the flowers of *C. procera* as per the standard method (OECD No: 423).
The present study was evaluated for phytochemical screening, mast cell stabilizing, anti-inflammatory and antioxidant activity of ethyl acetate extract of *C. procera*
Keywords: *Calotropis procera*, mast cell stabilizing, antioxidant and anti-inflammatory activity.

Introduction

The herbal medicines occupy distinct position right from the primitive period to present day. The ethnobotanical pharmacology is as old as man himself. These medicines have less side effects and man can get the herbs easily from nature. India being a tropical country is blessed with vast natural resources and ancient knowledge for its judicious utilization. However, in order to make these remedies acceptable to modern medicine, there is a need to scientifically evaluate them, to identify the active principles and to understand the mechanism of action. [1-4]
It is found in most parts of the world in dry, sandy and alkaline soils and warm climate and is more common in south western and central India and western Himalayas. It is found in waste lands and grows as a weed in agricultural lands. In ancient Ayurvedic medicines the plant Calotropis procera was known as "Rakta arka".Different parts of this plant have been reported to exhibit anti-inflammatory, analgesic, and antioxidant properties. *C.procera* has revealed the enormous diversity of its medicinal uses and popular use of the plant for a wide range of common ailments like fevers, rheumatism, indigestion, cough, cold, eczema, asthma, elephantiasis, nausea, vomiting and diarrhea. Either the whole plant or a plant part used singly or mixed with other plant materials to enhance the efficacy. [5-7]
Calotropis procera Linn., also known as Alarka, Surya, Suuryaahvya, Vikirna, Vasuka, Tapana, Tuulaphala, Kshirparna, Arkaparna, Aasphota Aakh, Madaar, Ashar in India, belongs to the Asciepiadaceae family and grows in tropical region and most abundant in Bangladesh, India, Burma, Pakistan and in the sub Himalayan tract. This plant was used first time as a medicinal plant by Ved Sushruta, which is about 800–900 AD. It is used from very ancient period in folk beliefs as well as a drug of choice for different ailments.Different parts of the plant have been used in Indian traditional system of medicine for the treatment of leprosy, ulcers, tumors, piles and diseases of spleen, liver and abdomen. [8-9]

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Neuropharmacological Exploration of Standardized Extract of Annona squamosa (L.) Fruit Pulp in Experimental Animals

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ABSTRACT

Aims: The present study aimed to investigate the neuroprotective potential of standardized *Annona squamosa* Linn fruit pulp extract using various in-vitro and in-vivo models.

Methodology: Neuroprotective potential of standardized extract was screened against dopamine-induced contraction of isolated rat vas deferens, serotonin-induced contractions of isolated rat fundus, acetylcholine-induced contractions of isolated goat tracheal chain. *In-vivo* models such as elevated plus maze, light and dark model, force swim test, tail suspension test, lithium-induced head twitches, haloperidol-induced catalepsy, PTZ induced seizure and foot shock-induced aggression were implemented to screen various doses intervals (50-200mg/kg) of extracts in experimental animals.

Results: Standardization of extract showed content of polyphenols 65.37 mg/g of GAE, total flavonoid 5.33 mg/g of RE and HPLC fingerprinting of ASP-ME showed identical retention time as that of standard gallic acid, quercetine and rutin, viz 3.830, 5.765 and 3.830 respectively. Inhibition of DPPH radical reflected as 91.32±0.19 % while percent inhibition of RRI of DPPH was observed as 95.99±0.47 at 150 min. ASP-ME significantly inhibited dopamine and serotonin induced contraction on isolated rat vas deferens and rat fundus respectively at log dose (1.3, 2.5) for dopamine and log dose (2.2, 2.5) for serotonin. ASP-ME potentiated ach-induced contractions on goat tracheal chain preparation. Ach alone produces 106.90±4.6 % response, while ASP-ME in presence of Ach potentiates response and produces 141.80±10 % response. The extract demonstrated anxiolytic activity by increasing the time spent in open arms and light zone in elevated plus maze and light dark test respectively. The duration of immobility was significantly decreased in force swim & tail suspension test respectively demonstrating antidepressant activity. Administration of ASP-ME shown antipsychotic effect in dose dependent manner by minimising aggression induced by foot shock (reduced number of flights), while potentiation of catalepsy induced by haloperidol. The extract also exhibited serotonergic system inhibitory effect by significantly reducing head twitches imparted by lithium.

The ASP-ME significantly delayed the onset of first myoclonic and clonic spasms induced by PTZ indicating anticonvulsant effects. Extract also shown ability to decrease the behavior facilitated by the serotonergic and dopaminergic coordination, while potentiated the actions produced by GABA.

Conclusion: Finding of the study suggests anxiolytic, antidepressant, antipsychotic effects of ASP-ME probably mediated through dopamine D2 and 5-HT receptors, with neuroprotective activity.

Key Words: *Annona squamosa*, Anxiolytic, Antidepressant, Antipsychotic, Anticonvulsant, Antiaggresion

INTRODUCTION

Brain ischemia induces the release of excitatory amino acids, with subsequent receptor activation leading to metabolic and electrophysiological dysfunction, along with oxidative stress (including lipid peroxidation).[1] Subsequent reperfusion worsens this oxidative stress, potentiating ischemic injury.[2] Many plants have been reported to be effective against CNS disorders and thus providing opportunity to evaluate ethno pharmacologically potential medicinal plants against neurological disorders.[3,4] *Annona squamosa* Linn (*Annonaceae*), which is popularly known as Custard Apple, has been cultivated all over India. It is traditionally used as an abortifacient, for the treatment of cardiac problems, constipation, dysentery, dysuria, fever, fainting, hemorrhage,

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3

Formulation, Characterization And Evaluation Of Topical Biodegradable Film Loaded With Levofloxacin Solid-Lipid Nano Carriers

pdf (https://www.nveo.org/index.php/journal/article/view/4783/3873)

Ashish Bababrao Roge , Sagar Nareshrao Firke , Shriniwas Keshavrao Sarje , Kunal Vilasrao Bhambar , Alesh Kasliwal

Abstract

The major goal of this research was to develop a levofloxacin loaded solid lipid nanoparticles and formulate the topical biodegradable film of that nanoparticles and assess its prospects as a topical drug delivery system. The films were created utilising a solvent casting method using varied quantities of ethyl cellulose, hydroxypropyl methylcellulose K4M, hydroxypropyl methylcellulose, eudragit L-100, and Chitosan coalescence, as well as dibutyl phthalate as a plasticizer. The films were assessed for weight variation, thickness, percent moisture absorption, percentage moisture loss, folding endurance, percentage swelling index, percentage elongation, as well as an in vitro drug release study and an ex-vivo permeation investigation. The F5 formulation was discovered to be superior in terms of film. As a result, it was investigated as an optimum formulation. When compared to another formulation, the in-vitro drug release analysis shows that the F5 formulation had the highest drug release (91.34 percent) at the end of 8 hours.

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Research Article

FORMULATION AND CHARACTERIZATION OF POLYHERBAL TOPICAL CREAM

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ABSTRACT

Herbal plants and their combination report therapeutic as well synergistic effect that has been recognized in medicine. So, taking into account this factor, polyherbal topical cream formulation was prepared by using plant extracts, to improve patient compliance, enhance antimicrobial spectrum and enhance aesthetic properties. The objective of this study was to formulate and evaluate topical polyherbal cream for the delivery of the active constituents present in plants to improve skin diseases. The plant extracts of *Ocimum sanctum* (OS), *Rubia cordifolia* (RC) and *Glycyrrhiza glabra* (GG) were utilized for the preparation of cream. The formulated cream was subjected to different evaluation parameters and the results depicted that the spreadability of the formulation was low (17.80±1.10g. cm/sec) and this low value of spreadability coefficient was sufficient suggesting easy spreading and no signs of grittiness. In rheological studies, all the cream formulations also exhibited the same non-Newtonian behavior. Polyherbal topical cream showed potential antimicrobial activity against all selected microorganisms. Polyherbal topical cream (PHC5) was ideal in terms of viscosity than other formulations and showed good drug release. Thus, the formulated polyherbal cream was found to be stable in terms of all physicochemical properties.

Keywords: *Ocimum sanctum, Rubia cordifolia, Glycyrrhiza glabra,* topical cream, Polyherbal cream.

1. INTRODUCTION

In the present era, the use of herbal cosmeceuticals is rapidly increasing. As these possess varied properties in terms of availability of the natural resources, development of successful products and preparation of good quality, these are the potentials in the market [1]. Cosmetics are those products that are applied on the body for the purpose of cleansing, beautifying or altering appearance and enhancing the beauty. For most of the skin conditions, creams are used, for their various benefits they possess [2]. Human skin is the major organ of the body that is acts as a defense mechanism against most of the disorders. The basic three layers of skin include epidermis, dermis and the hypodermis. These layers of skin have specific properties and role that make them to act as a barrier against foreign material to enter the body, through skin [3]. The function of skin is to protect the underlying muscles, ligaments, internal organs etc. [4]. It also interfaces with environment, to protect against pathogens, with loss of excessive water [5, 6]. The other functions of skin include regulation of temperature, insulation, sensation, synthesis and storage of Vitamin D against UV, water resistance etc. [7]. So, the present study is aimed to prepare a polyherbal topical cream useful in the management of various skin diseases, by use of extracts of *Ocimum sanctum (OS), Rubia cordifolia (RC), Glycyrrhiza glabra (GG).*

2. MATERIAL AND METHODS

2.1. Material

Ocimum sanctum, Rubia cordifolia, Glycyrrhiza glabra, were procured from local market and authenticated.

2.2. Methods

The extraction of collected plant materials was carried out using established methods. The part of individual plant was selected, cleaned and powdered to get crude drug. To obtain non polar extracts, the air-dried coarse powders of *Ocimum sanctum, Rubia cordifolia* and *Glycyrrhiza glabra* were extracted separately by Soxhlet extraction process using petroleum ether and chloroform. These extracts were further successively extracted with respective polar extracts hydroalcoholic (60:40) solution. The extracts were then concentrated to dryness under reduced pressure and controlled temperature, respectively and they were preserved in a refrigerator for further study. The extracts obtained were filtered, evaporated to dryness to yield semi solid paste and preserved in refrigerator for further study [8]

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Short Communication

Solid State Characterization and Dissolution Enhancement of Nevirapine Cocrystals

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Keywords:
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Abstract

Purpose: Novel cocrystals of nevirapine (NP) were designed and prepared with salicylamide and 3-hydroxy benzoic acid (3-HBA).

Methods: The cocrystals were prepared by solvent drop grinding method by adding few drops of acetone to enhance the solubility and dissolution. The drug and cocrystals were characterized by differential scanning calorimetry (DSC) and powder x-ray diffraction (PXRD). The solubility of NP, its wet ground form, and cocrystals were investigated at different pH. Moreover, the effect of surfactant on solubility of cocrystals was also studied. Finally, intrinsic dissolution rate (IDR) and stability of cocrystals was examined.

Results: The characterization of cocrystals by DSC and PXRD revealed formation of new solid forms due to changes in thermogram and PXRD pattern. The cocrystal of NP with 3-HBA showed 4.5 folds greater solubility in pH 1.2 buffer and 5.5 folds in 1% Tween 80 as compared to original drug. IDR of cocrystals was higher than the pure drug in 0.1 N hydrochloric acid (HCl). Moreover, cocrystals were found physically stable after 3 months as evident from unchanged IDR.

Conclusion: Hence, the present research indicates the new stable solid forms of NP with improved dissolution rate than pure drug.

Introduction

The significance of solubility and dissolution rate of drugs has been explicitly understood for the *in vivo* performance of the drug and/or drug product.[1] Several approaches have been used to improve solubility and dissolution like micronization, solid dispersion, solubilisation, etc.[2] However, pharmaceutical cocrystals have attracted enormous attention from the pharmaceutical industry owing to commercial potential and ability to modulate solubility, dissolution, stability, pharmacokinetics, etc. of drugs. Further, the entry of the Food and Drug Administration (FDA) approved cocrystal products in the market and their presence in clinical trials pipeline provided an impetus to cocrystal research in the academia and pharmaceutical industry.[3,4] Moreover, it provides an opportunity to industry for filing patents related to new solid forms and launches old drugs in new forms extending the life cycle. The potential of cocrystals to modulate solubility is the biggest benefit as it is indispensable for the performance of the drug *in vivo*. Cocrystallization has been endorsed as an approach to tailor the solubility and/or dissolution rate of drugs. The most widely accepted definition of cocrystal is 'cocrystals are solids that are crystalline single-phase materials composed of two or more different molecular and/or ionic compounds generally in a stoichiometric ratio which are neither solvates nor simple salts'.[5] The chief hypothesis cited in the literature for enhanced solubility and dissolution is the altered structure of the drug and weak bonds involved in the cocrystal.[6]

Nevirapine (NP) is a BCS class-II non-nucleoside reverse transcriptase drug having inadequate aqueous solubility of 0.1 mg/mL and high permeability (Log P 2.5). NP (pKa 2.8), at higher doses exhibit solubility limited absorption with low bioavailability.[7,8] It is possible to prepare novel solid forms of NP with greater therapeutic efficacy and commercial value via cocrystallization. The various cocrystals of NP with amides, carboxylic acid, amino acids have been reported possessing enhanced solubility and dissolution.[9] However, cocrystals of NP with salicylamide and 3-hydroxy benzoic acid (3-HBA) have not been reported till date. Besides, NP contains an amide group which could be the probable site for the preparation of cocrystals with selected coformers. Scheme 1 shows the structure of NP and coformers. Moreover, H-bonding functionalities in the NP could form cocrystal through the supramolecular synthon approach.[10] This research was undertaken to check the feasibility of amide/

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ORIGINAL ARTICLE

Quantitation of Vitamin C from Marketed Chyawanprash Using UV Spectrophotometer

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ABSTRACT Chyawanprash (CP) is an antioxidant paste created by blending around 50 herbs and spices in a synergistic fashion. It contains Vitamin C as a key ingredient. All of the substances are mixed in precise proportions and exposed to unique pharmaceutical techniques to develop products with the greatest health benefit. In the pharmaceutical sector, however, noncompliance with normal manufacturing processes is a typical blunder. It made it essential to test the products' quality before releasing them for sale. The content of a product's primary ingredient, i.e., Vitamin C ensures quality of Chyawanprash. In this study, a rapid and simple UV spectrophotometric method was developed for quantitation of Vitamin C from a few marketed Chyawanprash. Buffer and sodium oxalate solution were employed to keep the pH acidic and prevent Vitamin C oxidation in aqueous media. The absorption was measured at 266 nm. The response was found to be linear over 2.5-12 µg/mL with r^2 value 0. 998. The proposed method was also found to be specific, precise, accurate, and linear, and it was effectively used to estimate Vitamin C from commercially available Chyawanprash.

Keywords: Chyawanprash, Vitamin C, Noncompliance, Sodium oxalate, UV spectrophotometer

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INTRODUCTION

According to Ayurvedic Pharmacopeial Index (API), Chyawanprash is a traditional Indian polyherbal formulation with a semisolid and sticky in nature.[1] Chyawanprash is classified as Rasayana in Ayurvedic texts, and its main purpose is to maintain the body's integrity in order to delay the ageing process, improve longevity, and improve digestion.[2] It is the primary source of health care for respiratory tract disorders such as bronchial spasms, cough, asthmatic breathing, and tuberculosis. It can also be used as an immunomodulator and memory booster.[3] Formulation composes of more than 50 medicinal plants ingredients such as AmLaki (*Emblica officinalis*), Bilva (*Aegle marmelos*), Agnimantha (*Premna Integrifolia*), Syonak (*Oroxylum indicum*), Kasmari (*Gmelina arborea*), Patala (*Stereospermum suaveolens*), Bala (*Sida cordifolia*), Salaparni (*Desmodium gangeticum*), Prsniparni (*Uraria picta*), Mudgaparni (*Phaseolus trilobus*), Mashaparni (*Teramnus labialis*), Pippali (*Piper longum*), Goksura (*Tribulus terrestris*), Brhati (*Solanum indicum*), kantakari (*Solanum surattense*), Sangi (*Pistacia integerrima*), Bhumyamalaki (*Phyllanthus amarus*), Draksha (*Vitis vinifera*), Jeevanti (*Leptadenia reticulate*), Puskaramul (*Inula racemosa*), Agaru (*Aquilaria agallocha*), Haritaki (*Terminalia chebula*), Guduchi (*Tinospora cordifolia*), Rddhi (*Habenaria intermedia*), Jivaka (*Malaxis acuminate*), Rsabhaka (*Malaxis muscifera*), Sati (*Hedychium spicatum*), Mustak (*Cyperus rotundus*), Punarnava (*Boerhaavia diffusa*), Meda (*Polygonatum cirrhifolium*), Ela (*Elettaria cardamomum*), Candan (*Santalum album*), Utpala (*Nymphaea stellata*), Vidari (*Pueraria tuberose*), Vrsamula (*Adhatoda vasica*), Kakoli (*Lilium polyphyllum*) and Kakanasika (*Maytynia annua*) in various amounts.[4]

One of the main active ingredients (35%) of Chyawanprash is Amla (*Emblica officinalis*) a richest source of Vitamin C a

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Evaluation of Mast Cell Stabilizing, Anti-Inflammatory, and Anti-Oxidant Activity of Seed Extracts of *Saraca Asoka* (Roxb.), De. Wild

M. H. Ghante, C. P. Rathod*

Abstract

Saraca Asoka (Caesalpiniaceae) is a medicinal plant used traditionally for the treatment of various diseases. There is no scientific evidence for the anti-asthmatic activity of *Saraca Asoka*. Preliminary phytochemical screening of extract has revealed the presence various phytochemical components such as flavonoids, tannins, saponins, carbohydrates, phenols, glycosides, and fixed oils and fats. However, no alkaloids, proteins and amino acids were found in the extracts. The present study was evaluated for phytochemical screening, mast cell stabilizing, anti-inflammatory, and antioxidant activity of the methanolic extract of *Saraca Asoka*. In the present study, DPPH radical scavenging activity was highest in methanol extract (94.5 % ± 1.8%) of *Saraca Asoka* seeds. The *in vivo* anti-inflammatory activity was evaluated in rats using carrageenan-induced paw edema and *in vitro* antioxidant activity was performed by 1, 1-diphenyl-2-picryl-hydrazyl (DPPH) and ABTS. Quantitative estimation of total polyphenolic content of the (SA-ME) was estimated by Folin-Ciocalteu method. SA-ME (200 mg/kg body wt.) significantly decreased paw volume, after oral administration of SA-ME in carrageenan and formaldehyde injection. SA-ME also exhibit significant antioxidant activity. Total polyphenolic content was found to be (179 ± 0.27 mg/ml) and exhibited highest flavonoid content (8.42 ± 0.25 mg/ml). These results show that the methanol extract of *Saraca Asoka* seeds shows potential mast cell stabilizing, anti-inflammatory and anti-oxidant activity.

Keywords: Anti-inflammatory activity, Antioxidant, Mast cell stabilizer, *Saraca asoka*

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Introduction

Asthma is a chronic inflammatory disorder of the airways mainly associated with variable (usually reversible) airflow obstruction and enhanced bronchial hyper responsiveness to a variety of stimuli. During an asthmatic attack, the lining of the airways become swollen and muscles surrounding the airways become narrower. As a result, the inside of the airways become narrower, hence breathing becomes difficult.[1]

The prevalence of asthma worldwide is around 200 million with a mortality of around 0.2 million per year. Studies have indicated that asthma has increased by almost 7% during the last three decades in most countries including India. The estimated burden of asthma in India is more than 15 million.[2]

The current pharmacotherapy contains bronchodilators, anti-inflammatory agents, mast cell stabilizers, leukotriene modifiers, IgE antibody, etc. The limitations of current therapies are that, they may not produce complete cure and may not prevent all complications of bronchial asthma. Even though, these synthetic drugs are used, these are not completely safe especially for long term use and are associated with a number of serious side effects such as renal failure, liver failure, skeletal muscle tremor, hypokalemia, intense irritability, compromised immune system, and sustained high blood pressure. This has diverted the researchers toward the potential of medicinal plants and its herbal formulations claimed in the traditional systems of medicines like Ayurveda, these therapies can be successfully integrated with conventional therapy to provide maximal benefits to patients.[3]

Almost all parts such as bark, flowers, and seeds of *Saraca Asoka* are considered therapeutically valuable due to the presence of secondary metabolites such as alkaloids, terpenoids, flavonoids, steroids, glycosides, anthraquinones, phenolics, tannins, saponins, and other phytochemicals.[4]

Silver nanoparticles (AgNPs) using the extract of *Saraca Asoka* leaves have synthesized and evaluated and the extract of this leaves has been used as an antimicrobial agent.[5]

Asthma is an inflammatory disease of the lungs characterized by increased infiltration of leukocytes, especially eosinophil's, into the airways, and reduced respiratory function. The inflammation leads to bronchoconstriction, increased airway hyper-responsiveness, and mucus production.[6-10]

Pharmacognostic study, physiochemical analysis, toxicity assessment, and evaluated and the extracts of this seeds have been used as an antipyretic activity.[11]

In the present study was evaluated for phytochemical screening, mast cell stabilizing, anti-inflammatory, and antioxidant activity of the methanolic extract of *Saraca Asoka* for antiasthmatic potential has been carried out.

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Antiatherosclerotic Activity of Methanolic Extract of *Woodfordia fructicosa* Flowers

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

In the present investigation the methanolic extract of *Woodfordia fructicosa* flowers at the doses of 100, 200 and 400 mg/kg was investigated for antiatherosclerotic against high fat diet induced atherosclerosis and triton induced atherosclerosis. In high fat diet induced atherosclerosis several parameters of lipid profile such as total cholesterol (TC) and triglycerides (TG), lipoprotein profile such as low density lipoprotein cholesterol (LDLc), very low density lipoprotein cholesterol (VLDLc) and high density lipoprotein cholesterol (HDLc), atherosclerotic markers such as alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP), lactate dehydrogenase (LDH) and creatine phosphokinase (CPK) and atherogenic index parameters such as TC/HDLc, LDLc/HDLc were determined and found to significantly altered in induction control group treated with high fat diet. The histopathological studies of liver and heart tissue were also performed wherein high fat diet showed toxic effects on cardiac and hepatic tissue. Similarly, in triton induced atherosclerosis parameters of lipid profile such as total cholesterol, triglycerides, low density lipoprotein and very low density lipoprotein levels were determined and were found to be significantly increased in induction control group. methanolic extract of *Woodfordia fructicosa* flowers showed protection against the atherosclerosis by bringing back the altered parameters to normal l both the models and showing ameliorating effects against high fat diet induced hepatic and cardiac damage. The multistep putative action of methanolic extract of flowers of *Woodfordia fructicosa* is attributed to the prominent phytoconstituents namely ellagic acid estimated through HPTLC analysis of the extract. Thus the study exhibited the protective effect of methanolic extract of flowers of *Woodfordia fructicosa* against atherosclerosis.

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Cardioprotective Activity of *Randia Dumetorum* against Doxorubicin Induced Cardiotoxicity

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In the present investigation the cardioprotective activity of ethanolic extract of Randia dumetorum fruits at the doses of 100, 200 and 400 mg/kg was investigated against doxorubicin induced cardiotoxicity model. In high fat diet induced atherosclerosis several heamodynamic parameters such as systolic and diastolic blood pressure, serum parameters such as lactate dehydrogenase (LDH), tissue parameters such as superoxide dismutase (SOD), reduced glutathione (GSH), and malonaldehyde (MDA) were determined and found to be significantly altered in induction control group treated with doxorubicin. The histopathological studies of cardiac tissue were also performed wherein doxorubicin showed toxic effects on tissue. Ethanolic extract of Randia dumetorum fruits showed protection against doxorubicin induced cardiotoxicity by normalizing the altered parameters and producing ameliorating effects against doxorubicin induced cardiac damage. The multistep putative action of ethanolic extract of Randia dumetorum fruits may be attributed to the prominent phytoconstituent namely 2-(3,5-dihydroxyphenyl)-3,4-dihydro-2H-chromene-3,5,7-triol estimated through HPTLC analysis of the extract. Thus, the study exhibited the protective effect of ethanolic extract of Randia dumetorum fruits against doxorubicin induced cardiotoxicity.

Keywords: Cardiotoxicity; Doxorubicin: lactate dehydrogenase (LDH); Randia dumetorum; superoxide dismutase (SOD).

The term cardiovascular disease (CVD) represents a broad range of diseases including heart disease, stroke, hypertension, hyperlipidemia, thromboembolism, coronary heart disease, congestive heart failure (CHF), hardening of the arteries, other circulatory system diseases etc. The published reports state that cardiovascular diseases are currently the leading cause of death especially in industrialized countries.[1] In addition to mortality, poorly managed CVD can lead to significant long-term disability from the complications of heart attacks, strokes, heart failure, and end-stage renal disease. CVD has become serious public health issue and hence requires greater attention to promote adequate awareness and treatment, both to health care providers and to the public. The growth of CVD in India further indicates that certain conditions like complicated hyperlipidemia, drug induced cardiotoxicity, atherosclerosis hasten the progress of disease and can cause various complications.[2]

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Synthesis and biological evaluation of 3, 4 - dihydropyrimidines thiones derivatives

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***Abstract*—**3, 4-dihydropyrimidin-2(1H)-thiones, derivatives were synthesized by one pot solvent free green modified Biginelli cyclocondensation reaction catalyzed by triphenylphosphine as Lewis base. The structures of the synthesized compounds have been elucidated by IR, 1H NMR and elemental analysis. Synthesized compounds were screened for their antimicrobial screened against the *E.coli* and staphylococcus aureus, Salmonella typhi, *Bacillus subtilis, Escherichia coli* and antifungal activity against *Aspergillus niger, Penecillium crysogenum, Aspergillus flavus,* and *Candida albicans.*

***Keywords*—**Dihydropyrimidines, Biginelli, synthesis, antimicrobial, antifungal.

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Formulation and Evaluation of Chitosan Based Polyelectrolyte Complex of Levodopa for Nasal Drug Delivery

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***Abstract*—**Because chitosan is biodegradable, biocompatible, non-toxic, and mucoadhesive, it is commonly used in the formulation of nasal drug delivery nanoparticles employing polyelectrolyte complexes. However, chitosan's lower solubility in aqueous and alkaline conditions limits its use in the pharmaceutical and biomedical fields. This needs the development of improved chemically altered chitosan mimics that can overcome the solubility barrier. Although Levodopa is an alternative in the treatment of Parkinson's disease, it has a low oral bioavailability and very low brain absorption due to its extensive degradation by aromatic amino acid decarboxylase in the peripheral

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Development and modification of the tragacanth solid lipid nanoparticles with natural polymer

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***Abstract*—**Nanobiocomposite recycling is straightforward because nanofillers' physical properties do not modify throughout processing because of their considerable thermal stability. Additionally, the low nanofiller loading has no notable effect on the density of nanobiocomposite during an elevated appearance ratio, designate that nanobiocomposite has a very elevated prospective for use. Under mild situation, we present an easy technique for fabricating silver nanoparticles spontaneously in the presence of gum tragacanth polymer (a natural polymer) without the use of a conventional reducing agent. Silver nanoparticles were formulated by mixing equal

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Review on Medical Applications of Titanium Dioxide Nanoparticles

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ABSTRACT

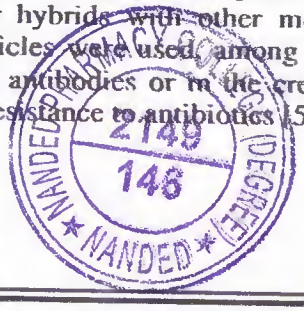
Metal oxide nanoparticles (NPs) with liposomes, micelles, quantum dots, dendrimers or fullerenes, metals, and titania NPS are among the polymer NPs currently being produced. It has the potential to be used in medical treatment. It is gaining a growing amount of attention. Titanium dioxide (titanium oxide (IV), titanium oxide, TiO2) is an inorganic molecule whose photoactivity has sparked contemporary scientific attention. TiO2 produces a range of reactive oxygen species when exposed to ultraviolet light in an aqueous media (ROS). Photodynamic treatment (PDT) uses the ability to generate ROS and trigger cell death to treat a wide range of disorders, from psoriasis to cancer. The use of titanium dioxide NP as a photosensitizer in the treatment of malignant tumors and the photodynamic inactivation of antibiotic-resistant bacteria has been investigated. Both TiO2 NP and its composites, as well as other compounds and biomolecules, can be employed as photosensitizers for PDT with success.

Keywords: Titanium dioxide, composite material, nanoparticles, photodynamic treatment, Photosensitizer etc.

INTRODUCTION

In recent years, photodynamic treatment (PDT) has undergone rapid growth. Look for new photosensitizers and media that can be used to administer them. The combination of dyes and nanoparticles (NPS) is one of the many potential ways for photodynamic research that has resulted in increased photosensitizer (PS) selectivity and/or therapeutic impact. Field of paddy. To begin, it's important to understand that NP refers to a certain sort of particle with a size of 1100 nm (including the surrounding boundary layer). "A nano item having all threenanoscale exterior dimensions, and no substantial difference between its longest and shortest axis," according to ISO technical specification 8004[1,2].

Studies on titanium dioxide (also known as titanium (IV) oxide, titania, or TiO2)nanoparticles, which fall under the category of metallic NPs, are discussed in the current study. Notably, this work was motivated by an evaluation of current TiO2 functionalization techniques as well as the biological and medicinal impacts of these NPs. Early in the 20th century, TiO2 was mass-produced as a non-toxic alternative to a white paint colour.Today, more than four million tonnes of TiO2 are produced annually, and this molecule is used in a wide range of everyday products as an excipient in the pharmaceutical industry, a colourant in white plastics, a sun cream excipient in the cosmetics industry, and as a relatively inexpensive and nontoxic food pigment that has been approved by the relevant European Union authorities for the safety of food additives [3]. When one of the earliest papers on the topic of photocatalytic disinfection was published in 1985, research on the potential uses of TiO2 NPs began [4].Since then, TiO2 NPs have been increasingly used in research on photodynamic treatment. It relates to the photodynamic inactivation of antibiotic- resistant bacteria and the use of TiO2 NPs as photosensitizing agents in the treatment of cancer. TiO2 NPs were effectively investigated as photosensitizers in photodynamic therapy, both by themselves and in composites, combinations, or hybrids with other molecules.In order to treat cancerous tumours, titanium (IV) oxide nanoparticles were used, among other things, in the synthesis of bioconjugates with cell-specific monoclonal antibodies or in the creation of black TiO2 NPs for the treatment of bacteria that have developed resistance to antibiotics [5,6].



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Development, Validation of RP-HPLC Method and GC MS Analysis of Desloratadine HCL and It's Degradation Products

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ABSTRACT

Introduction: Efficacy and safety of drug therapy is directly related to the stability of active pharmaceutical ingredient (API) and drug product used. Forced degradation studies (also called stress testing) are performed for better understanding of API and drug product stability. Thus, stress testing is a prognostic research tool used to ascertain stability of drug molecule and provide support for developing stability indicating method.

Aim: The research aim is Development, Validation of RP-HPLC Method and GC MS Analysis of Desloratadine HCL and its Degradation Products.

Objective: The objective of current study was to develop validated specific stability indicating reversed-phase liquid chromatographic method for the quantitative determination of Desloratadine HCl in bulk sample in the presence of degradation products.

Method: Desloratadine HCL was subjected to variable pH, oxidative, dry heat and photolytic stress condition as per ICH guideline for stability study. Stressed samples were further studied by validated RP-HPLC method and also studied by GC-MS to characterise degradation products (Fig 15).

Result: At oxidative stress, degradation products were generated and detected by GCMS. Slight degradation was observed in acidic and alkaline stress while no degradation was observed in other stress conditions. Separation of degradation products from pure drug was achieved on C18 column 5µ (4.6 X 250 mm) using the mobile phase consists a mixture of Orthophosphoric acid (0.1%V/V), Acetonitrile and Methanol (50:35:15 V/V/V). The detection was carried out at 242 nm. The proposed validated LC method was used to quantify the stressed test solutions in order to ascertain stability indicating potential of the method.

Conclusion: The established LC approach has been shown to be suitable for determining the quality of Desloratadine HCl from its dosage form and assessing its stability when required.

Key Words: Reversed-Phase Liquid Chromatographic Method, Validation, Stability study, Gas Chromatography and Mass Spectrometry (GCMS), Orthosphosphoric acid

INTRODUCTION

8-chloro-6, 11-dihydro-11-(4-piperdinylidene)-5*H*-benzo [5,6] cyclohepta[1,2-b]pyridine Desloratadine (DSLR) is a tricyclic antihistamine, an antagonist at histamine H1 receptors, and at all subtypes of the muscarinic acetylcholine receptor. It is originally used for the treatment of allergies and allergic rhinitis. [1,2]

It is reported that Desloratadine exhibit antihistaminic activity and anti-inflammatory activity.[1]Desloratadine impedes release of proinflammatory cytokines, such as the interleukin (IL) 6 and IL-8.

It has a long-lasting effect and in moderate and low doses, does not cause drowsiness as it does not readily enter the central nervous system.[3] It is demonstrated that Desloratadine has no adverse effects on the central nervous system,

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