



**GOA – CENTER FOR EXCELLENCE
IN INTELLECTUAL PROPERTY**

in association with

GOA COLLEGE OF PHARMACY



10th Annual International Conference on IPR

DEVELOPED INDIA
(विकसित भारत २०४७) : Role of IPR !!

Nov. 04-05, 2025

G-CEIP

Venue: National Institute of Oceanography (NIO), Dona- Paula, Panaji, Goa

ABOUT G-CEIP

India is yet to recognize the full potential of the Intellectual Property Rights (IPR) in all its dimensions – prosecution, preservation and protection. Based on this motivation the **Goa – Center for Excellence in Intellectual Property [GCEIP]** in association with **Goa College of Pharmacy [GCP]** was founded in 2016. The Center – *first of its kind in India, and perhaps globally* – has the sole purpose of serving the nation to promote innovation in all disciplines and in all contexts of IPR. The Center focuses on addressing the immediate need(s) relating to IP considerations with an appropriate balance of academic training, continuous updating and upgradation of knowledgebase in IP matters and providing IP services to academia and industry in India as well as globally.

GCEIP is currently housed in the prestigious, Goa College of Pharmacy (GCP), 18th June Road, Panaji- Goa, INDIA. The GCEIP, an initiative to spread the knowledge and enhance the awareness of IPR nationally was mooted by Dr. Umesh Banakar - an eminent alumnus of GCP - is Professor and President of Banakar Consulting Services, Westfield, Indiana, USA.

VISION:

RECOGNIZE AND PROTECT SCIENTIFIC DISCOVERY WITH THE RIGHTS IT DESERVES

MISSION:

Provide professional services with the highest quality and integrity to scientific community in recognizing and protecting scientific discovery through intellectual property rights at the highest level that it deserves globally.

OBJECTIVES:

The Objectives of G-CEIP, aligned with its Vision and Mission, will focus on an appropriate balance of:

- **academic advancement (programs)** through Professional Advancement Programs,
- **continuous update and upgradation** of knowledgebase in IP matters through various formats, and
- **provide IP services** to the industry in India with an objective to provide such services globally.

DEVELOPED INDIA
(विकसित भारत २०४७) : Role of IPR !!

The GCEIP is registered with the Office of the District Registrar, North & Inspector General of Societies, Panaji, Goa, INDIA. The Intellectual Property, India, Controller General of Patent, Design and Trade Marks, Government of India granted Trade Mark - in 2025. **This has come during this auspicious year as we celebrate the tenth glorious year of GCEIP as a milestone event on the continuing journey to fulfil its mission.**



The Trade Mark symbolises the mission of GCEIP - **enhancing IP awareness nationally, one institution at a time !** Till date, the Center has successfully reached out to 23 states and 1 union territory spreading and enhancing IP awareness nationally.

GCEIP continuously strives to increase the awareness of IP in India. In keeping with this perspective, GCEIP focuses on addressing the immediate need(s) concerning IP considerations with an appropriate balance of academic training, continuous updating and upgradation of knowledgebase in IP matters and providing IP services to the industry and academia in India with an objective to provide such services globally.

TITLE: FORMULATION AND EVALUATION OF SODIUM HYALURONATE-TRIPHALA OPHTHALMIC SOLUTION FOR THE TREATMENT OF COMPUTER VISION SYNDROME



AUTHORS: __MR HRITHIK. SATISH. REVANKAR,

DR. SHILPA P. BHILEGAONKAR

DEPARTMENT: DEPT OF PHARMACEUTICS

COLLEGE ADDRESS: PES RTBCOP FARMAGUDI PONDA GOA

CORRESPONDING AUTHOR EMAIL ID: hrithikrevankar2000@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Computer vision syndrome is an eye condition seen in patients who are exposed to prolonged usage of screen and other such gadgets. The condition however goes undiagnosed in most cases as the symptoms are mostly common like eye irritation, dryness of the eye, red eyes and are treated symptomatically ignoring the necessity to treat the light induced ocular damage. Symptomatic treatments are available in allopathy and in Ayurveda however each treatment has its own limitations. Through this research, attempts were made to bypass the flaws available in the current treatment methodologies. A new concept of amalgamating Allopathic and Ayurvedic treatment of approach was utilized and a more specific dosage form was developed which focused on enhanced therapeutic output, patient compliant and ease of manufacturing and commercialization. The research involved development and evaluation of ophthalmic solution using Sodium hyaluronate and aqueous extract of Triphala for the prophylaxis of acute conditions of CVS. The developed dosage forms were evaluated for their physicochemical characteristics and physical stability. Pharmacological evaluation is also performed to confirm its therapeutic ability and efficiency. In order to obtain its permeation behavior in ocular region *in-vitro* permeation study was conducted on the dosage form using Franz diffusion cell. The research concludes with histological analysis to visualize the impact of the developed dosage form on the biological tissues of goat cornea which are used as reference for human cornea which proved the effectiveness of the developed dosage form in prophylaxis of UV induced ocular damage.

KEYWORDS: Computer vision syndrome (CVS), Sodium hyaluronate, Triphala, Vitreo-retinal disease, Cornea, Ocular damage, Screen



TITLE: SPANLASTIC LOADED IN-SITU GEL AS A PROMISING APPROACH FOR OCULAR DELIVERY OF MOXIFLOXACIN HYDROCHLORIDE

AUTHORS: Keshav Shetgaonkar / Rajashree Gude *, Onaswi Mulvi

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Goa College Of Pharmacy, Panaji Goa

CORRESPONDING AUTHOR EMAIL ID: kshetgaonkar11@gmail.com / rgude69@gmail.com

ABSTRACT:

Moxifloxacin HCl, a third-generation fluoroquinolone, is widely used to treat bacterial eye infections. A major drawback of conventional ocular drug delivery systems is the rapid drug loss due to precorneal constraints such as tear dilution, blinking, and nasolacrimal drainage. Spanlastics loaded in-situ gel offers advantages that overcome these limitations. The study aimed to formulate Moxifloxacin HCl (MXF) spanlastics and incorporate them into an in-situ gel base to sustain drug release. Ethanol-injection method was used to prepare spanlastics with varying concentrations of span 60 and edge activator. MXF spanlastics were evaluated for particle size, polydispersity index, entrapment efficiency, and zeta potential to identify the optimum formulation. The optimised formulation underwent FTIR and XRD studies, confirming complete encapsulation of MXF within spanlastic vesicles. In-vitro release studies showed sustained drug release from the optimised formulation. For the in-situ gel base, different concentrations of gelrite solution were tested for gelling capacity, pH, and viscosity to select the best concentration. The optimised MXF-spanlastics formulation was incorporated into the in-situ gel base and further evaluated. The MXF spanlastics-loaded in-situ gel demonstrated sustained in-vitro drug release of 80% at 24 h. Ex-vivo permeation studies using goat cornea showed similar extended-release results at 24 h. Findings indicate that MXF spanlastics-loaded in-situ gel has the potential to provide sustained drug release, thereby improving bioavailability and patient compliance.

KEYWORDS: Moxifloxacin HCl, Spanlastics, In-situ gel.



TITLE: FORMULATION AND EVALUATION OF NIOSOMAL *IN-SITU* NASAL GEL OF BCS CLASS III DRUG

AUTHORS: Raunak Rai/ Dr. Rajashree Gude*, Vishal Mudakekar

DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: Department of Pharmaceutics, Goa College of Pharmacy, 18th June Road, Panaji – 403001, Goa, India

CORRESPONDING AUTHOR EMAIL ID: raunakrai7r@gmail.com / rgude69@gmail.com

ABSTRACT

Baclofen, GABA receptor agonist, is primarily indicated for spasticity associated with sclerosis and spinal cord disorders. Despite high oral bioavailability (80%), clinical utility in central nervous system (CNS) disorders is limited by its poor permeability across blood–brain barrier (BBB), resulting in subtherapeutic brain concentrations and necessitating higher doses that increase risk of adverse effects. The study aimed to develop and evaluate Baclofen-loaded niosomal *in-situ* nasal gel to enhance brain targeting, bypassing first-pass metabolism and improving bioavailability.

Thin film hydration method was used, employing Span 60 and cholesterol. A 3² full factorial design was implemented to optimize formulation variables. The optimized niosomal formulation (V1) was incorporated into a thermosensitive *in-situ* nasal gel using Poloxamer 407 as the gelling agent and Carbopol 974 as the mucoadhesive polymer. The system was characterized for physicochemical parameters.

The niosomal formulation exhibited a particle size of 705.4 nm, zeta potential of –26.27 mV, and high entrapment efficiency (85%). TEM imaging had spherical vesicles. The gel displayed pH (5.84), thermoresponsive gelation at 32 °C, rapid gelling within 10 seconds, good viscosity (84 cP at 4 °C; 3768 cP at 32 °C). Spreadability (2375.82 mm²) and mucoadhesive strength (2090.65 dynes/cm²). *in vitro* studies showed sustained drug release (83.45% over 8 hours), while *ex vivo* permeation through goat nasal mucosa was significantly higher (84.32%) compared to Baclofen solution gel (63.48%). With no signs of mucosal irritation or damage.

The integration of niosomal vesicles with a mucoadhesive thermoresponsive gel presents a promising strategy for targeted nose-to-brain delivery of Baclofen.

KEYWORDS: Baclofen, Niosomes, Mucoadhesive *In-situ* Nasal Gel.



TITLE: DEVELOPMENT OF POLYMERIC MICELLES LOADED THERMOREVERSIBLE IN-SITU NASAL GEL FOR ANTIPSYCHOTIC DRUG

AUTHORS: Aarya Chimulker, Tanishka Dhavjekar, Nikita Parker Kapeel Gaonkar, Bothiraja Chellampillai

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Goa College Of Pharmacy, Panaji Goa

CORRESPONDING AUTHOR EMAIL ID: aaryachimulker14@gmail.com

ABSTRACT:

Amisulpride (AMS), a BCS Class II drug for schizophrenia, has low oral bioavailability (48%) due to pH-dependent solubility, P-glycoprotein efflux and first-pass metabolism. Intranasal delivery offers a promising alternative. In-situ nasal gels and polymeric micelles enhance drug stability, solubility and sustained release, improving CNS drug delivery.

Aim of the study was to develop and optimize Amisulpride loaded polymeric micelles thermoreversible *in-situ* nasal gel in order to increase the solubility, brain bioavailability and therapeutic efficacy. Polymeric micelles were prepared by Solvent evaporation technique. A 3² full factorial design was used to optimize the formulation by keeping the drug and poloxamer 188 as the two independent variables and particle size and entrapment efficiency as the two dependent variables. The batch T4 was optimized by considering particle size (177.8 nm) and entrapment efficiency (98.5 %).

AMS loaded Polymeric micelles thermosensitive *in-situ* gel was prepared using the cold method and showed the pH, T_{sol}-gel, gelling time, viscosity, spreadability, drug content and mucoadhesive strength of 5.62, 28°C, 32 sec, 119.66 cP, 2097.79 mm², 88.48% and 3851.528 dynes/cm² respectively. *In-vitro* diffusion study using Hi-media membrane showed a sustained release profile with 74.16 % release at 8 h. AMS loaded Polymeric micelles thermosensitive *in-situ* gel showed 2.22-fold improvement in flux (0.0526 mg/cm²/h) and permeability coefficient (5.069×10^{-3}) as compared to pure AMS-gel (flux 0.0237 mg/cm²/h and permeability coefficient 2.284×10^{-3}) in goat nasal mucosa. Thus, AMS-loaded thermosensitive nasal in-situ gel offers a promising alternative to conventional oral tablets for managing schizophrenia.

KEYWORDS: Schizophrenia, Amisulpride, In-situ nasal gel, Permeability coefficient

DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!



TITLE: DEVELOPMENT OF CRISABOROLE LOADED MICROSPONGE GEL FOR TOPICAL DELIVERY

**AUTHORS: Nikita Parker, Deepti Halarnekar, Aarya Chimulker,
Kapeel Gaonkar, Bothiraja Chellampillai**

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Goa College Of Pharmacy, Panaji, Goa-403001

CORRESPONDING AUTHOR EMAIL ID: nikitaparker02@gmail.com

ABSTRACT:

Crisaborole, a BCS Class II drug for atopic dermatitis, poses systemic absorption risks in ointment form. To enhance safety and efficacy, a microsp sponge-based topical gel was developed for sustained drug release and reduced systemic exposure.

Microsponges were prepared using three drug-to-polymer ratios (1:1, 1:1.5, 1:2). The 1:1.5 ratio was optimized with a practical yield of 164.5 mg, drug content of 65.96% and drug loading of 40.09%. DSC analysis confirmed a crystalline-to-amorphous transition, while SEM and microscopy revealed porous, spherical to irregular particles with an average size of 6995.2 nm, suitable for topical application.

The microsp sponge gel, formulated using Carbopol 934 and triethanolamine, showed ideal characteristics: pH 5.4–5.5, viscosity 4800–4900 cP, spreadability 5.1–5.3 cm, drug content 96.2% and drug loading 74.6%. Skin irritation tests confirmed it to be non-irritant, comparable to marketed products. In-vitro, the microsp sponge gel (CMG) released 79.91% of the drug over 8 hours, compared to 100% release from the plain gel and marketed ointment in 5 and 4 hours, respectively. Ex-vivo, CMG released 74.82% in 8 hours, showing zero-order and Higuchi kinetics, indicating sustained, diffusion-controlled release. The flux from CMG (0.046 mg/cm²/hr) was lower than that of the plain gel (0.0755) and ointment (0.0933), with a permeability coefficient of 5.54×10^{-3} cm/hr, supporting controlled drug delivery. Histopathological evaluation confirmed the safety of the formulation. Overall, the Crisaborole-loaded microsp sponge gel offers a safer, sustained and more effective treatment for atopic dermatitis.

KEYWORDS: Crisaborole, Microsp sponge, Sustained Release



TITLE: “DISPERSOME”: A NOVEL APPROACH TO INCREASE SOLUBILITY AND BIOAVAILABILITY OF BCS CLASS II AND IV DRUGS

AUTHORS: Kapeel Gaonkar/ Bothiraja Chellampillai*, Aarya Chimulker, Nikita Parker.

DEPARTMENT: Pharmaceutical Quality Assurance.

COLLEGE ADDRESS: Goa College Of Pharmacy, Panaji, Goa-403001

CORRESPONDING AUTHOR EMAIL ID: kapeelgaonkar@gmail.com

ABSTRACT:

The Biopharmaceutics Classification System (BCS) categorizes drugs based on aqueous solubility and intestinal permeability, aiding in the prediction of in-vivo drug performance. BCS Class II and IV drugs, characterized by low solubility, face significant challenges in oral bioavailability. Approximately 70-80% of new chemical entities exhibit poor water solubility, complicating formulation development and therapeutic efficacy. Conventional strategies such as particle size reduction, nanosuspensions, solid dispersions, co-crystallization and co-solvency have been employed to enhance dissolution. However, these methods often encounter limitations, including low drug loading, poor stability and solvent-related toxicity.

Dispersome technology, developed by Zerion Pharma, represents a novel approach to address poor solubility. This platform utilizes whey protein isolate (WPI), a biocompatible and sustainable by-product of cheese production, as a functional excipient in amorphous solid dispersions. WPI replaces traditional polymers, offering superior dissolution rates, enhanced bioavailability and improved physical stability. Whey proteins are rich in bioactive peptides, exhibit excellent solubility and are well-suited for pharmaceutical use. Advanced analytical techniques such as electrophoresis and chromatography support their characterization in drug formulations.

Dispersomes consist of the active pharmaceutical ingredient (API) molecularly dispersed within a whey protein matrix, enhancing drug loading and reducing dose frequency. This results in faster dissolution, more stable plasma concentrations and greater patient compliance. The technology also aligns with sustainability goals due to its reliance on dairy by-products. Future developments aim to optimize protein-drug interactions, scale-up processes and expand Dispersome applications across a broader range of poorly soluble drug candidates.

KEYWORDS: Biopharmaceutics Classification System, Solubility, Dispersomes, Whey protein isolate.



TITLE: FORMULATION AND EVALUATION OF ANTIFUNGAL CREAM OF TEA TREE OIL

AUTHORS: Sagar Singh / Rajashree Gude *, Kiranmao Kokkanti

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Goa College Of Pharmacy, Panaji Goa

CORRESPONDING AUTHOR EMAIL ID: sagarnpps@gmail.com / rgude69@gmail.com

ABSTRACT:

Tea tree oil, a natural essential oil derived from the leaves of *Melaleuca alternifolia*, exhibits potent antifungal, antibacterial, and anti-inflammatory properties. This study explores the formulation and evaluation of an antifungal cream incorporating tea tree oil as the active ingredient. The cream is designed to provide a topical, plant-based treatment option for fungal skin infections such as athlete's foot, ringworm, and candidiasis. Tea tree oil, rich in terpinen-4-ol and other active compounds, exhibits strong antifungal activity by disrupting fungal cell membranes and inhibiting spore germination. The cream is developed using a stable oil-in-water emulsion base to ensure optimal skin absorption and efficacy. In vitro antifungal testing demonstrated significant inhibitory activity of the formulation against common fungal pathogens such as *Candida albicans* and *Trichophyton rubrum*. The formulation also showed favourable physicochemical properties including homogeneity, spreadability, pH compatibility with skin, and stability under various storage conditions. Additionally, the cream underwent a skin irritation study using a rat model. No signs of erythema, edema, or allergic reactions were observed, indicating the formulation is non-irritant and safe for topical use. The study concludes that the tea tree oil-based antifungal cream is both effective and dermatologically safe, suggesting its potential as a natural alternative for the treatment of superficial fungal infection.

KEYWORDS: Tree Oil, Antifungal Cream

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025

TITLE: DEVELOPMENT AND CHARACTERISATION OF NATURAL POLYSACCHARIDE BASED MUCOADHESIVE BUCCAL PATCHES.



AUTHORS: MISS. SHIVSHRI TANAJI KALE.

DEPARTMENT: PHARMACEUTICS

COLLEGE ADDRESS: YASHWANTRAO BHONSALE COLLEGE OF PHARMACY, CHARATHE- 416510, TAL. -SAWANTWADI, DIST-SINDHUDURG

CORRESPONDING AUTHOR EMAIL ID: kshivshri@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

THIS PROJECT ABSTRACT DESCRIBES THE DEVELOPMENT OF MUCOADHESIVE BUCCAL PATCHES USING NATURAL POLYSACCHARIDES. THE GOAL OF THE RESEARCH WAS TO CREATE PATCHES THAT CAN STICK TO THE INSIDE OF THE CHEEK (BUCCAL MUCOSA) TO PROVIDE A SUSTAINED RELEASE OF MEDICATION, SPECIFICALLY ATENOLOL. THIS METHOD AIMS TO IMPROVE DRUG EFFECTIVENESS AND REDUCE HOW OFTEN A PATIENT NEEDS TO TAKE A DOSE.

NATURAL POLYSACCHARIDES WERE CHOSEN FOR THIS PROJECT BECAUSE THEY ARE BIOCOMPATIBLE AND BIODEGRADABLE. THE RESEARCHERS SYSTEMATICALLY TESTED DIFFERENT COMBINATIONS OF THESE POLYSACCHARIDES TO FIND THE BEST FORMULATION. THE PATCHES WERE OPTIMIZED FOR THEIR ADHESIVE STRENGTH, DRUG-HOLDING CAPACITY, AND RELEASE RATE. THEY WERE ALSO EXAMINED FOR THEIR MECHANICAL PROPERTIES, SURFACE TEXTURE, AND SWELLING BEHAVIOR.

THE RESULTS SHOWED THAT THE DEVELOPED PATCHES HAD EXCELLENT MUCOADHESIVE PROPERTIES, ENSURING THEY WOULD STAY IN PLACE AND RELEASE THE DRUG OVER A PROLONGED PERIOD. THE PATCHES ALSO HAD THE RIGHT MECHANICAL AND SURFACE CHARACTERISTICS FOR BUCCAL USE.

A KEY PART OF THE RESEARCH FOCUSED ON USING TAMARIND SEED POLYSACCHARIDE (TSP) AS A NATURAL POLYMER. THE STUDY OUTLINES A PLAN TO EXTRACT AND PURIFY TSP, THEN USE IT TO CREATE AND OPTIMIZE AN ATENOLOL BUCCAL PATCH. THE FINDINGS FROM THIS RESEARCH COULD BE HIGHLY BENEFICIAL FOR THE FIELD OF BUCCAL DRUG DELIVERY, ESPECIALLY FOR DRUGS LIKE ATENOLOL, BY IMPROVING THEIR BIOAVAILABILITY AND PATIENT COMPLIANCE.

KEYWORDS: MUCOADHESIVE BUCCAL PATCHES, TAMARIND SEED POLYSACCHARIDE, ATENOLOL

TITLE: “DEVELOPMENT AND CHARACTERIZATION OF NOVEL IN SITU GEL OF CLOTRIMAZOLE FOR ORAL CANDIDIASIS”



AUTHORS: MISS. ANUJA SHASHIKANT PARAB

DEPARTMENT: PHARMACEUTICS

COLLAGE ADDRESS: YASHWANTRAO BHONSALE COLLAGE
OF PHARMACY, CHARATHE- 416510, TAL- SAWANTWADI,
DIST - SINDHUDURG

CORRESPONDING AUTHOR EMAIL ID: anuja1542002@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

ORAL CANDIDIASIS IS A COMMON FUNGAL INFECTION OF THE ORAL MUCOSA, FREQUENTLY ASSOCIATED WITH IMMUNOCOMPROMISED CONDITIONS SUCH AS HIV/AIDS. CONVENTIONAL ANTIFUNGAL THERAPIES ARE OFTEN LIMITED BY POOR SOLUBILITY, SHORT RESIDENCE TIME AT THE INFECTION SITE, AND THE NEED FOR FREQUENT DOSING, WHICH MAY REDUCE PATIENT COMPLIANCE. TO ADDRESS THESE CHALLENGES, THE PRESENT STUDY WAS AIMED AT DEVELOPING A NOVEL IN-SITU ORAL GEL OF CLOTRIMAZOLE WITH ENHANCED RETENTION AND CONTROLLED DRUG RELEASE. CLOTRIMAZOLE, A POORLY WATER-SOLUBLE ANTIFUNGAL AGENT, WAS FORMULATED USING NATURAL POLYMER SUCH AS GUAR-GUM, SODIUM ALGINATE, AND HYDROXYPROPYL METHYLCELLULOSE (HPMC). THESE POLYMERS WERE SELECTED FOR THEIR MUCOADHESIVE AND GEL-FORMING PROPERTIES, ENABLING THE FORMULATION TO CONVERT INTO A GEL UPON CONTACT WITH ORAL CONDITIONS THE PREPARED GELS WERE EVALUATED FOR VISCOSITY, GEL STRENGTH, SPREADABILITY, AND STABILITY. COMPATIBILITY STUDIES USING FTIR AND DSC CONFIRMED NO SIGNIFICANT INTERACTION BETWEEN CLOTRIMAZOLE AND THE SELECTED POLYMERS.

THE OPTIMIZED FORMULATION DEMONSTRATED A SUSTAINED RELEASE PROFILE, WITH APPROXIMATELY 90% OF THE DRUG RELEASED WITHIN 8 HOURS, FOLLOWING FIRST-ORDER KINETICS. THE FORMULATION WAS STABLE UNDER ICH GUIDELINES AND WAS FOUND TO BE NON-IRRITANT. THESE RESULTS INDICATES THAT THE IN- SITU GEL SYSTEM PROVIDES PROLONGED RETENTION OF CLOTRIMAZOLE IN THE ORAL CAVITY, ENSURING EFFECTIVE ANTIFUNGAL ACTIVITY AND IMPROVED PATIENT COMPLIANCE.

IN CONCLUSION ,THE DEVELOPED MUCOADHESIVE IN-SITU GEL OF CLOTRIMAZOLE REPRESENT A PROMISING THERAPEUTIC APPROACH FOR THE EFFECTIVE MANAGEMENT OF ORAL CANDIDIASIS.

KEYWORDS: ORALCANDIDIASIS, CLOTRIMAZOLE, GUAR-GUM ,IN-SITU GEL, MUCOADHESIVE, SUSTAINED RELEASE,



TITLE: DEVELOPMENT OF QUERCETIN LOADED CHITOSAN POLYMERIC NANOPARTICLE IN-SITU GEL FOR ENDODONTIC TREATMENT

AUTHORS: Devesh Parsekar, Padmadip P. Phadte, Asmita Naik, Mythili Krishna Jeedigunta, Bothiraja Chellampillai, Supriya Hyam

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: Goa College of Pharmacy, 18 June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: jmythilikrishna@gmail.com

ABSTRACT:

Polymeric nanoparticles are novel drug-polymer coated carriers that have gained significant attention in pharmaceutical nanoscience and drug delivery. In this study, Quercetin-loaded Chitosan polymeric nanoparticles were synthesized using the ionic gelation dip injection method. These nanoparticles consist of Quercetin as the active drug and chitosan (90% deacetylated) as the natural polymer, along with high-purity ethanol and glacial acetic acid in distilled water to create a compatible structure for drug encapsulation. The nanosuspension was incorporated into Poloxamer 407 to formulate a novel in-situ gel, and compared with Quercetin and Chitosan-based in-situ gels for endodontic treatment against *Enterococcus faecalis* biofilms.

Pre-formulation studies analyzed drug-excipient compatibility and solubility, while the optimized batch was selected based on sedimentation delay, indicating good colloidal stability. Characterization using FTIR, UV, TEM, particle size analysis, and zeta potential confirmed successful drug encapsulation and stability. The optimized Quercetin-loaded Chitosan nanoparticles showed an average size of 599.1 nm and a zeta potential of +83 mV, outperforming other formulations (107 nm/ +32.6 mV and 74 nm/ +22.1 mV).

TEM images revealed smooth, spherical particles between 50–100 nm. FTIR analysis showed drug interaction without new peaks, confirming compatibility. In vitro antioxidant tests using Fenton and Pyrogallol reactions showed a scavenging activity of 75.23% for OH⁻ and 44.76% for O₂⁻. Drug diffusion studies using Franz cell and modified dialysis membranes indicated that in-situ gels released less drug compared to nanosuspensions, except for Chitosan in-situ gels, which showed higher release at pH above 7, advantageous for targeted drug delivery. The study compared Antibacterial effect of Quercetin, Chitosan nanoparticles suspension and gel with simple Quercetin and Chitosan gel.

KEYWORDS: Ionic gelation, Nanoparticles, TEM, Zeta Potential.



TITLE: DEVELOPMENT OF DUAL DRUG HESPERIDIN AND LIPOIC ACID LOADED SOLID LIPID NANOPARTICLES IN-SITU GEL FOR ALZHEIMER'S DISEASE

AUTHORS: Dweep Kavlekar, Rakhi Halarnkar, Mythili Krishna Jeedigunta, Bothiraja Chellampillai, Supriya Hyam.

DEPARTMENT: Department of Pharmacognosy

COLLEGE ADDRESS: Goa College of Pharmacy, 18 June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: jmythilikrishna@gmail.com

ABSTRACT:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by amyloid- β plaques, neurofibrillary tangles, and severe neuronal loss, leading to cognitive decline, personality changes, and speech impairments. Current oral drugs provide only symptomatic relief due to poor blood-brain barrier (BBB) penetration and low central nervous system (CNS) bioavailability. Hence, there is an urgent need for advanced therapeutic approaches.

Nasal delivery offers a direct route to the brain, bypassing BBB limitations. Solid Lipid Nanoparticles (SLNs), known for enhancing stability, bioavailability, and targeted delivery, present a promising option. This study focuses on dual drug-loaded SLNs encapsulating hesperidin (HSP) and lipoic acid (LA), both phytochemicals with neuroprotective potential, for nose-to-brain administration.

Preformulation studies confirmed drug-excipient compatibility and solubility. An in-situ intranasal gel was prepared via a modified microemulsion method using glyceryl monostearate as lipid and sunflower lecithin as surfactant, optimized through a 3-level factorial design. Key outcomes included entrapment efficiencies of 65% (HSP) and 47% (LA), particle size of 141 nm, zeta potential of -52.1 mV, and spherical morphology confirmed by TEM. In vitro release studies showed sustained drug release: 45.74% HSP and 83.84% LA from SLN-gel, compared with slower release (40.8% HSP and 68.75% LA) from drug-loaded gel after 8 hours. FTIR confirmed successful drug entrapment, while kinetic modeling indicated Korsmeyer-Peppas release behavior.

Overall, HSP-LA dual drug-loaded SLN in-situ gel demonstrates significant potential as an effective nasal-to-brain therapeutic strategy for AD management. Solid lipid nanoparticles (SLN) showed a dose-dependent neuroprotective effect against A β 42-induced cytotoxicity in SH-Sy5Y cells, with maximum cell viability (72.23%) observed at 100% concentration, surpassing rivastigmine.

KEYWORDS: Solid Lipid Nanoparticles, Alzheimer's disease, nasal delivery, hesperidin, lipoic acid, in-situ gel.



TITLE: DEVELOPMENT OF *BOSWELLIA SERRATA* EXTRACT LOADED NANOCOCHLEATES GEL FOR TOPICAL DELIVERY

AUTHORS: Sanjana Naik, Prapti Chodankar, Bothiraja Chellampillai, Supriya Hyam, Mythili Krishna Jeedigunta

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: jmythilikrishna@gmail.com

ABSTRACT

Topical therapy is widely preferred for localized treatment of inflammation. *Boswellia serrata* extract (BSE), composed of essential oil, gum, and resin, has shown promising anti-inflammatory potential. However, its low solubility and poor oral bioavailability limit clinical use. To overcome these challenges, BSE was formulated into nanocochleates (NC), lipid-based carriers formed through interactions of negatively charged liposomes with calcium ions. BSE-loaded nanocochleates (BSENC) were prepared by incorporating calcium into preformed nanoliposomes containing BSE, sunflower lecithin, and cholesterol. Preformulation studies involved solubility, UV, FTIR, and compatibility evaluations. Nanoliposomes were developed by ethanol injection and optimized using a three-level factorial design, selecting the batch with maximum entrapment efficiency. The optimized batch was further characterized by PSA, ZP, TEM, and FTIR. BSENC and corresponding gels were assessed through in vitro release, Franz diffusion, and kinetic modeling. FTIR confirmed no drug–excipient incompatibility. The optimized BSENC showed 78.23% entrapment, average particle size of 747.1 nm, and ZP of –50.6 mV, suggesting stability. Drug release from BSENC gel (96.73%) was markedly higher than BSE gel (73.51%) over 8 hours. Cell line studies in LPS-induced RAW 264.7 macrophages demonstrated reduced inflammatory cytokines (PGE-2, IL-6) with no cytotoxicity. Overall, BSENC enhanced solubility, release, and anti-inflammatory efficacy compared to conventional BSE formulations. These findings highlight BSENC as a promising topical delivery system for effective management of inflammation.

Keywords: *Boswellia serrata*, nanocochleates, nanoliposomes, topical drug delivery, inflammation, anti-inflammatory activity, controlled release, cytokine inhibition

10th Annual International Conference on IPR
DEVELOPED INDIA 2047: Role of IPR !!

Nov. 04-05, 2025



**TITLE: FORMULATION AND EVALUATION OF ANTI-ACNE KIT
MURRAYA KOENIGII EXTRACT**

**AUTHORS: TAMBE SHRADDHA ARAVIND
PRATIBHA .K. PATIL
Dr. MANISHA KARPE***

**COLLEGE ADDRESS: BHARATI VIDYAPEETH'S COLLEGE OF
PHARMACY, SECTOR 8, C.B.D BELAPUR,
NAVI MUMBAI – 400614.**

CORRESPONDING AUTHOR EMAIL ID: manisha.karpe@bvcop.in

ABSTRACT:

Acne, a chronic inflammatory disorder of the pilosebaceous unit, is characterized by increased sebum production, abnormal desquamation of hair follicles, and follicular obstruction, often leading to bacterial proliferation and inflammatory responses. To address this prevalent skin condition, our study focused on the preparation of a kit containing *Murraya koenigii* extract, renowned for its antimicrobial, antioxidant, and anti-inflammatory properties. *Murraya koenigii*, commonly known as curry leaves, has shown promising efficacy against bacterial and fungal infections, with leaf extracts exhibiting comparable effectiveness to mainstream antibiotic drugs. In this research, we prepared methanolic extract of *Murraya Koenigii* leaves from *Murraya koenigii* leaves and formulated an anti-acne kit. Our findings underscore the potential of *Murraya koenigii* as a natural remedy for acne treatment, suggesting its future application in skincare formulations aimed at combating acne-related symptoms.

KEYWORDS:

Murraya Koenigii, Anti-acne activity, Anti-dandruff shampoo, anti-acne soap, anti-acne stick

TITLE: Formulation, Evaluation and Optimization of Self Microemulsifying Drug Delivery System of Chlorzoxazone.



AUTHORS: Rushikesh Shivaji Andhale , Shradha Sandeep Bankar,
Dr. Pallavi Kapale, Dr. Madhuri Shelar.

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Alard College Of Pharmacy, S.NO.50,
Marunje, Near Hinjewadi , Pune. 411057

CORRESPONDING AUTHOR EMAIL ID: rushiandhale7447@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Chlorzoxazone is a commonly used muscle relaxant that helps relieve muscle stiffness and spasms. It comes under Biopharmaceutics Classification System (BCS) Class II which have low aqueous solubility and high permeability. This study aimed to formulate a self-microemulsifying drug delivery system (SMEDDS) to enhance the solubility and bioavailability of chlorzoxazone using Cinnamon oil, Tween 20, and propylene glycol were selected as the oil phase, surfactant, and cosurfactant based on solubility screening. Pseudo-ternary phase diagrams were created to identify the specific region where a stable microemulsion forms by mapping the proportions of oil, surfactant, and cosurfactant. Once the ideal microemulsion area was determined, the best formulation was tested for its ability to remain stable when diluted, as well as its particle size, uniformity, polydispersity index (PDI), zeta potential, drug content, clarity, and in vitro drug release by in lab tests. The F7 batch of this formulation exhibit excellent results with particle size of 129.9 nm, PDI of 0.2563, zeta potential of -20.04 mV, and drug content of 95.98%. It demonstrated rapid self-emulsification within 20 seconds, high optical clarity (99.48% transmittance), and significantly enhanced in vitro drug release (96.69% within 120 minutes) compared to pure chlorzoxazone. The formulation was further studied for its stability and found to be stable for more than 90 days. The results indicate that the formulated SMEDDS significantly enhances the solubility and dissolution of chlorzoxazone, presenting a viable approach to improve its oral bioavailability and therapeutic efficacy and present it as a more potent muscle relaxant.

KEYWORDS: Chlorzoxazone, Self-microemulsifying drug delivery system (SMEDDS), Solubility enhancement, Oral bioavailability, Muscle relaxant,



TITLE: KOJIC ACID DIPALMITATE POROUS POLYMERIC VESICLES: FORMULATION AND DEVELOPMENT

AUTHORS: Pranav Kalmath, Upendra Shetgaonkar, Anant Bhandarkar

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: anatpharm@gmail.com

ABSTRACT:

Kojic Acid Dipalmitate (KADP), a stable esterified derivative of kojic acid, is widely recognized for its skin-lightening and anti-pigmentation potential but suffers from limited solubility and instability in conventional formulations. To address these challenges, the present study focuses on the formulation and evaluation of KADP-loaded porous polymeric vesicles (microsponges) for topical application. Microsponges were fabricated using the quasi-emulsion solvent diffusion method and systematically optimized through a Quality by Design (QbD) approach, wherein the effects of drug-to-polymer ratio, emulsifier concentration, and stirring parameters were investigated.

Among the developed formulations, the optimized batch exhibited an entrapment efficiency of 78.41% and a production yield of 80.85%. Characterization by FTIR, DSC, XRPD, SEM, and particle size analysis confirmed the compatibility of KADP with excipients, spherical porous morphology, average particle size of 911.1 nm, and a zeta potential of -27.19 mV, indicating good stability. The optimized microsponges were further incorporated into a carbopol-based gel at 2% concentration and evaluated for physical appearance, pH, viscosity, spreadability, extrudability, and homogeneity.

In vitro release studies using Franz diffusion cells demonstrated enhanced sustained release from the microsphere gel (87.9% at 9 h) compared to plain KADP gel (72.8% at 6 h), both following first-order kinetics. Additionally, skin irritation tests on Wistar rats confirmed dermatological safety, with no signs of erythema or irritation. The findings establish microsphere-based gels as a promising topical delivery system for KADP, offering improved stability, controlled release, and superior cosmetic acceptability.

Keywords: Kojic Acid Dipalmitate, Microsponges, Quasi-emulsion, Skin lightening, Quality by Design.

TITLE: Formulation and Characterization of a Novel Olaparib Nano- formulation Using Copper Sulfide Nanoparticles: A DoE approach



AUTHORS: Pooja Rayanade¹, Archana Patil^{1*}

DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi.

CORRESPONDING AUTHOR EMAIL ID: archanapatil@klepharm.edu

ABSTRACT:

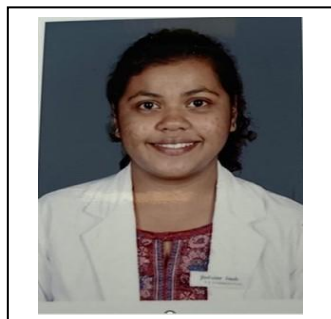
This study presents the development and optimization of a novel nano-formulation of Olaparib (OLA) using copper sulfide nanoparticles (CuS NPs) to address its poor oral bioavailability and associated toxicities. OLA, a BCS Class IV drug, requires high and frequent dosing, which leads to significant side effects like hematological toxicity. The CuS NPs, synthesized via a sacrificial templating method, act as a promising drug delivery vehicle due to their high surface area, biocompatibility, and ability to improve drug solubility and retention.

The nano-formulation was optimized using a CCD with Design Expert® software, investigating the impact of two independent variables: the concentration of PVP and CuCl₂. The dependent variables were particle size, zeta potential, and entrapment efficiency. The results showed that increasing the concentrations of both PVP and CuCl₂ led to an increase in particle size and entrapment efficiency, while zeta potential decreased.

The formulation showed excellent agreement between predicted and observed values for particle size (110.3 nm), zeta potential (-18.36 mV), and entrapment efficiency (77.48%). Characterization confirmed the nanoparticles' spherical shape. In vitro drug release showed a sustained release profile, with 67.457% of OLA released over 24 hours at pH 5.0. The IC₅₀ values showed a reduction i.e Olaparib alone has the highest IC₅₀ (512.07 µg/mL), and the lowest is observed with CuS NPs + Olaparib (300.14 µg/mL). This indicates that the Nano formulated combination, particularly with OLA and CuS NPs, improves cellular uptake and cytotoxic potential, likely due to enhanced bioavailability, targeted delivery, and synergistic effects, reduce dosing frequency and lower the risk of associated toxicities compared to the conventional drug.

KEYWORDS: Olaparib, Copper sulfide, Nanoparticles, Central composite design, Cytotoxicity

TITLE: Development and characterization of Pentoxifylline based cubosomal *in situ* gelling vaginal sponges for uterine targeting



AUTHORS: Yadishma A. Gaude¹, Archana S. Patil^{1*}

DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi

CORRESPONDING AUTHOR EMAIL ID: archanapatil@klepharm.edu

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Background: Pentoxifylline (PTX), a non-selective phosphodiesterase inhibitor, improves microcirculation through vasodilatory and hemorheological mechanisms. Enhancing endometrial vascularity and receptivity via localized PTX delivery may offer a novel therapeutic strategy for female infertility.

Methods: Cubosomal dispersions of PTX were prepared using a top-down technique with glyceryl monooleate, poloxamer 407 and polyvinyl alcohol. The dispersions were characterized for entrapment efficiency, particle size, and *in vitro* release. The optimized formulation was incorporated into a 2% chitosan matrix and lyophilized into *in situ* gelling intravaginal sponges. Pharmacokinetic and histopathological evaluations were performed in female Wistar rats, with intravaginal free sponges serving as controls.

Results: Optimized cubosomes exhibited entrapment efficiency of 44.3–84.8% and particle size between 169–196 nm, with sustained drug release over 8 h. Histopathological analysis demonstrated significant endometrial thickening, vascular congestion, and dilatation in rats treated with PTX-loaded sponges compared to free sponges. Pharmacokinetic studies revealed lower systemic exposure with intravaginal sponges than with oral PTX, indicating the involvement of a first uterine pass effect.

Conclusion: Intravaginal PTX sponges provide a promising uterine-targeted platform that enhances endometrial receptivity while minimizing systemic toxicity, thereby offering a potential therapeutic approach for infertility management.

KEYWORDS: Pentoxifylline, Cubosomes, *In situ* gelling sponges, Uterine targeting, Intravaginal

TITLE: FORMULATION AND EVALUATION OF CHITOSAN BASED NEOLAMARCKI CADAMBA (KADAMBA) LEAF EXTRACT GEL FOR ENHANCED WOUND HEALING



AUTHORS: SARTHAK JADHAV , Dr. VAISHALI PARDESHI

DEPARTMENT: PHARMACEUTICAL QUALITY ASSURANCE

COLLEGE ADDRESS: Alard College Of Pharmacy, S.NO.50,
Marunje, Near Hinjewadi , Pune. 411057

CORRESPONDING AUTHOR EMAIL ID: sarthakj399@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Wound healing is a complex biological process essential for restoring skin integrity and preventing complications such as infection and chronic wounds. Natural agents with antimicrobial and regenerative properties offer promising alternatives to conventional wound care therapies. *Neolamarckia cadamba* (Kadamba) leaves, known for their traditional medicinal applications, exhibit potent antimicrobial activity but remain underexplored in reported research. This study aimed to formulate and evaluate a chitosan-based gel incorporating Kadamba leaf extract to enhance wound healing efficacy. Kadamba leaves were collected, authenticated, and subjected to ethanol extraction, with phytochemical screening confirming the presence of alkaloids, glycosides, and flavonoids. The gel was prepared by dissolving chitosan in acetic acid, crosslinking with citric acid, and incorporating Kadamba extract. It was evaluated for physicochemical properties including color, clarity, homogeneity, pH (6.5), spreadability (6.1 g/cm/s), and viscosity (500 mPa.s), all of which met optimal standards. Antimicrobial activity was assessed using the agar diffusion method against *Escherichia coli* and *Staphylococcus aureus*, with Penicillin G as the control. The gel demonstrated significant zones of inhibition for *E. coli* (35 mm) and *S. aureus* (25 mm) indicating strong antibacterial efficacy at concentrations of 0.1–0.2 µL. Chitosan based present study offer both drug delivery and inherent antimicrobial activity against *E. coli* and *S. aureus*. The combined action of chitosan and Kadamba extract enhanced tissue regeneration, minimized infection, and improved wound healing over standard treatments, positioning the gel as a promising natural therapy with potential effects .

KEYWORDS: Chitosan, *Neolamarckia cadamba*, Kadamba, wound healing, antimicrobial gel, phytochemicals, tissue regeneration

10th Annual International Conference on IPR
DEVELOPED INDIA 2047: Role of IPR !!

Nov. 04-05, 2025



TITLE: FORMULATION AND EVALUATION OF ACF LOADED CYCLODEXTRIN BASED NANOSPONGES FOR ORAL ADMINISTRATION.

**AUTHORS: PATIL ABHISHEK SURESH
KOKARE SHUBHAM SHANKAR LAXMI
DR. NEHA DAND***

COLLEGE ADDRESS: BHARATI VIDYAPEETH'S COLLEGE OF PHARMACY, SECTOR 8, C.B.D BELAPUR, NAVI MUMBAI – 400614.

CORRESPONDING AUTHOR EMAIL ID: neha.dand@bvcop.in

ABSTRACT:

Oral administration is the most preferred route for drug delivery; however, nearly 40% of marketed oral dosage forms and up to 90% of new chemical entities suffer from poor aqueous solubility, resulting in low bioavailability. Aceclofenac (ACF), a widely used non-steroidal anti-inflammatory drug (NSAID) for rheumatoid arthritis and musculoskeletal disorders, belongs to the Biopharmaceutics Classification System (BCS) Class II, where solubility is the limiting factor for absorption. Moreover, ACF is prone to gastrointestinal side effects, alkaline hydrolysis, and photodegradation, further restricting its therapeutic efficiency. To address these challenges, cyclodextrin-based nanosponges (CDNS), a novel nanocarrier system, were developed and optimized to enhance the solubility, stability, and controlled release of ACF. Preformulation studies confirmed the identity and purity of ACF using melting point, FTIR, DSC, and UV-Visible spectroscopy, followed by calibration curve construction. Phase solubility studies revealed the formation of a 1:1 molar inclusion complex of ACF with β -cyclodextrin (BCD), with an apparent stability constant of 1463 M^{-1} , indicating strong host-guest interaction. Molecular docking studies further confirmed high binding affinity ($\Delta G = -5.72\text{ kcal/mol}$) of ACF within the BCD cavity. Among different crosslinkers, diphenyl carbonate (DPC) was selected for nanosponge synthesis based on the intensity of carbonate bond formation. Blank CDNS were synthesized using melt, interfacial polymerization, and ultrasonic probe methods, with the melt method yielding stable and amorphous particles.

Optimization of formulation parameters was carried out using StatEase® Design-Expert software (Box-Behnken design), where β CD molar concentration, DPC molar concentration, and reaction time were considered as independent variables, while percent yield, particle size, and carbonate bond intensity served as responses. The optimized batch demonstrated a yield of 46.14%, particle size of $\sim 620\text{ nm}$, and strong carbonate bond formation (confirmed by FTIR peak at 1772.88 cm^{-1}). ACF was loaded into optimized CDNS using the incubation-lyophilization method, and encapsulation was confirmed by FTIR and DSC, which showed significant peak shifts and reduced intensity, indicative of drug entrapment within CDNS cavities.

The developed ACF-loaded CDNS exhibited improved solubility, high entrapment efficiency, and potential for controlled release, which can enhance oral bioavailability, minimize dose dumping, and reduce gastrointestinal side effects associated with conventional ACF formulations. Thus, cyclodextrin-based nanosponges offer a promising strategy for the development of effective and safe oral delivery systems for poorly soluble drugs like ACF.

KEYWORDS: Aceclofenac, cyclodextrin-based nanosponges, drug loading, bioavailability, FTIR, Box-Behnken design, solubility enhancement, nanosponge optimization.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!

Nov. 04-05, 2025



TITLE: DEVELOPMENT AND EVALUATION OF TOPICAL NANOSPONGES BASED GEL CONTAINING CAFFEINE

**AUTHORS: BUTOLA SAKSHI NARENDRA
Dr. MANISHA KARPE***

COLLEGE ADDRESS: BHARATI VIDYAPEETH'S COLLEGE OF PHARMACY, SECTOR 8, C.B.D BELAPUR, NAVI MUMBAI – 400614.

CORRESPONDING AUTHOR EMAIL ID: manisha.karpe@bvcop.in

ABSTRACT:

A topical drug delivery system is a way to deliver medication that is applied onto a particular part of the body, typically the skin, to treat various ailments. Nanosponges serve as a means of diagnostic tool or to deliver therapeutic agents to specific targeted sites in a controlled manner especially for poorly water-soluble drugs like caffeine. Nanosponges are small spherical particles containing cavities where drug molecules can be stored. The caffeine nanosponges were prepared by emulsion solvent diffusion method, using different proportion of caffeine(drug):ethylcellulose(polymer) dissolved in 20ml of dichloromethane and slowly adding it to definite amount of polyvinyl alcohol in 100ml of aqueous continuous phase. The reaction mixture is kept for stirring at 1000 rpm for 2 hrs. Nanosponges were prepared for the drug:polymer ratio of 1:1, 1:0.25, 1:0.50, 1:0.75, 1:1.25, 1:1.50. Nanosponges were evaluated for weight uniformity, particle size analysis, dissolution testing, microscopy. The nanosponges were further incorporated into a topical gel by using Carbopol 940 polymer. The gel was evaluated for parameters like spreadability, consistency, odor, color, in vitro release, stability. From the study it was concluded that the gel exhibited satisfactory stability and promising drug release. The formulation was found to be a suitable candidate for the development of nanosponges loaded topical gel for therapeutic use in the treatment of cellulite.

KEYWORDS: Cellulite, nanosponges, particle size analysis

10th Annual International Conference on IPR
Nov. 04-05, 2024

Abstract No.
126



**TITLE: FORMULATION AND CHARACTERIZATION OF
A NOVEL DRUG DELIVERY SYSTEM**

**AUTHORS: GAWAI ASMITA ASHOKRAO
PATIL KAJAL DEORAM
MR. NILKAMAL WAGHMARE***

DEPARTMENT: PHARMACEUTICS

**COLLEGE ADDRESS: BHARATI VIDYAPEETH COLLEGE OF
PHARMACY ,SECTOR 8, CBD BELAPUR ,NAVI MUMBAI-
400614**

CORRESPONDING AUTHOR EMAIL ID: nilkamal.waghmare@bvcop.in

ABSTRACT:

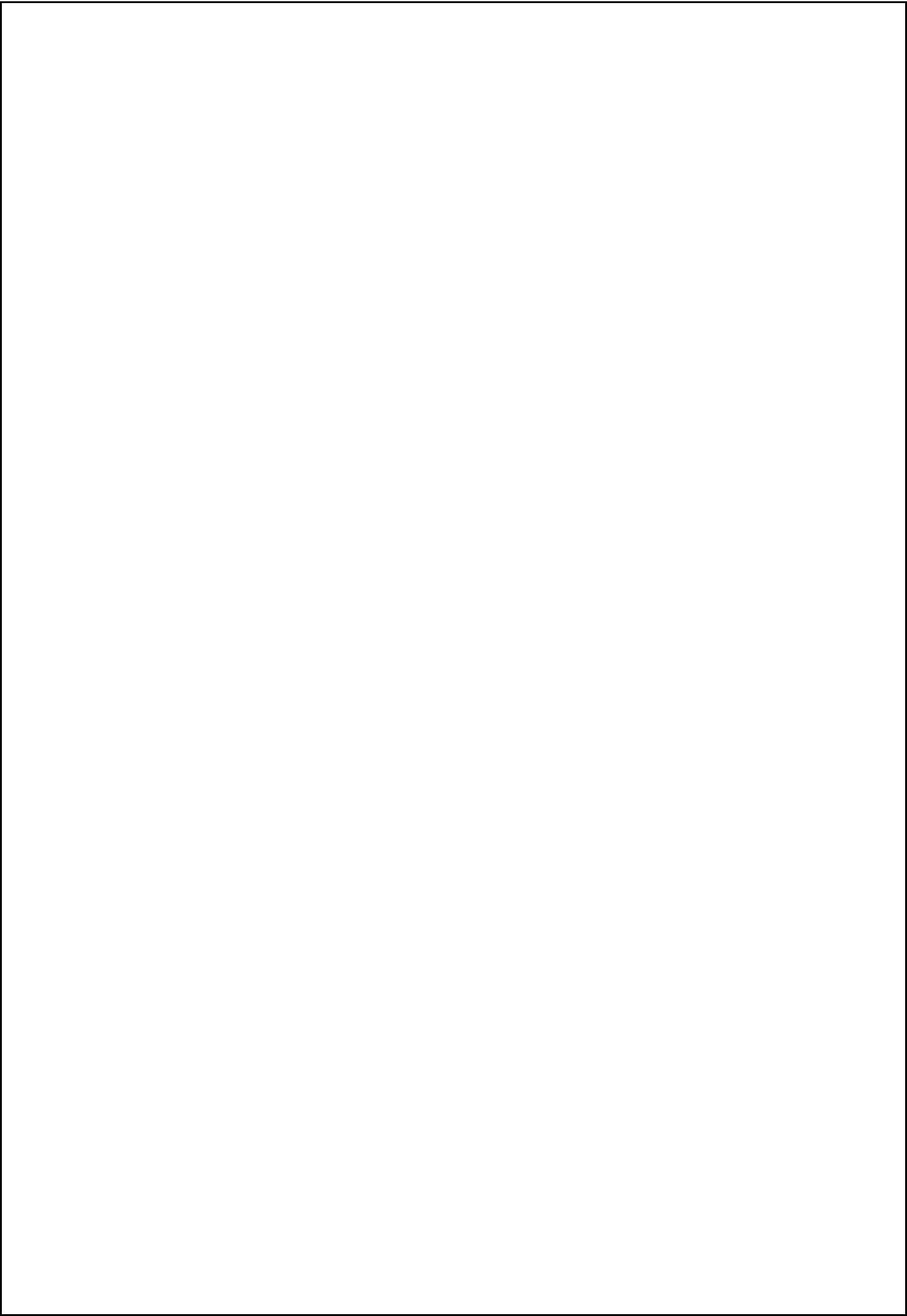
The present research focuses on the formulation and characterization of a novel drug delivery system using cyclodextrin-based nanosponges (CDNS) as an efficient carrier for poorly water-soluble drugs. Conventional oral drug delivery faces challenges such as low solubility, poor permeability, and reduced bioavailability, particularly for Biopharmaceutical Classification System (BCS) class II and IV compounds. To overcome these limitations, nanosponges, consisting of cross-linked cyclodextrin polymers, were synthesized to enhance solubility, stability, and controlled release of therapeutic agents.

Various methods including solvent evaporation, melt technique, and ultrasound-assisted synthesis were employed for nanosponges preparation. The synthesized formulations were evaluated using advanced characterization techniques such as Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Powder X-Ray Diffraction (PXRD), and Scanning Electron Microscopy (SEM) to confirm molecular interactions, crystallinity, morphology, and thermal stability.

Drug loading and entrapment efficiency were determined, demonstrating significant improvement in encapsulation capacity. In vitro release studies showed sustained and controlled drug release, indicating potential application in enhancing oral bioavailability and therapeutic efficacy.

This study highlights the versatility of CDNS in delivering both hydrophilic and hydrophobic drugs while ensuring safety, stability, and biocompatibility. The findings offer valuable insights into the development of advanced drug delivery platforms, potentially transforming therapeutic outcomes for drugs with poor water solubility, thereby paving the way for future clinical applications.

KEYWORDS: Mesalamine ,Cyclodextrin-based Nanosponges, Drug Loading, bioavailability, poor Water Solubility, Drug Loading, Entrapment Efficiency, Solvent Evaporation , FTIR.



TITLE: DESIGN AND EVALUATION OF NOVEL DRUG DELIVERY SYSTEM



**AUTHORS: MUJAGE VIPUL ARUN
KAPASE PRASHANT SAHEBRAO
DR. K. R. JADHAV***

DEPARTMENT: PHARMACEUTICS

**COLLEGE ADDRESS: BHARATI VIDYAPEETH COLLEGE OF
PHARMACY ,SECTOR 8, CBD BELAPUR, NAVI MUMBAI
- 400614**

CORRESPONDING AUTHOR EMAIL: drkrj24@gmail.com

ABSTRACT:

Widespread metabolic disease type 2 diabetes mellitus (T2DM) necessitates long-term medication; nevertheless, low absorption, gastrointestinal adverse effects, and patient non-compliance limit the use of traditional oral antidiabetic medications. To address these challenges, this study developed and characterized dual-drug-loaded nanofibrous scaffolds for enhanced transdermal delivery of Metformin Hydrochloride and Sitagliptin Phosphate. Response Surface Methodology (RSM) with a Central Composite Design (CCD) was used to optimize formulation parameters. Polyvinyl alcohol (PVA) and Eudragit RS100 were used as polymer matrices in electrospinning. The resulting nanofibers were evaluated for morphology, entrapment efficiency, drug content, tensile strength, wettability, and stability using advanced techniques including SEM, FTIR, and DSC. The optimized formulation (FDLNF) demonstrated high entrapment efficiency (92.4%), uniform bead-free morphology, and consistent thickness (342 μm), indicating robust structural integrity. In vitro drug release studies revealed sustained release, achieving 95.9% cumulative release within 12 hours, while ex vivo permeation studies using Franz diffusion cells and rat skin confirmed superior transdermal flux (1.76 $\text{mg}/\text{cm}^2/\text{hr}$) compared to other formulations. The scaffold also exhibited favorable mechanical strength, moderate wettability, and maintained physicochemical stability under accelerated and intermediate storage conditions for three months. These findings suggest that the dual-drug nanofibrous scaffold not only ensures controlled and sustained release but also enhances skin permeation, thereby improving therapeutic efficacy and patient compliance. Overall, the developed transdermal nanofiber system represents a promising novel drug delivery strategy for effective management of type 2 diabetes.

KEYWORDS: Electrospinning, Nanofibers, Transdermal drug delivery, Metformin Hydrochloride, Sitagliptin Phosphate, Type 2 diabetes.



TITLE: Optimizing Lasmiditan Delivery for Migraine with Nanostructured Lipid Carriers : Enhanced Bioavailability and Rapid Therapeutic Onset

AUTHORS: Krutuja R. Chougule, Archana S. Patil

DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi, KLE Academy of Higher Education and Research, Belagavi, Karnataka, India- 590010

CORRESPONDING AUTHOR EMAIL ID: archanapatil@klepharm.edu

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Introduction: Lasmiditan, a selective 5-HT_{1F} receptor agonist, has recently emerged as an approved therapy for acute migraine. Despite its therapeutic potential, its clinical performance is hindered by poor oral bioavailability, largely attributable to extensive first-pass metabolism. This study aimed to enhance the bioavailability of Lasmiditan through the development of nanostructured lipid carriers (NLCs) and to systematically assess their performance via *in vitro* and *in vivo* evaluations.

Method: NLCs were fabricated using the melt-emulsification ultrasonication method and optimized through a Box–Behnken design with Design-Expert® software. The optimized formulation was characterized for particle size, polydispersity index (PDI), zeta potential, and entrapment efficiency. Performance assessment further included *in vitro* release studies and pharmacokinetic profiling in Sprague Dawley rats.

Results: The optimized NLCs demonstrated a mean particle size of 201 nm with a narrow PDI (0.388) and a zeta potential of +33.22 mV, indicating excellent stability and uniformity. Entrapment efficiency exceeded 75%, confirming effective drug incorporation. *In vitro* release exhibited a biphasic profile, comprising an initial burst release for rapid therapeutic onset followed by sustained release to maintain drug levels. Pharmacokinetic analysis revealed accelerated absorption (reduced T_{max}), elevated C_{max}, and markedly improved relative bioavailability compared to the conventional suspension.

Conclusion: Lasmiditan-loaded NLCs effectively addressed the limitations of conventional delivery by providing rapid onset of action, enhanced systemic exposure, and prolonged therapeutic benefits. These findings highlight NLCs as a promising nanocarrier platform for patient-friendly and effective management of acute migraine.

Key words: Lasmiditan, 5-HT_{1F} Receptor, Migraine, In vivo study, NLC, SD Rats

**TITLE: DEVELOPMENT OF A BILAYER TABLET FOR
SYNCHRONIZED DELIVERY OF SIMVASTATIN AND LOSARTAN POTASSIUM IN
THE MANAGEMENT OF HYPERTENSION AND HYPERLIPIDEMIA**



AUTHORS: Ravikiran Kanabargi, Archana S Patil, Anusha M

DEPARTMENT: Department of Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi, KAHER
Belagavi

CORRESPONDING AUTHOR EMAIL ID: ravikirankanabargi@klepharm.edu

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Purpose: The research focused on formulating and evaluating a **new bilayer tablet** designed to treat hypertension and hyperlipidemia often seen with obesity. The aim was to combine **Simvastatin** (for hyperlipidemia) and **Losartan Potassium** (for hypertension) into a single tablet, making it easier for patients to stick to their treatment and improving overall effectiveness.

Methods: The bilayer tablets was prepared using a direct compression method. Simvastatin was put into an immediate-release layer, so it would show immediate action. Losartan Potassium was included in a sustained-release layer to provide a longer-lasting effect. To get the best formulation, we used a Central Composite Design. This helped to understand the different ingredients affected the tablet's properties.

Results: Evaluation was tested for both the powder mixtures (pre-compression) and the final tablets (post-compression) to ensure the quality standards. This included drug content uniformity, disintegration, and their dissolution profiles. Also different kinetic models was studied to understand the specific mechanisms of drug release. Finally, tablets were monitored for stability for six months under accelerated conditions.

Conclusion: The optimized bilayer tablet was successfully developed that delivers both Simvastatin and Losartan Potassium with the desired release characteristics. The tablets also demonstrated strong stability and satisfactory mechanical properties, all while meeting official pharmaceutical standards. This innovative formulation holds great promise for treating patients with obesity-related cardiovascular conditions and warrants further investigation through in vivo studies.

Keywords

Bilayer tablet, Simvastatin, Losartan Potassium, Immediate release, Sustained release, Obesity, Stability study, Cardiovascular comorbidities.

Nov. 04-05, 2025

TITLE: “DEVELOPMENT AND CHARACTERIZATION OF AN INTRANASAL RIZATRIPTAN BENZOATE-LOADED NIOSOMAL IN SITU GEL FOR MIGRAINE TREATMENT”



AUTHORS: Amit Prashant Patkar

DEPARTMENT: Department of Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Nehru nagar,
Belagavi.590010

CORRESPONDING AUTHOR EMAIL ID: amitpatkar2501@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

DEVELOPMENT AND CHARACTERIZATION OF AN INTRANASAL RIZATRIPTAN BENZOATE-LOADED NIOSOMAL IN SITU GEL FOR MIGRAINE TREATMENT

Migraine is a debilitating neurovascular disorder characterized by recurrent headaches often associated with nausea, photophobia and phonophobia. Rizatriptan Benzoate (RZB) a selective 5HT_{1B/1D} receptor agonist is effective in migraine therapy but its clinical use is limited by poor oral bioavailability due to its BCS Class III classification. The present study aimed to develop a niosomalbased intranasal *in situ* gel to enhance brain delivery, systemic absorption and therapeutic efficacy of RZB. Niosomes were prepared by the ethanol injection method using Span 60, cholesterol, ethanol and optimized through Box–Behnken Design. The vesicles were incorporated into a thermosensitive Pluronic F-127 gel and characterized by FTIR, DSC, TEM, particle size, zeta potential and entrapment efficiency. *In vitro* release, ex vivo nasal permeation and method validation were also performed. The optimized formulation displayed a particle size of 198 nm, zeta potential of –27.07 mV and entrapment efficiency of 82.20% along with favorable physicochemical and sustained release properties. These findings suggest that the RZB-loaded niosomal *in situ* nasal gel can significantly improve bioavailability, achieve prolonged release and enhance brain targeting making it a promising therapeutic approach for effective migraine management.

KEYWORDS: Rizatriptan benzoate, Niosomes, QbD, UV Spectroscopy, *In Vitro*, *Ex Vivo*, DSC, TEM, FTIR



TITLE: Formulation and Evaluation of Bornyl Acetate *In-Situ* Gel for Intranasal Administration in Migraine

AUTHORS: Perna Pawar, Balu Palekar, Sampada Bhosale, Swati Dhande

DEPARTMENT: Pharmacology

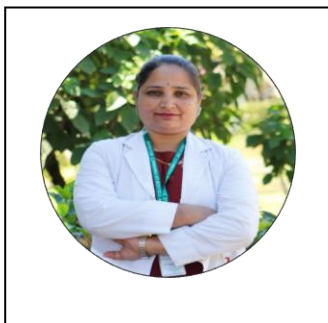
COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector 8, CBD Belapur, Navi Mumbai, 400 614

CORRESPONDING AUTHOR EMAIL ID: sampada.bhosale@bvcop.in

ABSTRACT:

Migraine is a chronic and disabling neurological disorder characterized by recurrent headaches and sensory disturbances. Despite the availability of pharmacological therapies, limitations such as poor brain bioavailability, delayed onset of action, and systemic side effects restrict their clinical utility. Intranasal drug delivery using *in situ* gel systems has emerged as a promising approach to overcome these challenges by enabling rapid absorption, prolonged nasal residence time, and potential direct transport to the brain. The present work focuses on the development of an *in situ* gel formulation of bornyl acetate, a naturally occurring monoterpene with neuroprotective and analgesic potential, for intranasal administration. The formulation was optimized using thermosensitive and mucoadhesive polymers to ensure sol–gel transition under nasal physiological conditions. Critical physicochemical parameters including pH, gelation temperature, viscosity, and mucoadhesive strength were evaluated to confirm suitability for intranasal application. Pharmacological evaluation was performed in a nitroglycerin-induced acute migraine rat model, wherein the *in situ* gel formulation was administered intranasally, while bornyl acetate was also assessed separately via the oral route. The anti-migraine potential was investigated through behavioral paradigms including thermal hyperalgesia using the hot plate method, mechanical allodynia using Von Frey filaments, and anxiety-like behavior using the light–dark box test. These assessments provided a comprehensive evaluation of migraine-associated pain and sensory alterations. The study concludes that intranasal administration of bornyl acetate through an *in situ* gel system provides greater therapeutic potential compared to the oral route, supporting its application as an effective and non-invasive approach for migraine management.

KEYWORDS: Bornyl acetate, *in situ* gel, intranasal delivery, migraine, nitroglycerin rat model



TITLE: Intranasal Ropinirole-Loaded Cubosomal Gel: A Next-Generation Strategy for Parkinson's Disease Therapy

AUTHORS: Archana S. Patil, Abhishek Revankar

DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi, KLE Academy of Higher Education and Research, Belagavi, Karnataka, India- 590010

CORRESPONDING AUTHOR EMAIL ID: archanapatil@klepharm.edu

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Purpose: This study aimed to develop and optimize a novel intranasal cubosomal in-situ gel of Ropinirole HCl to enhance brain targeting and therapeutic efficacy in Parkinson's disease.

Methods: Cubosomes were prepared using glyceryl monooleate, Poloxamer 407, and Tween 80, and optimized through a Box–Behnken design. Key parameters, including particle size, entrapment efficiency, and zeta potential, were evaluated. The optimized dispersion was incorporated into a thermoresponsive in-situ gel and characterized for pH, gelation time, mucoadhesive strength, viscosity, and stability. In vitro release, permeation, and in vivo pharmacodynamic studies were performed in a reserpine-induced Parkinsonian rat model. Antioxidant markers (GSH, MDA, SOD) and histopathological changes were also assessed.

Results: The optimized cubosomal formulation exhibited a particle size of 134.8 nm, entrapment efficiency of 82.77%, and zeta potential of –28.41 mV. The in-situ gel showed rapid sol–gel transition (32.44 s), strong mucoadhesion (4858 dyne/cm²), and a suitable viscosity profile. In vitro studies demonstrated biphasic, sustained drug release with enhanced permeation. In vivo, the formulation significantly improved motor function and antioxidant defence. Histopathological analysis confirmed reduced neuronal degeneration and inflammation. Stability testing demonstrated that the formulation remained stable for 180 days under both refrigerated and room temperature conditions.

Conclusion: The Ropinirole HCl-loaded cubosomal in-situ gel offers a promising intranasal strategy for effective brain delivery, providing enhanced therapeutic benefits and potential superiority over conventional therapy in the management of Parkinson's disease.

Keywords: Ropinirole, Cubosome, Intranasal, *In vivo* study, Biochemical assay



TITLE: Design & Development of Novel Self- Self-Nanoemulsifying granules used in Treatment of Aphrodisiac

AUTHORS: Ashutosh Kumar Pandey^{1,2*}, Ankita Wal¹, Suvarna G Kini², Pranay Wal¹

DEPARTMENT: Pharmacy and Department of Pharmaceutical Chemistry

COLLEGE ADDRESS: ¹Pranveer Singh Institute of Technology (Pharmacy), ²Manipal College of Pharmaceutical Sciences

CORRESPONDING AUTHOR EMAIL ID: ashutosh.mcopsmpl2023@learner.manipal.edu

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

The increasing development of lipophilic polyherbal formulations in the pharmaceutical sector highlights the need for advanced drug delivery systems with enhanced bioavailability, independent of diet or food intake. Many polyherbal candidates suffer from poor aqueous solubility, limiting oral absorption. Herbal medicines remain a cornerstone in the management of aphrodisiacs, widely used in both developing and developed nations due to the global preference for natural therapies.

As a part of the pre-formulation study, molecular docking of the phytoconstituent with the receptor was done to understand the interaction. Later, Self-emulsifying drug delivery systems (SEDDS/SNEDDS) offer promise, as they form fine oil-in-water emulsions upon mild agitation. However, high surfactant levels may induce drug degradation and gastrointestinal toxicity. To overcome this, self-nanoemulsifying granules (PH-SENG) were developed using polyherbal extracts, grape seed oil, and optimized surfactant-co-surfactant ratios via Design Expert software. The system protected lipophilic actives from gastric degradation, enabling intestinal absorption. Adsorption of SNEDDS onto colloidal silicon dioxide yielded stable, free-flowing granules. Characterization (XRD, DSC, TGA, SEM, microscopy) confirmed reduced crystallinity, enhanced solubilization, and improved stability compared to crude extracts.

Preclinical toxicity evaluation followed OECD 425 and 408 guidelines. Limit tests indicated safety at 2000 mg/kg, with no mortality or adverse clinical signs observed over acute (28-day) and sub-chronic (90-day) studies. Histopathology, hematology, and hormone analyses supported safety. Functional assays, including organ blood flow studies, Y-maze behavioural testing, and fertility assessments via ultrasonography, demonstrated significant pharmacological activity.

Comparative pharmacokinetic analysis revealed that polyherbal self-nanoemulsifying granules markedly improved oral bioavailability over marketed testosterone boosters, supporting their potential as a safe and effective therapeutic strategy for aphrodisiacs.

KEYWORDS: Aphrodisiacs, Phytoconstituents, SNEDDS, synergistic, cost-effective,

TITLE: FORMULATION AND CHARACTERISATION OF BORNYL ACETATE LOADED NIOSOMES: A COMPUTATIONAL AND NANOTECHNOLOGICAL APPROACH FOR DRAVET SYNDROME.



AUTHORS: Pranjal Sambare , Sayli Gaikwad, Harshada Gujar, Shrushti Pingle , Asmita Shinde , Sanika Taigade.Sampada Bhosale

DEPARTMENT: PHARMACOLOGY

COLLEGE ADDRESS: Bharati Vidyapeeth College of Pharmacy , Sector-8, C.B.D Belapur , Navi Mumbai- 400614.

CORRESPONDING AUTHOR EMAIL ID: sampada.bhosale@bvcop.in

ABSTRACT:

Dravet Syndrome (DS) is a rare and severe epileptic encephalopathy associated with high morbidity, mortality, and limited treatment efficacy due to drug resistance and adverse effects. To address this challenge, the present study explored bornyl acetate—a bioactive monoterpene with reported neuroprotective and anticonvulsant potential—using computational and nanotechnological approaches. *In silico* docking studies demonstrated that bornyl acetate exhibited favourable binding affinity toward key targets implicated in DS, including the SCN1A gene, NMDA, GABA, and Tyrosine Kinase receptors, surpassing or comparable to standard antiepileptic drugs. To enhance its delivery, bornyl acetate-loaded niosomes were formulated via the thin-film hydration method using Span 60, Tween 60, cholesterol, and stearylamine. The optimised formulation (Batch B14) displayed a vesicle size of 171 nm, PDI of 0.22, zeta potential of -41.2 mV, and high entrapment efficiency (92.53%), indicating excellent stability and uniformity. These physicochemical properties suggest efficient blood–brain barrier penetration and sustained drug release. The findings support bornyl Acetate niosomes as a promising intranasal drug delivery system with potential therapeutic efficacy in Dravet Syndrome, warranting further *in vivo* and clinical investigations.

KEYWORDS: - Bornyl Acetate; Niosomes; Dravet Syndrome; *In silico* docking; Intranasal drug delivery; SCN1A; Blood–brain barrier; Nanotechnology; Antiepileptic therapy.



TITLE: Retinal Delivery of Novel Conjugated Nanomicellar system
using Dissolvable Microneedles for Retinoblastoma

AUTHORS: Kavita Singh, Mudassir Ansari and Yogesh Kulkarni
DEPARTMENT: Pharmaceutics

COLLEGE ADDRESS: Shobhaben Pratapbhai Patel School of Pharmacy & Technology Management, SVKM's Narsee Monjee Institute of Management Studies (NMIMS), Deemed to be University, Mumbai, India.

CORRESPONDING AUTHOR EMAIL ID: kspharma05@gmail.com

ABSTRACT: (Not more than 250 words)

In the past decade, microneedles (MNs) have emerged as an innovative transdermal delivery approach, which has the potential to integrate the advantages of transdermal drug delivery along with hypodermic needles. The micron size of these needles helps to penetrate the skin, overcoming skin barriers with minimal pain during delivery. The present investigation focuses on the development of Aflibercept-loaded conjugated soluplus nanomicelles for targeted transscleral drug delivery using dissolvable microneedles.

In this project, the melt casting technique was used to prepare dissolvable microneedles using polyvinyl alcohol (PVA) and polyvinylpyrrolidone (PVP 90F) as core polymers. Microneedles were studied for morphology by optical and scanning electron microscopy, confirming that the microneedles were elongated, smooth, and free from brittleness. The mechanical assessment of needles ensured sufficient strength, i.e., $85.71 \text{ g} \pm 2.05$; penetration studies showed penetration of goat scleral tissue stained by trypan blue stain. The developed microneedle was found to contain $20.04 \mu\text{g} \pm 0.42$ of drug per microneedle patch.

The microneedles released the drug payload in 4 hours, ensuring rapid and complete dissolution. Drug transport across the goat sclera manifested a permeation of $11.43 \pm 0.1 \mu\text{g}/\text{cm}^2$ with a tissue deposition of $3.54 \pm 0.22 \mu\text{g}$, suggesting an effective drug passage. Drug deposition was further evaluated in posterior segment delivery, showing retinal and vitreous concentrations of $113.15 \pm 3.54 \text{ ng/g}$ and $15.73 \pm 0.28 \text{ ng/g}$, respectively.

The optimized drug-loaded microneedles were found to be stable for three months and demonstrated no ocular irritation, emphasizing their potential as a minimally invasive alternative to intra-vitreal injections for effective retinoblastoma management.

KEYWORDS: Retinoblastoma, Anti-VEGF, Dissolvable microneedle, Posterior eye segment, Retina, Transcleral route, Nano-micelles.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: PHYTOSYNTHESIS OF *HOLOSTEMMA ADA-KODIEN* LOADED CHITOSAN NANOPARTICLES AND ITS BIOMEDICAL APPLICATIONS.

AUTHORS: Miss. Puja Thakkar, Dr. Damita Cota, Dr. Bothiraja Chellampillai

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji-Goa-403001

CORRESPONDING AUTHOR EMAIL ID: pujathakkar01@gmail.com

ABSTRACT

Background: Nanotechnology, utilizing 10-1000nm polymer-based nanoparticles, is transforming pharmaceuticals through controlled drug delivery. The Ayurvedic plant *Holostemma ada-kodien* (Adakodien) is valued for its rejuvenating tuberous roots, traditionally treating debility, night blindness, and intestinal issues. Its saponins, flavonoids, and steroids offer anti-inflammatory, antidiabetic, and anticancer properties.

Aim and Objectives: This study aimed to phytosynthesis of *Holostemma ada-kodien* loaded chitosan nanoparticles and its biomedical applications.

Methods: Chitosan nanoparticles of *Holostemma ada-kodien* were formulated using the Ionic Gelation technique. Transmission Electron Microscopy (TEM) and entrapment efficiency were then estimated. Comparative studies were conducted on the extract and the formulated nanoparticle for *in vitro* anti-inflammatory and alpha-amylase inhibitory actions. MTT assay were evaluated for anticancer activity.

Results: Transmission electron microscopy (TEM) revealed spherical shape, nanoscopic non aggregated particles of *Holostemma* extract loaded chitosan Nanoparticles (CHH) with size of 46-104 nm. The phytosynthesized CHH has EE 88.55%. CHH showed maximum efficacy for *in vitro* anti inflammatory activity when compared with positive control (Aspirin) and *Holostemma* extract. CHH was analyzed for alpha amylase activity in a concentration range of 1000-125ug/ml. CHH possesses moderate to potent anticancer activity, depending on the concentration range 30-1000ug/ml were tested.

Conclusion: The investigation presents an eco-friendly, cost-effective approach for synthesizing chitosan nanoparticles loaded with *Holostemma ada-kodien* extracts, and concludes that they could offer promising anti-inflammatory, antidiabetic activity and anticancer activity.

KEYWORDS: Chitosan nanoparticles, *Holostemma ada-kodien*, Entrapment efficiency, anti inflammatory, alpha amylase inhibition.



TITLE: *In silico*, antioxidant, anti-inflammatory, pharmacodynamic and pharmacokinetic studies of Rutin loaded phyto-nanosponges for peptic ulcer.

AUTHORS: Monica RP Rao, Bushra Ashpak Bagwan, Anushriya Ganesh Thakur*

DEPARTMENT: M. Pharmacy – Pharmaceutics

COLLEGE ADDRESS: AISSMS College of Pharmacy, Kennedy road, near R.T.O, Pune- 411001

CORRESPONDING AUTHOR* EMAIL ID: anushriyathakur18@gmail.com

ABSTRACT: Peptic ulcer disease (PUD) is a complex illness that is impacted by *Helicobacter pylori* infection, oxidative stress, and excessive gastric acid production. Although rutin (RTN), a plant-derived flavonoid with anti-inflammatory, antioxidant, and proton pump inhibitory qualities, has low bioavailability and poor aqueous solubility, it has therapeutic potential. RTN-loaded β -cyclodextrin-based nanosponges (RTN-NS₄) were created and thoroughly characterized in order to get around these restrictions. Phase solubility experiments showed a curve of the AL type. While FTIR verified successful drug encapsulation, DSC and PXRD showed improved amorphization. The nanoscale, flaky morphology was revealed by SEM imaging. In comparison to RTN, RTN-NS₄ showed a 25.4-fold increase in saturation solubility in aqueous medium. The DPPH assay, which measures antioxidant capacity, revealed that RTN-NS₄ had a considerably greater antioxidant activity of 87.91% at 500 μ g/ml, showing improved ROS-scavenging ability. RTN's significant binding affinity for H⁺/K⁺-ATPase (glide energy of -62.822 kcal/mol) was further validated by molecular docking experiments, which also demonstrated improved binding affinity and complex stability. Omeprazole, on the other hand, demonstrated a glide energy of -48.147 kcal/mol, indicating PPI-potential. This study also demonstrated that RTN binds to NS more strongly than β -CD (glide energy of -33.034 kcal/mol) with a glide energy of -37.924 kcal/mol. In ethanol-induced stomach ulcers in Wistar rats, RTN-NS₄ outperformed RTN (22.17 $\pm$ 6.53%) and nearly equaled the effectiveness of omeprazole (60.16 $\pm$ 8.23%), achieving 42 $\pm$ 7.23% ulcer inhibition. In rats given RTN-NS₄, histological investigations verified almost total mucosal protection and decreased inflammation. These findings highlight RTN-NS₄ as a promising nano phytotherapeutic system that provides synergistic benefits of PPI, antioxidant, and anti-inflammatory activities for efficient ulcer control.

KEYWORDS: Rutin, nanosponges, photostability, DPPH Assay, BSA Denaturation Assay, Peptic ulcer disease



TITLE: Synthesis and evaluation of controllable sized silver nanoparticles for antibacterial activity against multidrug resistance bacterial species

AUTHORS: Nandini Bhavsar, Shevade Vaibhavi Vinay, Dr. Sugandha Mulgund

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Poona College of Pharmacy, Erandwane, Pune 411038

CORRESPONDING AUTHOR: sugandhamulgund@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT:

The rising threat of multidrug-resistant (MDR) bacterial species necessitates the development of novel antimicrobial agents. MDR, a major global challenge, occurs when bacteria resist multiple antibiotics, reducing treatment effectiveness. This study focuses on the synthesis and evaluation of controllable-sized silver nanoparticles (AgNPs) using a chemical reduction method and their antibacterial efficacy against MDR gram-positive and gram-negative bacteria.

Silver nanoparticles were synthesized using silver nitrate as a precursor and trisodium citrate as both reducing and stabilizing agent. The synthesis was optimized by varying parameters such as concentration and temperature. The optimized batch (F5) showed a UV-Vis absorbance peak at 423 nm, particle size of 42.5 nm, and a zeta potential of -38 mV, indicating stable, nano-sized particles. Characterization was confirmed using UV-Vis spectroscopy, Zeta sizer, FESEM, and XRD.

The antibacterial activity of AgNPs was assessed against MDR strains of *Staphylococcus aureus*, *Enterococcus faecalis*, *Escherichia coli*, and *Pseudomonas aeruginosa* through zone of inhibition, Minimum Inhibitory Concentration (MIC), and Minimum Bactericidal Concentration (MBC) assays. Results revealed that synthesized AgNPs were significantly more effective than ionic silver solution against all tested bacterial species.

In conclusion, this study established a reliable method for producing stable silver nanoparticles with strong activity against multidrug-resistant bacteria. The findings confirm the potential of AgNPs to serve as an alternative or complementary therapy to overcome drug resistance, possibly enabling reduced doses of conventional antibiotics and minimizing associated side effects.

KEYWORDS: Silver nanoparticles, Silver nitrate, Multidrug resistance, Trisodium citrate.



TITLE: PREPARATION AND EVALUATION OF A NOVEL HERBAL FORMULATION

DEPARTMENT: M. PHARMACY

COLLEGE ADDRESS: HSNCB's Dr. L. H. Hiranandani College of Pharmacy, CHM
Campus, Ulhasnagar

CORRESPONDING AUTHOR EMAIL ID: rushikeshgunjal714@gmail.com

AUTHORS: Rushikesh Gunjal

ABSTRACT:

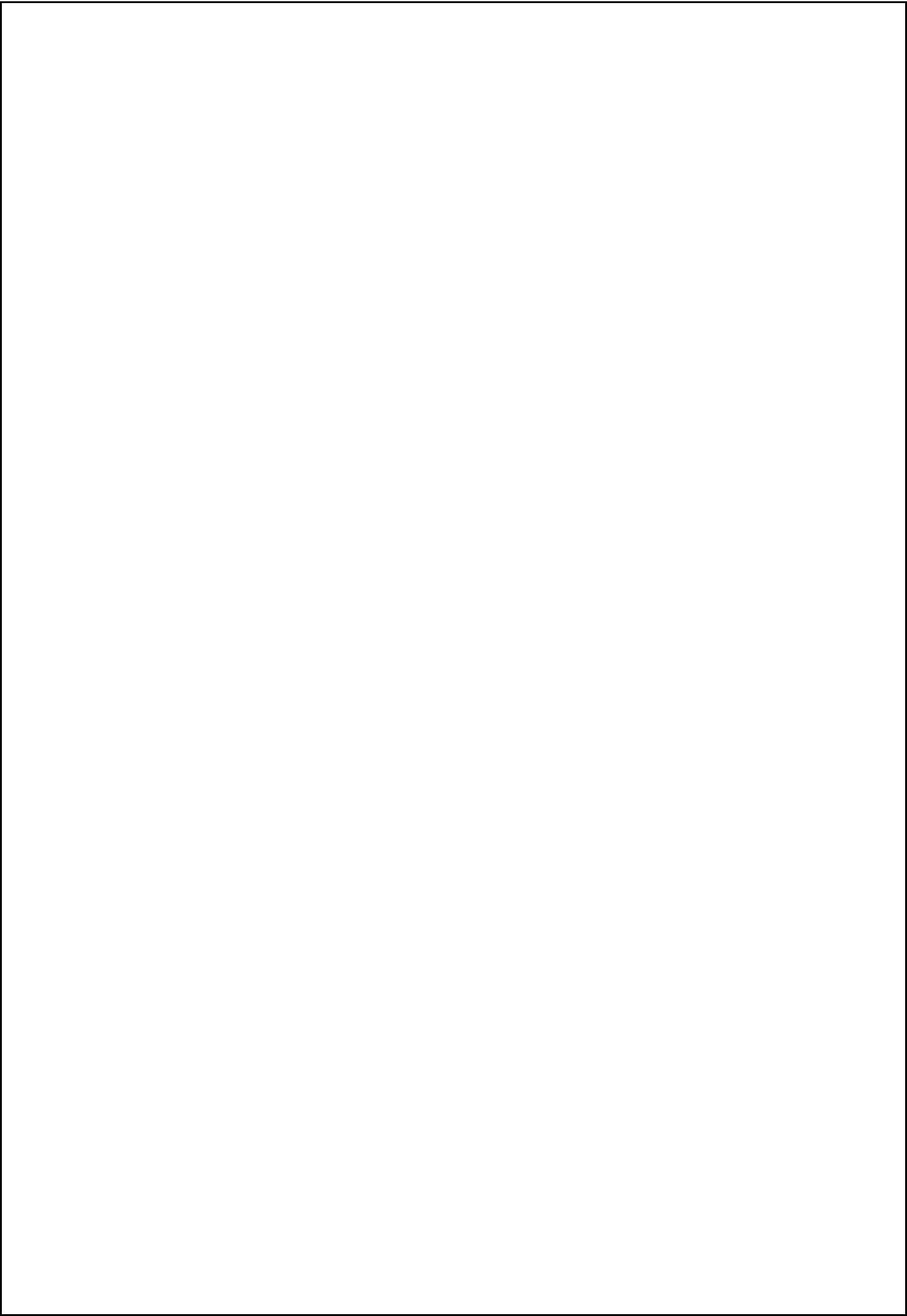
Thymoquinone (TQ), a bioactive monoterpene from *Nigella sativa* (black seed), possesses diverse pharmacological activities including antimicrobial and antioxidant effects. However, its therapeutic application is limited due to hydrophobicity, poor aqueous solubility, and instability under light and pH variations. To overcome these challenges, TQ-loaded transethosomes were formulated and evaluated, along with transethosomal gels intended for topical application. Transethosomes were prepared using the cold method, with phospholipid 90G selected for its high entrapment efficiency and Span 60 chosen as a surfactant based on low absorbance and stable sedimentation. Optimization of the formulation was carried out using Design Expert software.

Pre-formulation studies including solubility analysis, UV spectroscopy, FTIR, and DSC confirmed drug identity and compatibility with excipients. TQ-loaded transethosomes and transethosomal gels (0.5% and 1%) were successfully formulated and subjected to comprehensive evaluation. Parameters such as particle size distribution, entrapment efficiency, pH, viscosity, spreadability, drug content, and in-vitro release were assessed. Comparative analysis between 0.5% and 1% gels demonstrated favorable outcomes for drug release and stability. Both formulations exhibited significant antimicrobial and antioxidant activity, validating their therapeutic potential. Stability studies of TQ transethosomal gels further confirmed consistent pH, drug content, and physical appearance.

Overall, the development of TQ-loaded transethosomal gel enhanced solubility, stability, and bioavailability of thymoquinone, offering a promising drug delivery approach for topical treatment of microbial skin infections and related disorders.

KEYWORDS:

Thymoquinone, *Nigella sativa*, Transethosomes, Transethosomal gel, Bioavailability, Antimicrobial activity, Antioxidant activity, Stability.



10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!

Nov. 04-05, 2025



TITLE:SOLUBILITY ENHANCEMENT OF POORLY WATER

SOLUBLE DRUG

AUTHORS: Pradnya Satpute, Bhagyashree Jadhav, Dr. Sushma Singh.

DEPARTMENT: M. Pharmacy – Quality Assurance

COLLEGE ADDRESS: HSNCB's Dr. L. H. Hiranandani College
of Pharmacy, CHM Campus, Ulhasnagar

CORRESPONDING AUTHOR EMAIL ID: satpute.pradnya@dlhcop.org

ABSTRACT:- Solubility enhancement of poorly water-soluble drugs remains a major challenge in pharmaceutical development, as dissolution is the rate-limiting step for absorption and subsequent pharmacological response. Among various techniques, solid dispersion has emerged as a promising approach over the past two decades to improve solubility and bioavailability. In the present study, solid dispersion of Butenafine HCl was prepared using Kollidon VA64 and Soluplus as polymers, with optimized ratios determined through a 3² factorial design. The optimized formulation demonstrated nearly 50-fold enhancement in solubility. DSC and XRD analyses confirmed transformation in drug crystallinity upon solid dispersion formation.

Further, the prepared solid dispersion was incorporated into a film-forming dermal gel using Eudragit RSPO, Triethyl citrate, and Hydroxy propyl cellulose. Polymer concentrations were optimized through factorial design to achieve optimum drug release and antifungal efficacy. The developed formulation showed superior antifungal activity compared to commercial products, with improved bio-adhesive properties and controlled release profile. This novel dermal gel not only ensures accurate dose positioning but also enhances patient compliance. Overall, the study highlights the potential of solid dispersion-based film-forming gels as an effective strategy to enhance solubility, therapeutic efficacy, and patient acceptability of poorly water-soluble drugs like Butenafine HCl.

KEYWORDS: Poorly water-soluble drugs, Solid dispersion, Butenafine HCl, Kollidon VA64, Soluplus, Film-forming gel, Antifungal activity, Bioavailability.



TITLE: DEVELOPMENT AND EVALUATION OF PAEDIATRIC DOSAGE FORM

DEPARTMENT: M. PHARMACY

COLLEGE ADDRESS: HSNCB's Dr. L. H. Hiranandani College of Pharmacy, CHM
Campus, Ulhasnagar

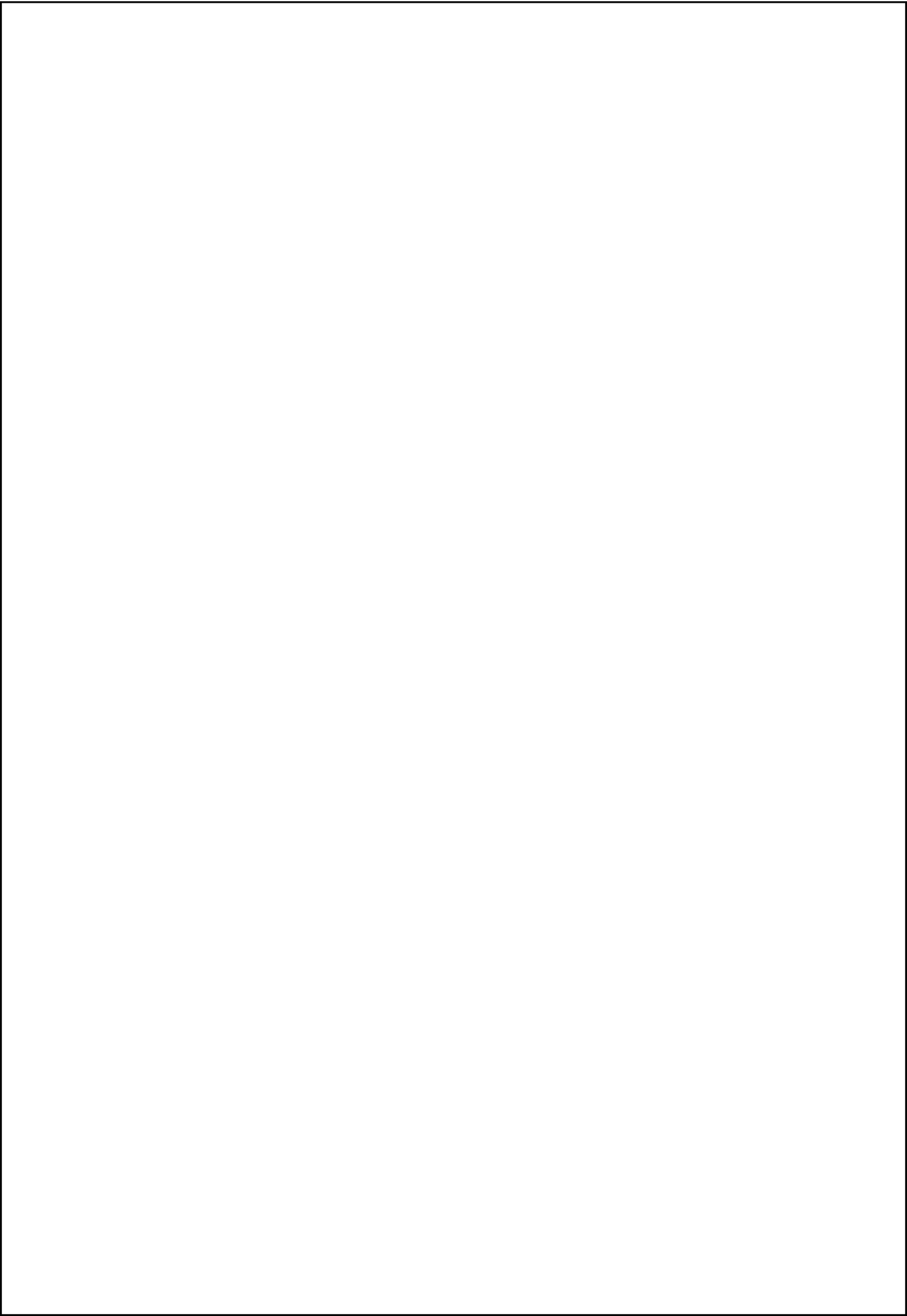
CORRESPONDING AUTHOR EMAIL ID: parth.telavane@dlhhcop.org

AUTHORS: Parth Telavane, Suchira More, Sushma Singh Mam

ABSTRACT:

The present research aimed to design and develop a taste-masked pediatric oral formulation of Levocetirizine Dihydrochloride to improve compliance and acceptability. Taste masking was achieved by preparing a drug-polymer complex using Eudragit L100 at different ratios. The solvent evaporation method with isopropyl alcohol (IPA) was employed, and an effective taste masking was obtained at a drug-polymer ratio of 1:3, which showed a taste score of 1 (tasteless). The drug content of this batch was $88.68 \pm 5\%$, and in-vitro taste assessment in phosphate buffer (pH 6.8) revealed minimal drug release of $0.06 \mu\text{g/ml}$ at 60 seconds and $0.17 \mu\text{g/ml}$ at 120 seconds. Solid-state characterization (XRD, DSC, FTIR, polarimetry) confirmed the formation of a semi-crystalline solid. The optimized IPA batch yielded a free-flowing powder with good taste masking (taste score 0). This optimized complex was incorporated into child-friendly formulations—medicated gummies and oro-dispersible films (ODFs)—equivalent to 2.5 mg drug. Optimization was carried out using 2^3 factorial design for gummies and 3^2 factorial design for ODFs. The optimized batches were G2 (gummies) and F3 (ODFs), showing drug content of $99.01 \pm 1.00\%$ and $98.69 \pm 0.44\%$, respectively. In-vitro drug release studies showed 98.02% release in 40 min (G2) and 98.97% release in 35 min (F3). Despite higher drug release in salivary fluid, both formulations exhibited effective taste masking (score 0). Although ODFs showed faster release, gummies were preferred due to better physical appearance, novelty, and acceptability in children. Thus, medicated gummies emerged as the most desired formulation ensuring complete taste masking, palatability, and compliance.

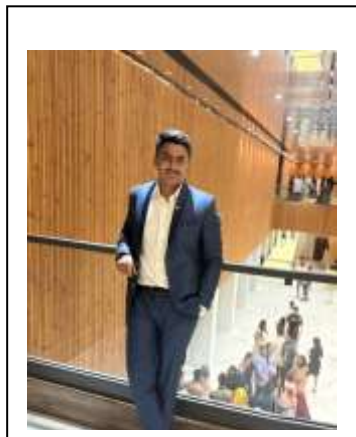
KEYWORDS: Levocetirizine Dihydrochloride, Taste masking, Eudragit L100, Drug-polymer complex, Solvent evaporation, Orodispersible films, Medicated gummies, Pediatric formulation, Factorial design, In-vitro drug release.



10th Annual International Conference on IPR

DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!

Nov. 04-05, 2025



TITLE: Synthesis and Characterization of Green Silver Nanoparticle of leaf extract of *Kalanchoe pinnata*: Exploring nanotechnology for In-vitro Anti- Inflammatory Activity.

AUTHORS: Sairaj Tukaram Bhogan^{1*}, Shailendra S Suryawanshi¹

DEPARTMENT:

Department of Pharmaceutical Analysis¹, Department of Pharmaceutical Analysis².

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: siddheshbandekar10@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

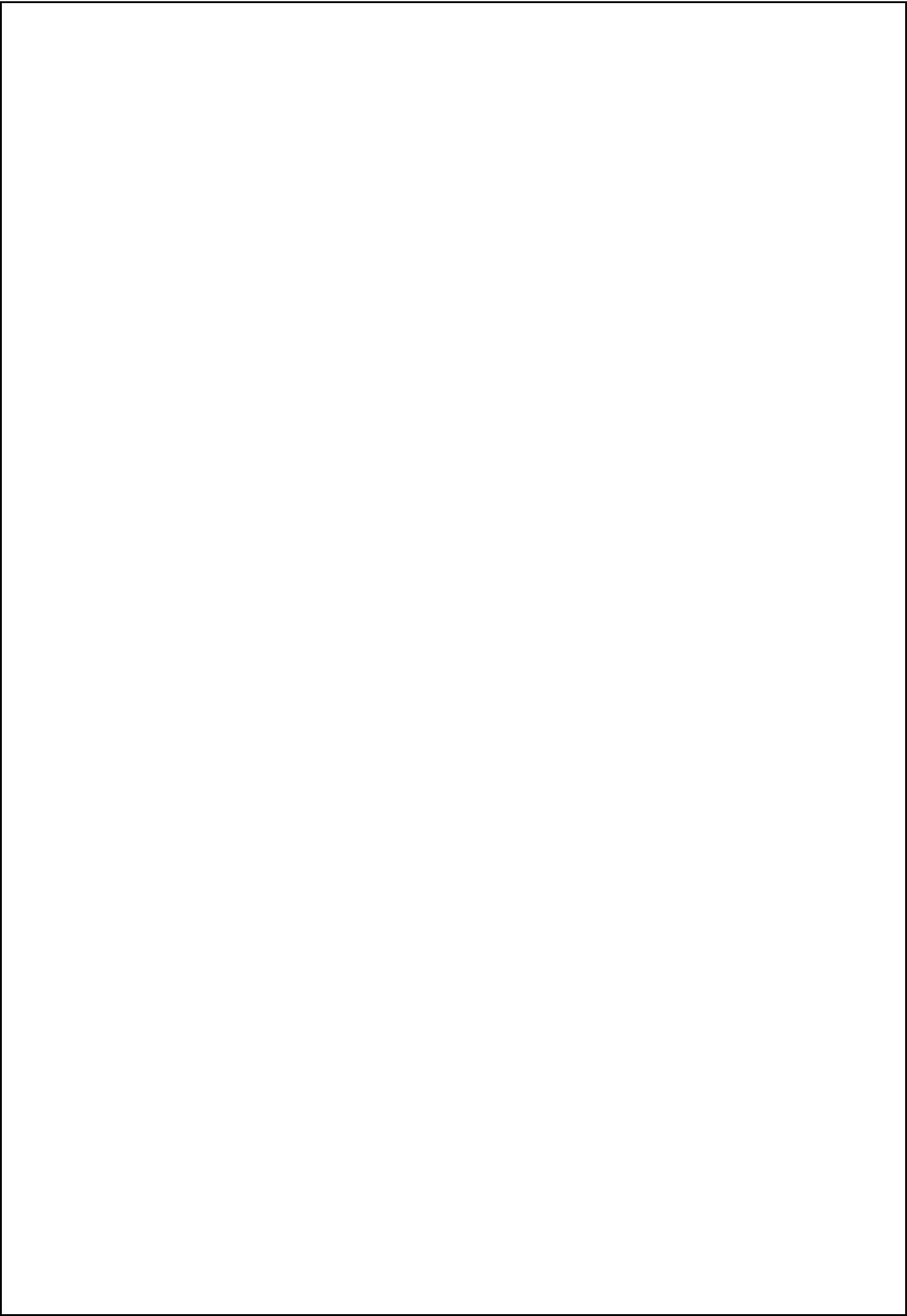
Background: Green synthesis of nanoparticles provides a sustainable approach to developing novel biomedical agents. *Kalanchoe pinnata*, a widely used medicinal plant, possesses phytoconstituents capable of reducing metal salts and stabilizing nanoparticles. Silver nanoparticles (AgNPs) derived through green synthesis are increasingly explored for their anti-inflammatory potential.

Objective: To synthesize silver nanoparticles using aqueous extract of *Kalanchoe pinnata* leaves and evaluate their in-vitro anti-inflammatory activity.

Materials and Methods: Fresh leaves of *Kalanchoe pinnata* were shade-dried, powdered, and extracted in boiling water. The filtrate was reacted with 1 mM silver nitrate solution in a 1:9 ratio (v/v) and incubated at room temperature under dark conditions. Formation of AgNPs was confirmed by visual color change and UV-Visible spectrophotometry, which showed a peak at 428 nm. The anti-inflammatory activity was tested using protein denaturation and human red blood cell (HRBC) membrane stabilization assays. Diclofenac sodium was used as the standard reference drug.

Results: The synthesized AgNPs exhibited a visible color shift from pale yellow to dark brown, and UV-Vis spectroscopy confirmed nanoparticle formation with a peak at 428 nm. In protein denaturation and HRBC assays, AgNPs demonstrated significant inhibition of inflammation in a dose-dependent manner. At 400 µg/mL, AgNPs achieved 71.83% and 68.12% inhibition respectively, closely approaching the standard.

Conclusion: Green-synthesized AgNPs using *Kalanchoe pinnata* showed promising in-vitro anti-inflammatory effects. This eco-friendly method holds potential for developing alternative therapeutic agents using plant-based nanotechnology.





TITLE: Approach towards biomolecular interaction of cilnidipine

AUTHORS: Jaime Mendonsa, Dr. Rahul Chodankar, Dr. Maushmi Kumar, Dr. Anand Mahajan

DEPARTMENT: Pharmaceutical analysis, Pharmacy

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June road, Panaji-Goa

CORRESPONDING AUTHOR EMAIL ID: jaimemary10@gmail.com

ABSTRACT: (Not more than 250 words)

The drug cilnidipine (CIL) is fourth-generation calcium channel blocker, generally prescribed for the treatment of hypertension in India. The biomolecular interaction of CIL was studied with Bovine Serum Albumin (BSA) and Calf Thymus DNA (ct-DNA) to generate valuable pharmacological information. The interaction of CIL with BSA was studied using UV-visible, fluorescence spectrophotometry, circular dichroism (CD) and in-silico tools. The UV-visible spectrophotometric study showed increased absorbance at 280 nm, while fluorescence study showed a concentration-dependent decrease in BSA fluorescence intensity with a blue shift in emission maxima, indicating static quenching. Synchronous fluorescence spectrophotometry (SFS) was used to study structural changes in BSA upon interaction with CIL. A concentration-dependent decrease in fluorescence intensity and a blue shift in emission maxima for tyrosine and tryptophan residues indicated conformational changes. These shifts suggested a more hydrophobic microenvironment around the residues, reflecting CIL-induced structural rearrangement in BSA. Three-dimensional (3D) fluorescence spectrophotometry revealed conformational changes in BSA upon interaction with CIL. Increased Rayleigh scattering and decreased fluorescence intensity, along with a blue shift in emission for tryptophan and tyrosine residues, indicate structural alterations. These changes suggest an expanded BSA structure and a modified microenvironment around key aromatic residues due to CIL binding. Circular dichroism (CD) study confirmed a slight reduction in α -helical content, further supporting structural changes in BSA upon CIL binding. Additionally, agarose gel electrophoresis demonstrated CIL's interaction with Calf Thymus DNA (Ct-DNA), suggesting potential implications for its biological activity. Molecular docking studies corroborated the spectrophotometric findings, providing insight into the binding orientation and key interacting residues. These results contribute to a better understanding of CIL's pharmacokinetic and pharmacodynamic profiles through its interaction with plasma proteins and nucleic acids.

KEYWORDS: Cilnidipine, Bovine Serum Albumin, UV-Visible Spectrophotometry, Fluorescence Quenching, Molecular Docking, Gel electrophoresis, Calf Thymus DNA Interaction



TITLE: DEVELOPMENT OF VALIDATED SPECTROPHOTOMETRIC METHODS FOR QUANTITATIVE ESTIMATION OF DRUGS CILNIDIPINE AND CHLORTHALIDONE.

AUTHORS: Chandradip Kumbharjuvekar, Sejal Kunkolienkar, Dr. Sachi Kudchadkar

DEPARTMENT: Department of Pharmaceutical Analysis, Goa College Of Pharmacy, Panaji

COLLEGE ADDRESS: 18th June Road, Panaji – 403001, Goa, India

CORRESPONDING AUTHOR EMAIL ID: chandradipkumbharjuvekar@gmail.com

ABSTRACT:

The objective of the current research work includes development and validation of novel, precise and accurate UV-visible spectrophotometric techniques for the analysis of Cilnidipine and Chlorthalidone without the need of prior separation. Two methods, namely Ratio Subtraction Coupled with Spectrum Subtraction (RS-SS) and Absorption Factor Method (AFM) were developed for the simultaneous estimation of Cilnidipine (CIL) and Chlorthalidone (CHLOR). In the RS-SS method, CIL and CHLOR were quantified at 360 nm and 275 nm, respectively, using a divisor concentration of 8 µg/mL of CIL. In the AFM method, CHLOR was determined directly by measuring the absorbance at 275 nm. For the estimation of CIL, an absorption factor was calculated from the absorbance values at two selected wavelengths, 275 nm and 365 nm. These values were applied in the AFM equation to compute the absorbance attributable to CIL in the mixture. The developed methods were validated in accordance with ICH Q2 (R2) guidelines. Linearity was established over the concentration ranges of 4–12 µg/mL for CIL and 5–15 µg/mL for CHLOR, with good correlation coefficients. Precision was confirmed through intraday and interday studies, with % RSD values below 2%. Accuracy was demonstrated by recovery studies conducted at three concentration levels (80%, 100%, and 120%), with recovery results ranging between 98% and 102%, confirming the reliability and robustness of the methods. Greenness was evaluated using Complex GAPI and AGREE software.

KEYWORDS: Cilnidipine, Chlorthalidone, Ratio subtraction, spectrum subtraction, absorption factor method, ICH Q2 (R2) guidelines, ComplexGAPI, AGREE.

TITLE: ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF UNIVARIATE SPECTROPHOTOMETRIC METHODS FOR QUANTIFYING BINARY DRUG COMBINATION IN HYPERTENSIVE CARE



AUTHORS: Avani Naik^{1*}, Amogh Kinnerker, Dr. Sachi Kudchadkar

DEPARTMENT: Department of Pharmaceutical Analysis

COLLEGE ADDRESS: Goa College of Pharmacy 18th June Road
Panaji – 403001, Goa, India

CORRESPONDING AUTHOR EMAIL ID: naik22avani@gmail.com

ABSTRACT:

The objective of present research work was to develop a novel, precise, and accurate UV spectrophotometric method based on four methods namely Ratio Subtraction Coupled with Extended Ratio Subtraction Method (RS-ERSM) and Ratio Subtraction Coupled with Constant Multiplication Method (RS-CMM), Ratio subtraction coupled with Spectrum Subtraction (RSSS) and Absorption Factor method (AFM) approach for simultaneous estimation of Azelnidipine and Olmesartan medoxomil in fixed dose combination. Validation of method was carried out as per the ICH guideline Q2 (R2). FOR RS-ERSM, RSCM and RSSS absorbance of AZE was measured at 258.8nm and that of OLME was measured at 255nm. For AFM AZE was measured at 342.2nm and OLME was measured at 255 nm. The coefficients of correlation were found to be 0.9997 and 0.9995 for AZE and OLME, respectively in for RS-ERS, RS-CM AND RSSS method and for AFM it was found to be 0.999 and 0.9995 for AZE and OLME respectively. Precision studies indicated % RSD values of less than 2% for both intra-day and inter-day measurements. The % recovery was found to be within the accepted criteria, i.e., 98-102%. The assay results met the acceptable pharmacopeial limits of 90-110%. These methods were further evaluated for their greenness with help of two greenness evaluation tools namely Agree and complex Gapi.

KEYWORDS: Azelnidipine, Olmesartan medoxomil, Ratio Subtraction Coupled with Extended Ratio Subtraction Method, Ratio Subtraction Coupled with Constant Multiplication Method, Ratio subtraction coupled with Spectrum Subtraction, Absorption Factor method, ICH Q2 (R2).

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: ECO FRIENDLY UV SPECTROPHOTOMETRIC APPROACHES FOR QUANTITATIVE ESTIMATION OF ANTIHYPERTENSIVE DRUG MIXTURES.

AUTHORS: Tejal Naik Gaonkar, Adison Fernandes, Aditi Desai

DEPARTMENT: Pharmaceutical Analysis

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road Panaji

CORRESPONDING AUTHOR EMAIL ID: tejalnaikgaonkar@gmail.com

ABSTRACT:

The research work focused on development and validation of two ecofriendly UV spectrophotometric methods for quantitative estimation of Amlodipine besylate (AMLO) and Telmisartan (TEL). Method A is Ratio Subtraction coupled with Extended Ratio Subtraction (RS-ERS) and method B is Ratio Difference (RD). Approaches were developed using distilled water as a solvent.

In Ratio Subtraction coupled with Extended Ratio Subtraction method, TEL was obtained by ratio subtraction method and AMLO was obtained by extended ratio subtraction method followed by measuring absorbance at 296 nm for TEL and 366 nm for AMLO respectively. In the ratio difference method, AMLO was determined by measuring the amplitude difference between 244 nm and 294.20 nm on its ratio spectrum, while TEL was determined by measuring the amplitude difference between 226 nm and 244 nm on its ratio spectrum. Validation of methods were carried out as per the ICH guideline Q2 (R2). Linearity was established over the concentration range of 6-12 µg/mL for AMLO and 12-20 µg/mL TEL, respectively. The proposed methods were found to be precise with % RSD less than 2. The percentage recoveries were found to be in the range of 98 – 102 % confirming the accuracy of the methods. These methods were further evaluated for their greenness with help of two greenness evaluation tools namely Agree and complex Gapi. Application of the methods were also studied on marketed dosage form.

KEYWORDS: Amlodipine besylate, Telmisartan, Ratio subtraction coupled with extended ratio subtraction, Ratio difference, Complex Gapi.



TITLE: DEVELOPMENT AND VALIDATION OF UV-VIS SPECTROSCOPIC METHOD FOR ESTIMATION OF VORTIOXETINE IN PHARMACEUTICAL PRODUCT

AUTHORS: Nikhil S. Gawas*, Meenaxi M. Maste

DEPARTMENT: Department of Pharmaceutical Chemistry

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: nikhilgawas@klepharm.edu

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Vortioxetine is an antidepressant medication indicated for the treatment of major depressive disorder. Being a serotonin modulator and simulator, its multimodal mechanism of action responsible for simultaneously modulating one or more serotonin receptors and inhibits the reuptake of serotonin. It is crucial to determine the right dose for the right patient, which can be established through dose response relationship using an analytical technique. Vortioxetine being poorly soluble in water, an attempt was made to develop an ecofriendly spectroscopic method using micronized vortioxetine. The method was developed by using 20% Methanol and 80% Water as a diluent. Following the ICH Q2(R2) guidelines the method was validated in terms of specificity, and selectivity ensuring no interference near vortioxetine, correlation coefficient (R^2) of 0.999 exhibited the linearity in the concentration range of $2\mu\text{g/ml}$ to $10\mu\text{g/ml}$, lowest limit of detection was found to be $0.374\mu\text{g/ml}$ and quantification was $1.132\mu\text{g/ml}$. Percentage relative standard deviation being less than 2% for precision, robustness and ruggedness, it assured the method to be precise, robust and rugged for analysis. The assay of vortioxetine exhibited 99.08% of purity using marketed formulation and the mean recovery at 80%, 100% and 120% was in the range of 99.02% to 100.49%. The method was concluded to be, simple, economical, specific, reproducible, and accurate, for routine analysis of vortioxetine in the bulk and pharmaceutical dosage forms.

KEYWORDS: Multimodal mechanism, Micronized Vortioxetine, ecofriendly spectroscopic method, ICH Q2(R2) guidelines.



TITLE: DEVELOPMENT AND VALIDATION OF ANALYTICAL METHODS FOR QUANTIFICATION OF BETULINIC ACID IN HERBAL MEDICINES.

AUTHORS: Raksha R. Shet^{1*}, Nikhil S. Gawas²

DEPARTMENT:

Department of Pharmaceutical Analysis¹, Department of Pharmaceutical Chemistry².

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: shetraksha3@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT:

Betulinic acid is a naturally occurring pentacyclic triterpenoid, exhibiting a wide array of biological activities, including anticancer, antiviral, and anti-inflammatory properties. For the purpose of successfully exploring and utilizing these therapeutic potentials, simple, accurate, reliable and dependable methods for assessing Betulinic acid are essential. Additionally, the concentration of Betulinic acid in natural sources such as *Diospyros* species is crucial for streamlining extraction and purification procedures, which may result in the development of novel drugs. An RP-HPLC method was developed and validated using waters e2695 module equipped with waters 2998 PDA detector. The method was developed using Phenomenex Luna C18 (250×4.6 mm, 5μ). The chromatographic conditions were comprised of mobile phase containing 0.1% orthophosphoric Acid and methanol in the ratio of 10:90% v/v with flow rate of 1ml/min and detection wavelength of 210nm. The retention time was found to be 5.84 min, followed by validation as per ICH Q2R2 guidelines. The linearity was assessed by calculating the correlation coefficient, found to be 0.999 in the concentration range of 50-150μg/ml. The lowest limit of detection and quantitation were, 11.9μg/ml and 36.0μg/ml respectively. %RSD for precision, robustness and ruggedness was found to be below 2%. The methanolic extract of *Diospyros montana Roxb* was used for the quantification of Betulinic acid. The extract yielded 6.5μg of Betulinic acid per 10mg of methanolic extract.

Keywords: RP-HPLC, Betulinic acid, *Diospyros montana Roxb*, ICH Q2(R2).



TITLE: ADVANCED PLANAR CHROMATOGRAPHIC BIOANALYSIS OF RIOCIQUAT IN HUMAN PLASMA: REGULATORY COMPLIANT HPTLC METHOD DEVELOPMENT AND VALIDATION

AUTHORS: Sneha S. Patil, Divya R. Shelke, Mr. Abhay R. Shirode.

DEPARTMENT: M.Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth College of Pharmacy, Sector-8, C.B.D. Belapur, Navi Mumbai-400 614

CORRESPONDING AUTHOR EMAIL ID:
snehasureshpatil2002@gmail.com

ABSTRACT:

A selective and specific method was developed and validated for the quantification of riociguat in human plasma using instrumental thin-layer chromatography (TLC) combined with protein precipitation for sample preparation. The planar chromatographic separation was performed on silica gel 60 F₂₅₄ TLC plates as the stationary phase, employing a mobile phase consisting of toluene, ethyl acetate, and glacial acetic acid in a 3.2:7.5:0.35 (v/v/v) ratio. The high-performance TLC (HPTLC) densitograms demonstrated distinct, well-resolved peaks for riociguat and the internal standard furosemide at hRf values of 23.5 and 79.7, respectively, when scanned at 325 nm. Method validation was conducted following an in-house protocol aligned with ICH M10 and analytical procedure validation guidelines (ICH Q2 R2) and the European Medicines Agency's bioanalytical method validation guidelines. The developed method exhibited excellent linearity over the concentration range of 8–32 ng/band, with a correlation coefficient (R^2) of 0.9975. Furthermore, the method demonstrated high sensitivity, accuracy, precision, and robustness. This validated planar chromatographic HPTLC method is suitable for the reliable quantification of riociguat in real plasma samples. The proposed HPTLC method meets all acceptance criteria of validation parameters set in validation protocol. The validated method has scope in analysis of real samples of various studies namely, IVIVC, therapeutic drug monitoring studies, pharmacokinetic studies, Bioavailability and bioequivalence studies for generic formulations of Riociguat.

KEYWORDS: Planar chromatography, HPTLC, Bioanalysis, Riociguat, Internal Standard-Furosemide, Protein-Precipitation technique, ICH M10, hRf.



TITLE: REGULATORY-COMPLIANT RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR DETECTION AND QUANTIFICATION OF RIOCIGUAT IN HUMAN PLASMA.

AUTHORS: Lekha H. Dhindale, Divya R. Shelke, Mr. Abhay R. Shirode

DEPARTMENT: M. Pharmacy- Quality Assurance

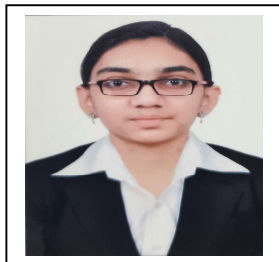
COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector-8, C.B.D. Belapur, Navi Mumbai -400 614, India.

CORRESPONDING AUTHOR EMAIL ID: lekhadhindale26@gmail.com

ABSTRACT: Regulatory agencies such as the FDA and EMA, have established detailed frameworks for bioanalytical method validation and sample analysis to ensure that resulting data are scientifically robust, reproducible, and compliant with Good Laboratory Practice (GLP) and Good Clinical Practice (GCP). In this study, a reliable bioanalytical RP-HPLC method assisted by liquid-liquid extraction (LLE) technique was developed and validated for the quantification of Riociguat- a pharmaceutical drug substance used for treating patients with pulmonary hypertension. Chromatographic separation was achieved on a C18 column with detection wavelength of 325 nm, employing a mobile phase of acetonitrile and double-distilled water in a 60:40 (v/v) ratio. The resulting chromatogram showed clear and well-separated peaks for riociguat and the internal standard (metronidazole) at retention times (RT) of 4.98 and 3.33 minutes, respectively. Method validation adhered to an in-house validation protocol developed in accordance with ICH M10 and ICH Q2 (R2) guidelines of bioanalytical and analytical method validation respectively. The method showed linearity across 1–30 µg/mL, with a correlation coefficient (R^2) of 0.9906. Additionally, it demonstrated excellent sensitivity, accuracy, reproducibility, and robustness. Overall, the developed RP-HPLC method meets all acceptance criteria of validation parameters set in validation protocol and the proposed methods sounds appropriate for analysis of real samples of various BA/BE studies, therapeutic drug monitoring studies, Pharmacokinetic studies conducted on bioequivalent generic formulations of Riociguat.

KEYWORDS: Riociguat, Liquid-Liquid Extraction (LLE), HPLC, Internal Standard-Metronidazole, ICH M10 and ICH Q2(R2)

TITLE: INNOVATIVE DEVELOPMENT AND VALIDATION OF RP-HPLC AND HPTLC METHODS FOR MELOXICAM: A STEP TOWARDS ANALYTICAL INTELLECTUAL PROPERTY CREATION



AUTHORS: Shreya A. Firake, Ammara H. Sahibole, Dr. Vineeta V. Khanvilkar

DEPARTMENT: M. Pharmacy -Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector-8, C.B.D. Belapur, Navi Mumbai- 400 614, Maharashtra, India.

CORRESPONDING AUTHOR EMAIL ID: shreyafirake18@gmail.com

ABSTRACT:

Meloxicam is a potent non-steroidal anti-inflammatory drug and the aim of the study was to develop a method capable of determining the lowest concentration of Meloxicam in bulk and formulation. Here RP-HPLC and HPTLC methods were developed and validated in accordance with the ICH Q2 (R2) and USP guidelines. For RP-HPLC method the stationary phase selected was octadecyl silane C18 column (250×4.6 mm, 5 µm) with an isocratic elution for mobile phase of ACN: Water (pH adjusted to 7.5 with triethylamine) in the ratio of 3:7v/v and a flow rate of 0.5mL/min at a wavelength of detection 362nm. In HPTLC method, precoated silica gel F₂₅₄ plates using mobile phase composition of toluene: ethyl acetate: glacial acetic acid (7:3:0.2 v/v/v) at detection wavelength of 362nm. The RP-HPLC method demonstrated linearity over the range of 50-450 ng/mL while the HPTLC method showed 1.0-4.0 µg/mL which indicated higher sensitivity of RP-HPLC method when compared with HPTLC method. Both methods demonstrated high precision, accuracy, and robustness, confirming their reliability for routine analysis, while the novel solvent system and optimized chromatographic conditions present opportunities for intellectual property generation. Comparative evaluation showed that RP-HPLC offers greater sensitivity, whereas HPTLC provides a cost-effective alternative, with both validated methods being scientifically sound, reproducible, contributing to safeguarding of innovation and aligned with global regulatory standards.

KEYWORDS: Meloxicam, RP-HPLC, HPTLC, Validation

TITLE: EXPLORING HPTLC FOR BIOANALYSIS: QUANTIFICATION OF AMISULPRIDE FROM HUMAN PLASMA.



AUTHORS: Akshata A. Kuvalekar, Yograj D. Kolhe,
Mr. Abhay R. Shirode

DEPARTMENT: M Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector-8, C.B.D. Belapur, Navi Mumbai -400 614, India.

CORRESPONDING AUTHOR EMAIL ID: akshatakuvalekar817@gmail.com

ABSTRACT: The proposed work deals with exploring a planner chromatographic- High Performance Thin Layer Chromatographic (HPTLC) technique for determination of amisulpride in human plasma. The goal was to establish a reliable and regulatory compliant method for the analysis of amisulpride in human plasma. This method was developed systematically considering method development guidance ICH Q14 and validated as per the validation protocol designed based on the recommendations given by ICH Q2(R2) and M10. The advanced HPTLC system of CAMAG, Switzerland employed with Applicator- Linomat 5, densitometric detection system -TLC Scanner 4, operated through 21CFR compliant Vision CATS 4.0 software was used for experimental research work. The protein precipitation technique was used for preparation of samples. The chromatographic separation was performed on Silica Gel 60 Silica Gel 60 F₂₅₄ plates with a mobile phase of ethyl acetate, methanol, toluene, and triethylamine in a ratio of 7:1:3:0.5 (V/V/V/V). Amisulpride and internal standard (caffeine) were detected at 283 nm. The retardation factors for drug and internal standard were found to be 0.342 and 0.515, respectively. A proposed method demonstrated remarkable linearity over the concentration range of 0.217 to 1.521 ug/ml with the correlation coefficient (R^2) of 0.9954. The QC samples LQC, MQC, and HQC had mean recovery percentages of 65%, 86.22% and 89%, respectively. The HPTLC method successfully separates and quantifies amisulpride in human plasma with high sensitivity. The validation results confirm the method's accuracy, linearity, precision and robustness meeting the criteria for regulatory compliance. The developed planar chromatographic method has scope to identify and quantify amisulpride in real samples of clinical, Bioavailability-bioequivalence (BABE) studies of new generic dosage forms of amisulpride.

KEYWORDS: HPTLC, Amisulpride, Bioanalysis, Internal standard-Caffeine, ICH M10, ICH Q2(R2), ICH Q14.



TITLE: Development and validation of new HPTLC method for the determination of bakuchiol in Nanoemulgel formulation.

AUTHORS: Sakshi Sonule, Suvarna Phadatare, Mansi Nikam

DEPARTMENT: M.Pharmacy _ Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeet's College of Pharmacy,

Sector-8, C.B.D. Belapur , Navi Mumbai-400614, India

CORRESPONDING AUTHOR EMAIL ID: sakshisonule559@gamil.com

(Kindly note: *All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication*)

ABSTRACT: (Not more than 250 words)

A high-performance thin-layer chromatography (HPTLC) method was successfully developed and validated for the quantification of active phytochemical from Babchi plant (*Psoralea corylifolia* Linn, *Leguminosae* family) in herbal formulations. Babchi oil is widely recognized for its antioxidant, anti-inflammatory, and anti-aging properties, and has been increasingly used in dermatological and cosmeceutical applications. A very few analytical methods such as HPTLC, HPLC, LC-MS, and spectrophotometry have been reported in the literature for its estimation. Nanoemulgel of Babchi oil was quantified by using HPTLC method. Chromatographic separation was performed in a linear ascending mode on silica gel 60 F254 TLC plates using hexane:ethyl acetate:formic acid (9:1:0.2, v/v/v) as the mobile phase, and quantification was carried out at 262 nm with a CAMAG TLC Scanner 4. The calibration curve showed good linearity in the range of 50–500 ng/spot with a correlation coefficient (r^2) of 0.996, confirming excellent proportionality between concentration and response. Under the optimized conditions, active phytochemical produced a sharp, compact, and well-resolved peak at an R_f value of 0.33 ± 0.05 . The sensitivity of the method was demonstrated with a limit of detection (LOD) of 15.79 ng/spot and a limit of quantification (LOQ) of 47.87 ng/spot, confirming its ability to quantify even trace levels. ICH Q2(R2) guideline were followed to confirm precision, accuracy, specificity, and robustness of method. Key indicators like low RSD values, high recovery rates, and lack of excipient interference demonstrated its reliability. HPTLC method suits routine analysis and quality control of Babchi oil formulation.

KEYWORDS: HPTLC, *Psoralea corylifolia*, Method development, validation.



TITLE: A PROTEIN PRECIPITATION ASSISTED BIOANALYTICAL RP-HPLC METHOD FOR AMISULPRIDE: DEVELOPMENT AND VALIDATION.

AUTHORS: Shruti M. Shetye, Yograj D. Kolhe, Mr. Abhay R. Shirode

DEPARTMENT: M. Pharmacy - Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector - 8, C.B.D. Belapur, Navi Mumbai - 400 614, India.

CORRESPONDING AUTHOR EMAIL ID: shrutishetye702@gmail.com

ABSTRACT: The RP-HPLC method was developed and validated for the quantification of Amisulpride in human plasma. Chromatographic separation was performed on a Hemsil C18 column, with a mobile phase consisting of acetonitrile (ACN) and 0.1% orthophosphoric acid (OPA) in a 20:80 (v/v) ratio, delivered at a flow rate of 0.8 mL/min. The detection wavelength of the drug sample was at 227 nm. Sample preparation involved protein precipitation to effectively extract Amisulpride from the plasma matrix. The retention times for amisulpride and caffeine as internal standard were found to be approximately 7.1 and 6.4 minutes, respectively. The validation was carried out in accordance with the ICH M10 and ICH Q2(R2) guidelines on bioanalytical method validation by the International Council for Harmonisation (ICH), ensuring the method meets international regulatory standards for selectivity, specificity, linearity, accuracy, precision, recovery and stability. Linearity was demonstrated over a concentration range of 0.217 to 1.521 µg/mL. Intra-day and inter-day precision (%CV) ranged from 0.772% to 7.629%. Recovery ranged between 64% and 76%. Freeze-thaw stability, autosampler stability, short-term stability and long-term stability studies were performed. Stability studies confirmed that the method produced results within acceptable limits. The proposed RP-HPLC method proved to be accurate and rapid for the determination of Amisulpride in human plasma, and it can quantify lower concentration of amisulpride with a run time of approximately 10 minutes and minimal consumption of organic solvent.

KEYWORDS: RP-HPLC, Bioanalytical Method Development, Amisulpride, Internal Standard-Caffeine, Protein-Precipitation Technique, ICH M10.

**TITLE: CREATING ANALYTICAL INTELLECTUAL PROPERTY:
DEVELOPMENT AND VALIDATION OF A SENSITIVE BIOANALYTICAL
METHOD FOR ARIPIPRAZOLE**



AUTHORS: Kalyani U. Deshmukh, Gayatri S. Vinchurkar,
Dr. Vineeta V. Khanvilkar

DEPARTMENT: Department of Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy,
Sector 8, C.B.D. Belapur, Navi Mumbai-400614, Maharashtra, India.

CORRESPONDING AUTHOR EMAIL ID: deshmukhkalyani441@gmail.com

ABSTRACT: Bioanalytical method development is a critical step in drug discovery, pharmacokinetic studies, and regulatory submissions. A novel, validated method can be considered part of an organization's intellectual property (IP). This work focuses on HPTLC development and validation of a rapid and sensitive bioanalytical method for quantification of Aripiprazole in human plasma by using Glimepiride as an internal standard. Chromatographic separation was accomplished on silica gel 60F254 having thickness of 200nm using mobile phase comprised of Toluene: Ethyl acetate: Methanol (4:2:1 V/V/V). Densitometric detection of drug and the internal standard was done at 252 nm. Liquid-liquid extraction method was used to extract the drug from spiked human plasma. The method was validated as per ICH M10 guidelines. Lower limit of quantitation and limit of quantitation values were found to be 5 ng/band and 15 ng/band. Precision evaluated at both intraday and inter-day showed % CV $\pm$ 15% for quality control samples and $\pm$ 20% at lower limit of quantification. Accuracy studies gave the % recovery of 88.55, 90, 105% which was maintained within 85–115% across quality control levels. This method is cost-effective approach for routine bioanalytical and quality control purposes. Due to its effective performance in plasma sample analysis, it may be extended for future use in therapeutic drug monitoring, bioequivalence studies, and pharmacokinetic evaluation. This method demonstrates high sensitivity, selectivity, and reproducibility. This innovative method will be well-suited for regulatory submissions, clinical research applications.

KEYWORDS: Aripiprazole, HPTLC, Human plasma, Liquid-liquid extraction, Bioanalytical.

TITLE: VALIDATED STABILITY INDICATING HPTLC METHOD FOR THE QUANTIFICATION OF FLAVOURING AND FRAGRANT AGENT, SYRINGALDEHYDE FROM *MAGNOLIA OFFICINALIS*



AUTHORS: Roshani Bhamare, Rutuja Pujari, Dr. Aruna Jadhav

DEPARTMENT: M. Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy,
Sector-8, C.B.D. Belapur, Navi Mumbai -400614, India

CORRESPONDING AUTHOR EMAIL ID: roshanibhamare2002@gmail.com
aruna.jadhav@bvcop.in

ABSTRACT:

A high-performance thin-layer chromatography (HPTLC) method was developed for the estimation of syringaldehyde from *Magnolia officinalis* bark powder, family Magnoliaceae. syringaldehyde has antidiabetic potential. A CAMAG Linomat ATS 5 sample applicator was used for the application of the sample. Chromatographic separation of the syringaldehyde was performed over thin-layer chromatography (TLC) plates precoated with Silica Gel 60 F₂₅₄ using Toluene: ethyl acetate: glacial acetic acid (6:4:0.3, V/V/V) as a mobile phase via linear ascending technique in a twin trough chamber. Detection and quantification were carried out at a wavelength of 307 nm using a TLC scanner 4. This method showed good peak symmetry for the syringaldehyde with a retardation factor of 0.39 ± 0.02 . The calibration curve was linear in the range of 10 to 100 ng/spot, and the correlation coefficient (R^2) was 0.9978. The method was validated according to International Council for Harmonization (ICH) Q2 R1 Guidelines for the Linearity, Specificity, Limit of Detection, Limit of Quantification, Precision, Accuracy (Recovery) and Robustness. In conclusion, the developed HPTLC method is simple, reliable, and specific for the identification and quantification of syringaldehyde.

KEYWORDS: Syringaldehyde, *Magnolia officinalis*, HPTLC, Densitometry.

**TITLE: VALIDATED STABILITY INDICATING HPTLC METHOD FOR THE
QUANTIFICATION OF EMETINE HYDROCHLORIDE FROM *CEPHAELIS
IPECACUANHA***



AUTHORS: Vaishnavi Mohite , Bhavik Kalamkar, Dr Aruna Jadhav

DEPARTMENT: M Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy,
Sector-8, C.B.D. Belapur, Navi Mumbai -400614, India.

CORRESPONDING AUTHOR EMAIL ID: mohitev7213@gmail.com ,
aruna.jadhav@bvcop.in

ABSTRACT:

A high-performance thin-layer chromatography (HPTLC) method was developed for the estimation of an alkaloid, Emetine HCl, from *Cephaelis ipecacuanha*, Ipecac root powder, family Rubiaceae. Emetine is a drug used as both an anti-protozoal and an emetic. A CAMAG Linomat ATS 5 sample applicator was used for the application of the sample. Chromatographic separation of Emetine hydrochloride was performed using thin-layer chromatography (TLC) plates precoated with Silica Gel 60 F₂₅₄, with dichloromethane: methanol: formic acid (8.5:1.5:1.0, V/V/V) as the mobile phase, via a linear ascending technique in a twin trough chamber. Detection and quantification were carried out at a wavelength of 286 nm using a TLC scanner 4. This method showed good peak symmetry for the marker with a retardation factor of 0.60 ± 0.05 for Emetine HCl. The calibration curve was linear in the range of 100 to 1000 ng/spot for Emetine HCl, and the correlation coefficient (R^2) was 0.998. The method was validated according to International Council for Harmonization (ICH) Q2 R1 Guidelines for the Linearity, Specificity, Limit of Detection, Limit of Quantification, Precision, Accuracy (Recovery) and Robustness. In conclusion, the developed method is simple, reliable, and specific for the identification and quantification of Emetine HCl.

KEYWORDS: *Cephaelis ipecacuanha*, Ipecac, Alkaloid, Emetine HCl, HPTLC, Densitometry.



TITLE: ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF TOFISOPAM IN BULK AND PHARMACEUTICAL DOSAGE FORM.

AUTHORS: Vrushali V. Patil^{1*}, Nikhil S. Gawas², Raksha R. Shet¹

DEPARTMENT:

Department of Pharmaceutical Analysis¹, Department of Pharmaceutical Chemistry².

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: vrushalip550@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Background: Tofisopam, an anxiolytic and a 1,3-benzodiazepines with a unique CNS activity of not binding to the GABA receptor. Tofisopam is prescribed in 50-300mg perday and does not cause dependence as other benzodiazepines.

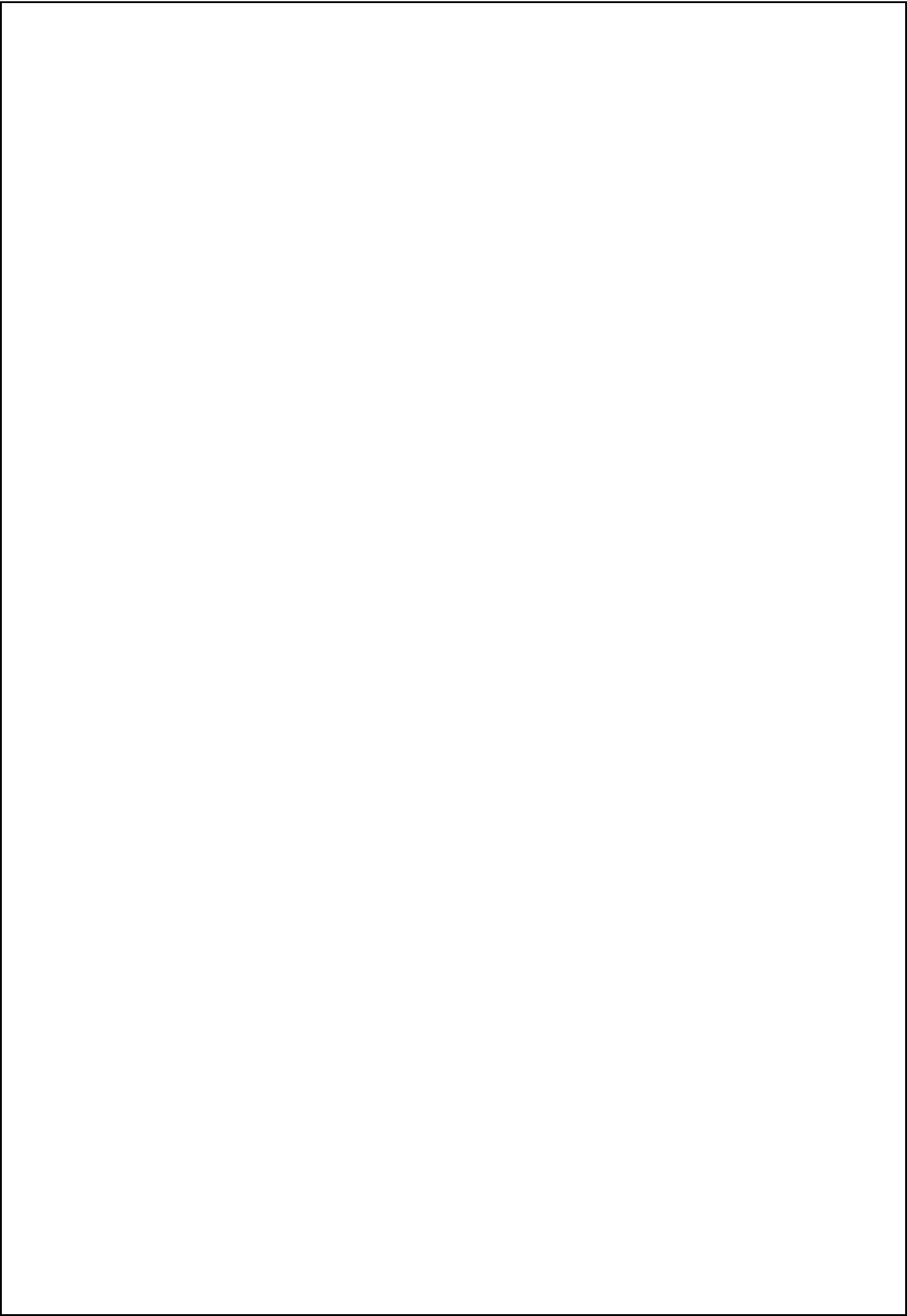
Objectives: The objective of the present investigation is to develop and validate a stability indicating UV-Spectrophotometric method for estimation of Tofisopam in bulk, pharmaceutical formulation.

Method: UV-Spectrophotometric method was developed by using Methanol:Water (25:75%) as a solvent. The Developed method was validated in terms of specificity, selectivity, linear range, LOD, LOQ, precision, accuracy, robustness, ruggedness, and reproducibility, as per ICH guidelines. The newly developed and validated method was successfully applied for the estimation of Tofisopam in pharmaceutical dosage forms. Stability studies were performed using acidic, basic, thermal, oxidative, and photolytic conditions.

Results: Tofisopam exhibits λ_{max} at 309nm. Beer's law was obeyed in the concentration range of 4-12 μ g/ml. The limit of detection and limit of quantification were found to 0.73 μ g/ml and 2.22 μ g/ml respectively. Recovery of Tofisopam was in the range of 92-100%. The percentage relative standard deviation was found to be less than 2% for all the precision and repeatability studies. The assay of Tofisopam was found to be 91.72%. On degradation studies, it was observed that 6-21% of the drug was degraded on exposure to Acidic, basic, thermal, oxidation, and photolytic conditions.

Conclusion: The method was found to be, simple, specific, reproducible, economical, for routine analysis of Tofisopam in the bulk and pharmaceutical dosage form. 6-21% of the drug was degraded on forced degradation.

Keywords: Method validation, Stability Indicating, Tofisopam, Toficalm, UV-Spectrometer.





TITLE: DEVELOPMENT AND OPTIMIZATION OF MARKER BASED STANDARDIZATION METHODS FOR ESTIMATION OF CHRYSIN IN HERBAL FORMULATION.

AUTHORS: Ashlesha Bhatkande^{1*}, Akanksha Bhatkande², Dr. M. S. Palled², Dr. Shailendra Suryawanshi².

DEPARTMENT: Department of Pharmaceutical Analysis, Department of pharmaceutical Chemistry.

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: bhatkandeashlesha@gmail.com

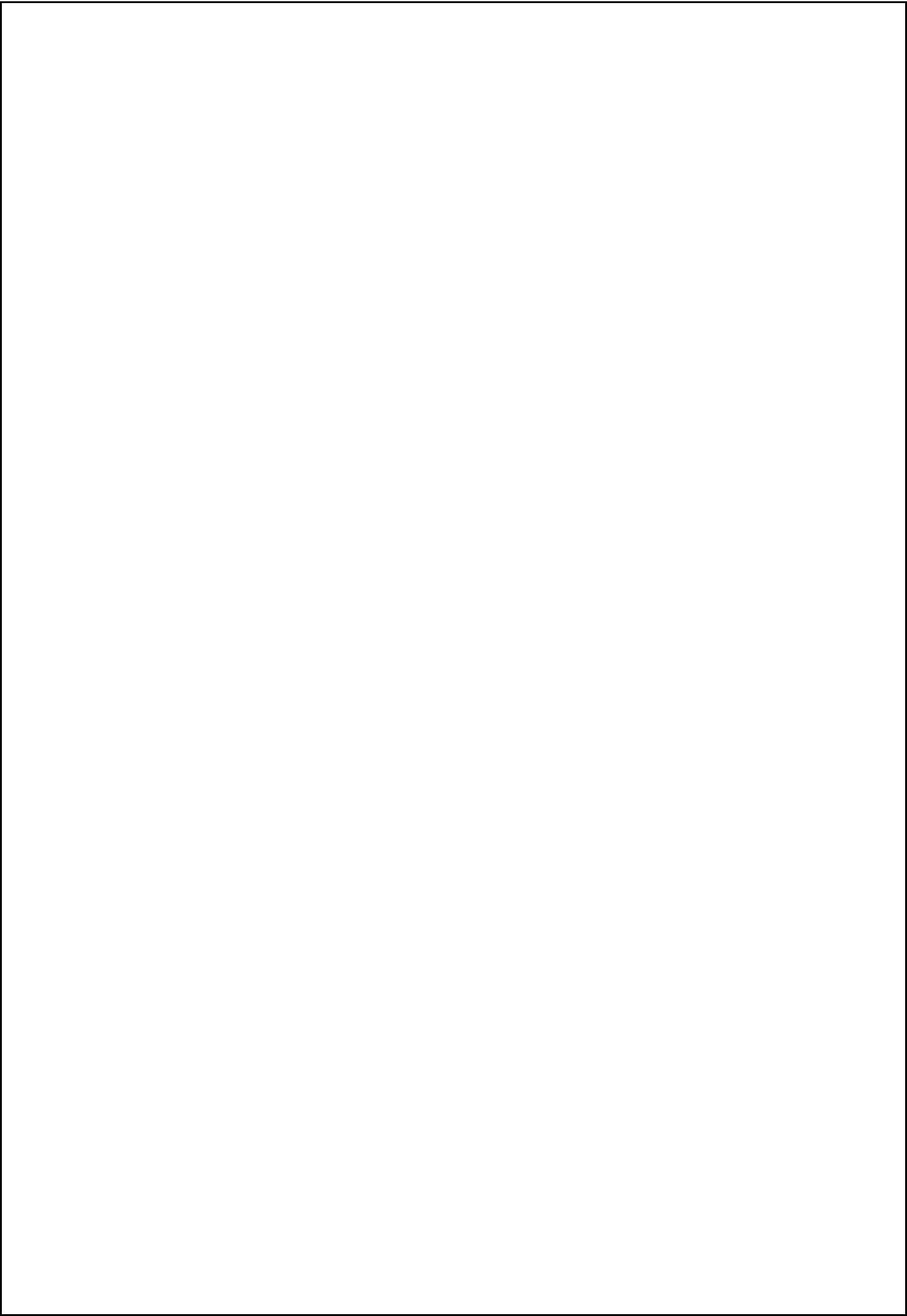
(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT:

Chrysin is an orally administered anticancer compound also used in the treatment of erectile dysfunction and other conditions. To enhance the selectivity, sensitivity, and speed of assay methods for chrysin, it is essential to develop robust and validated analytical techniques. The primary aim of this study was to develop and validate an ICH-compliant, stability-indicating method using UV Spectroscopy and Reverse Phase High Performance Liquid Chromatography (RP-HPLC). For the UV Spectroscopic method, a mobile phase of water and methanol (60:40 v/v) was employed. The absorption wavelength was set at 269 nm. The method exhibited linearity for chrysin concentrations ranging from 2 to 10 µg/ml, with a regression coefficient of 0.9997 and %RSD below 2. The purity of chrysin was found to be between 96% and 106%. In the RP-HPLC method, separation was achieved using an Agilent C18 column (100 mm × 4.6 mm, 2.5 µm) with a mobile phase of methanol and 0.05% OPA in a 75:25 v/v ratio. The flow rate was 1 ml/min, and quantification was performed using a UV detector at 269 nm. The method showed linearity across 10 to 50 µg/ml with a regression coefficient of 0.9995. Chrysin's purity ranged from 99% to 100%. The limit of detection and quantitation were 0.91 µg/ml and 2.74 µg/ml, respectively. %RSD values remained below 2%, confirming the method's reliability.

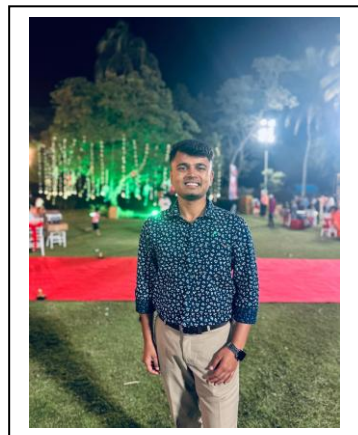
KEYWORDS: Chrysin, RP-HPLC, UV, AUC, Validation



10th Annual International Conference on IPR

DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!

Nov. 04-05, 2025



TITLE: Development and QBD- Assisted Validation of a Stability- Indicating RP-HPLC Method for Quantification of Kaempferol Using Design of Experiment.

AUTHORS: Siddhesh Santosh Bandekar^{1*}, Shailendra S Suryawanshi¹

DEPARTMENT:

Department of Pharmaceutical Analysis¹, Department of Pharmaceutical Chemistry².

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: siddheshbandekar10@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

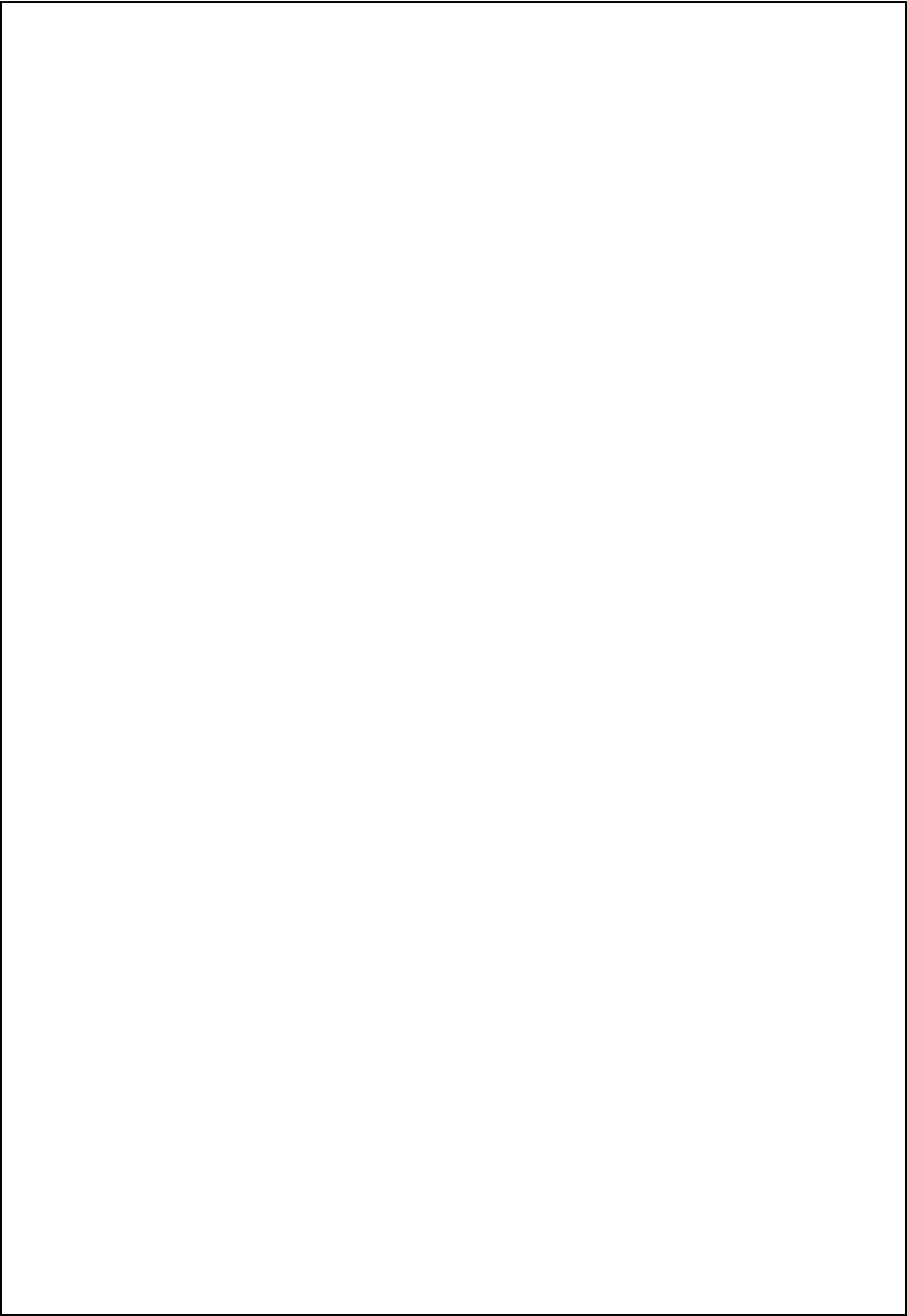
ABSTRACT:

Background and Objective: Kaempferol, a bioactive flavonoid with anti-inflammatory and antioxidant potential, requires a robust and validated analytical method for reliable quantification. The present study aimed to develop and validate a stability-indicating RP-HPLC method for Kaempferol employing a Quality by Design (QbD) approach with Design of Experiments (DoE).

Materials and Methods: The chromatographic separation was achieved using a Shimadzu HPLC system on a C18 column with Methanol:Orthophosphoric acid (75:25, v/v) as the mobile phase, at a flow rate of 1.0 mL/min, column temperature 30 °C, and detection at 365 nm. Method performance was optimized using DoE principles. Validation was carried out as per ICH guidelines assessing specificity, precision, accuracy, robustness, ruggedness, linearity, LOD, LOQ, and degradation behavior.

Results: Kaempferol showed a sharp peak at a retention time of 5.1 min with a linearity correlation coefficient of 0.9993. Specificity and selectivity were confirmed with mean theoretical plates of 4173.47 and tailing factor 1.32. Precision was within acceptable limits (intraday 0.07–0.79%; interday 0.01–0.93%). Ruggedness (0.25–1.02%) and robustness (0.02–0.35%) indicated high reproducibility. The method demonstrated LOD of 0.872 µg/mL and LOQ of 2.644 µg/mL. Accuracy at 3–9 µg/mL showed acceptable recovery values. Forced degradation studies revealed significant degradation (19.8–84.2%) under stress conditions, confirming the stability-indicating capability.

Conclusion: A reliable, precise, and stability-indicating RP-HPLC method for Kaempferol quantification was successfully developed and validated using a QbD-driven DoE approach. The method can be applied for routine quality control, formulation development, and stability studies of Kaempferol and its herbal preparations.





TITLE: QUALITY BY DESIGN ASSISTED DEVELOPMENT AND VALIDATION OF BIOANALYTICAL METHOD FOR QUANTIFICATION OF NARINGIN.

AUTHORS: Raj Deelip Mayanna^{1*}, Dr. M. S. Palled²

DEPARTMENT: Department of Pharmaceutical Analysis¹

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: rajmayanna48@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT:

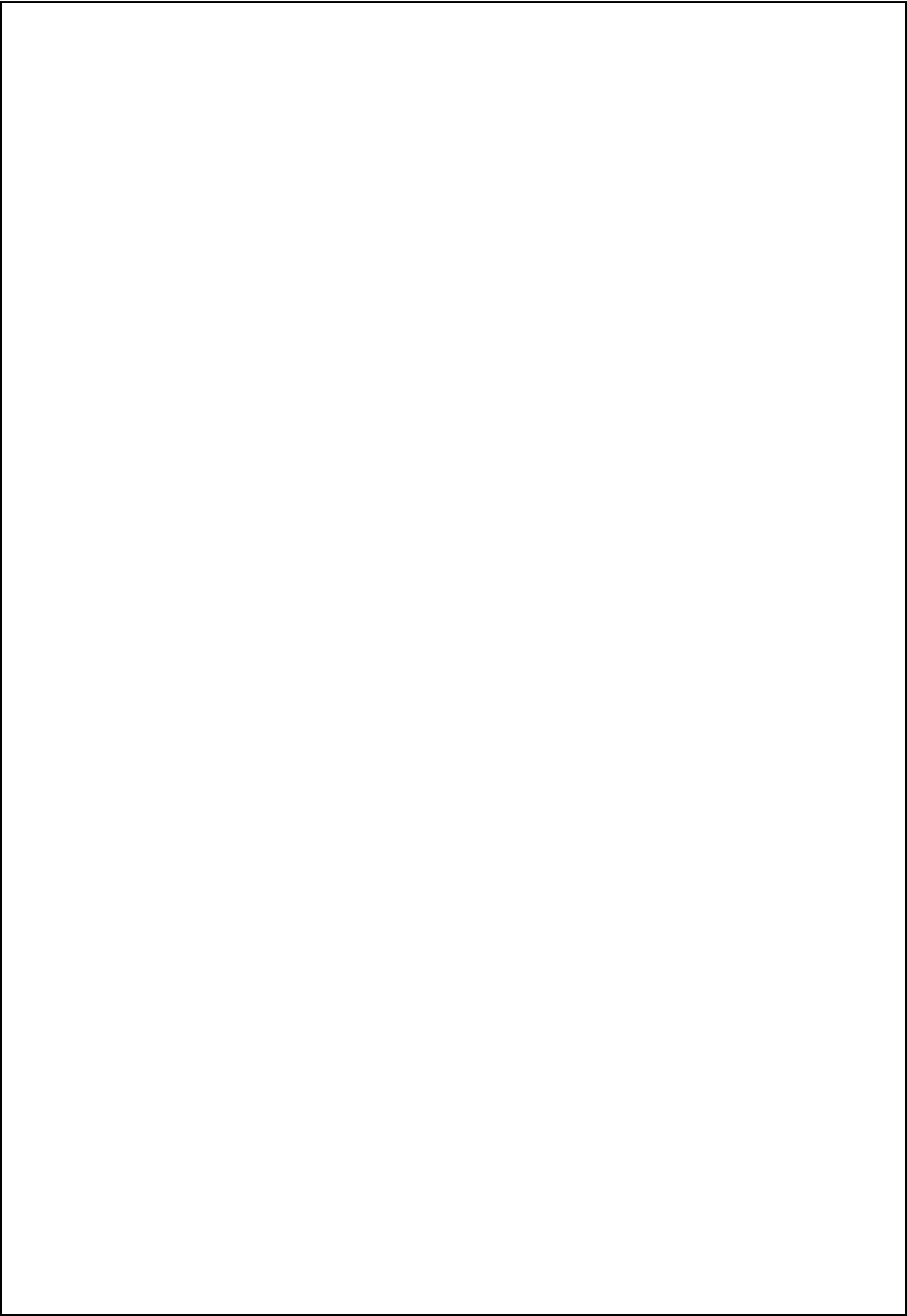
Background and Objective: Naringin, a prominent bioactive flavonoid known for its anti-inflammatory, antioxidant, and cardioprotective properties, necessitates a sensitive, robust, and validated analytical method for its reliable quantification in biological matrices. Accurate measurement is essential to support pharmacokinetic, bioavailability, and therapeutic monitoring studies. The present study aimed to develop and validate a bioanalytical method for the quantification of Naringin using a Quality by Design (QbD) framework. A systematic Design of Experiments (DoE) approach was employed to optimize critical method parameters, ensuring method robustness, reproducibility, and compliance with regulatory guidelines.

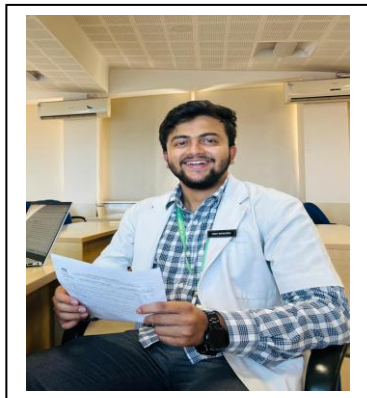
Materials and Methods: The chromatographic separation was achieved using a Shimadzu HPLC system equipped with a C18 column, employing a mobile phase consisting of methanol and orthophosphoric acid in the ratio of 52:48 (v/v). The flow rate was maintained at 1.0 mL/min, with the column temperature set at 35 °C. Detection was carried out at 283 nm, specific to Naringin. Method development and optimization were performed using Quality by Design (QbD) principles, incorporating a Design of Experiments (DoE) approach to identify and control critical method parameters. The method was validated in accordance with ICH guidelines, evaluating parameters such as specificity, precision, accuracy, robustness, ruggedness, linearity, limit of detection (LOD), limit of quantification (LOQ), and degradation behavior under various stress conditions.

Results: Naringin exhibited a sharp and well-resolved peak at a retention time of 3.6 min, with a linearity correlation coefficient (R^2) of 0.9981, indicating excellent linear response. Specificity and selectivity were established, with a mean theoretical plate count of 4032.56 and a tailing factor of 1.29, confirming efficient peak symmetry and column performance. Precision results were within acceptable limits, with intraday variation ranging from 0.08–0.85% and interday variation from 0.06–0.97%. Ruggedness (0.18–1.08%) and robustness (0.03–0.39%) studies demonstrated the method's high reproducibility under variable conditions. The method exhibited a limit of detection (LOD) of 0.915 µg/mL and limit of quantification (LOQ) of 2.773 µg/mL. Accuracy evaluated at concentrations of 3–9 µg/mL yielded acceptable recovery values within pharmacopeial limits. Forced degradation studies showed significant degradation ranging from 17.4% to 81.6% under various stress conditions, thereby confirming the method's stability-indicating nature.

Conclusion: A reliable, precise, and stability-indicating RP-HPLC method for Naringin quantification was successfully developed and validated using a QbD-driven DoE approach. The method is suitable for routine quality control, formulation development, and stability studies of Naringin and its herbal or nutraceutical preparations.

Keywords: Method validation, Stability Indicating, Tofisopam, Toficalm, UV-Spectrometer.





TITLE: QBD – Driven Development and Validation of UV Spectrophotometry Method for Dapagliflozin Estimation optimized through DoE

AUTHORS: Tanay Aniket Bhingurde^{1*}, Shailendra S Suryawanshi²

DEPARTMENT: Department of Pharmaceutical Analysis¹.

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: tanaybhingurde2130@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Background: Dapagliflozin, a selective sodium-glucose cotransporter-2 (SGLT2) inhibitor, demands an analytical approach that is rapid, economical, and reliable for routine pharmaceutical quality assessment. UV-spectrophotometry, when integrated with Quality by Design (QbD) methodology, enhances method robustness and minimizes variability compared to conventional trial-and-error techniques.

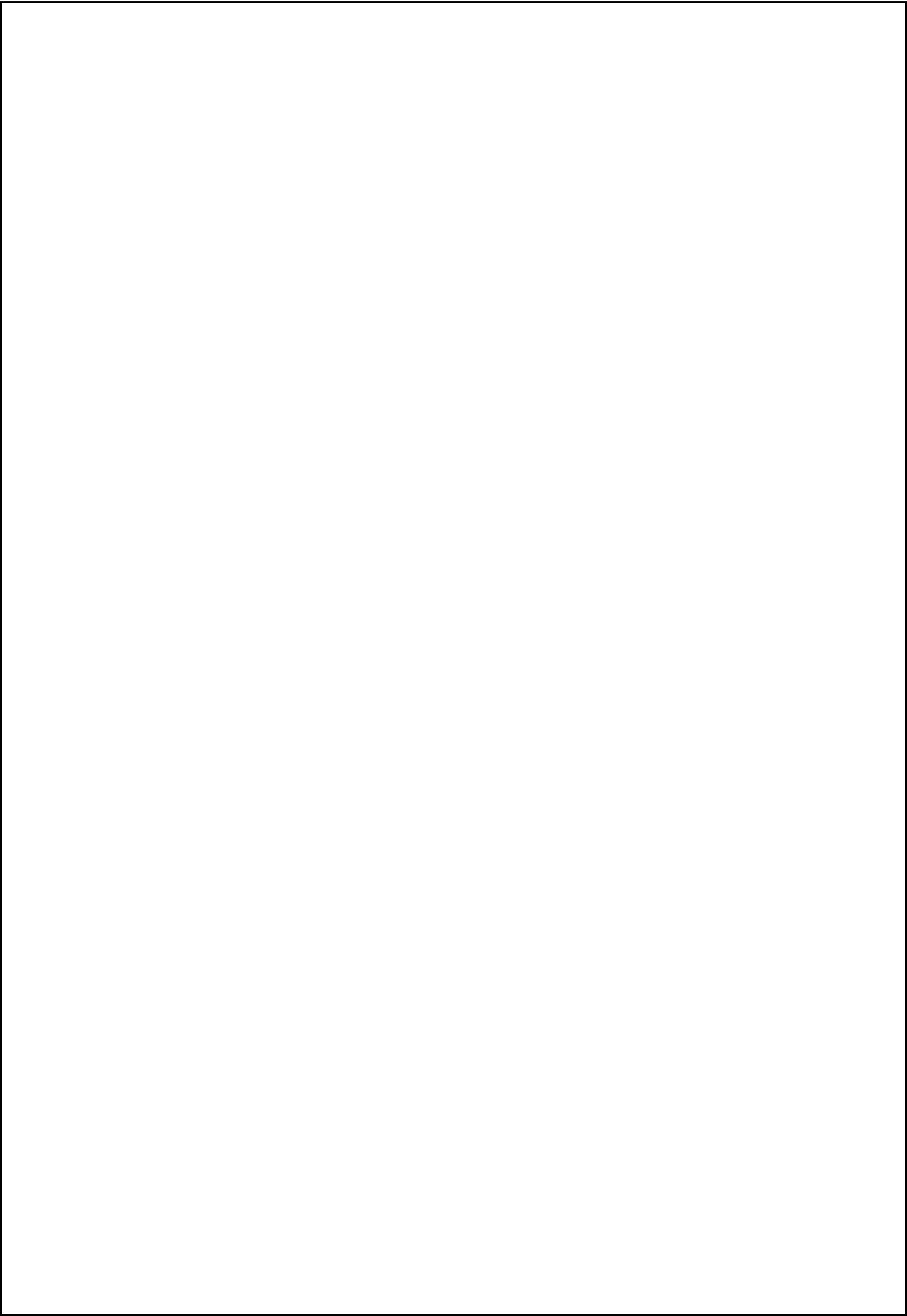
Objective: This study aimed to design and validate a UV-spectrophotometric method for Dapagliflozin estimation in bulk and marketed formulations, employing a QbD framework supported by a Design of Experiments (DoE)–Central Composite Design (CCD) optimization strategy.

Methods: A methanol–distilled water mixture (50:50 v/v) was optimized to ensure solubility and spectral clarity, with λ_{max} identified at 226 nm. DoE-CCD was applied for method optimization, considering solvent ratio and scanning speed as critical method parameters (CMPs). Statistical validation of the design was performed using ANOVA, contour mapping, and 3D response surface plots. Method validation followed ICH guidelines, assessing linearity, precision, accuracy, specificity, ruggedness, LOD, and LOQ.

Results: The developed method exhibited linearity over 4–20 $\mu\text{g/ml}$ with a correlation coefficient (r^2) of 0.9998. Sensitivity was confirmed with LOD and LOQ values of 0.63 $\mu\text{g/ml}$ and 1.92 $\mu\text{g/ml}$, respectively. Precision studies showed %RSD <2%, establishing reproducibility. Accuracy was demonstrated through recovery values ranging from 97.43% to 101.81%. The defined design space confirmed method robustness. Assay of marketed tablets yielded $98.60 \pm 0.55\%$ of the labeled claim.

Conclusion: A simple, sensitive, and validated UV-spectrophotometric method for Dapagliflozin was successfully developed using a QbD-guided DoE-CCD approach. The method proved accurate, precise, cost-effective, and reliable, making it suitable for routine quality control of pharmaceutical dosage forms.

Keywords: Dapagliflozin; UV-Spectrophotometry; Quality by Design (QbD); Design of Experiments (DoE); Central Composite Design (CCD).





TITLE: UV METHOD DEVELOPMENT AND VALIDATION FOR SINOMENINE HYDROCHLORIDE: INVESTIGATING STABILITY THROUGH FORCED DEGRADATION STUDIES

AUTHORS: Mitali Sanjay Kamat^{1*}, Rohan Shingadi², Patil Purva³
DEPARTMENT: Department of Pharmaceutical Analysis¹.

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: mitalisanjaykamat02@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Background:

Sinomenine hydrochloride, an alkaloid isolated from the medicinal plant *Sinomenium acutum*, has demonstrated significant anti-inflammatory, analgesic, and immunosuppressive properties. It is increasingly being investigated for its therapeutic potential in treating rheumatoid arthritis and other autoimmune disorders. Despite its growing importance, there is a need for a simple, reliable, and validated analytical method to quantify Sinomenine hydrochloride in pharmaceutical formulations and to assess its stability under various stress conditions.

Objective:

The primary objective of this study was to develop a simple, rapid, precise, and accurate UV spectrophotometric method for the estimation of Sinomenine hydrochloride. The study also aimed to validate the developed method in accordance with ICH guidelines and to perform forced degradation studies to investigate the stability-indicating properties of the method.

Methods:

A UV-Vis spectrophotometer was used for the analysis. The optimal solvent methanol:water [60:40] was selected after assessing drug solubility in various solvents. The wavelength of maximum absorbance (λ_{max}) was determined by scanning the drug solution over the UV range. The method was validated for parameters including linearity, range, accuracy, precision, limit of detection (LOD), and limit of quantitation (LOQ). Forced degradation studies were conducted by exposing the drug to acidic, alkaline, oxidative, thermal, and photolytic stress conditions.

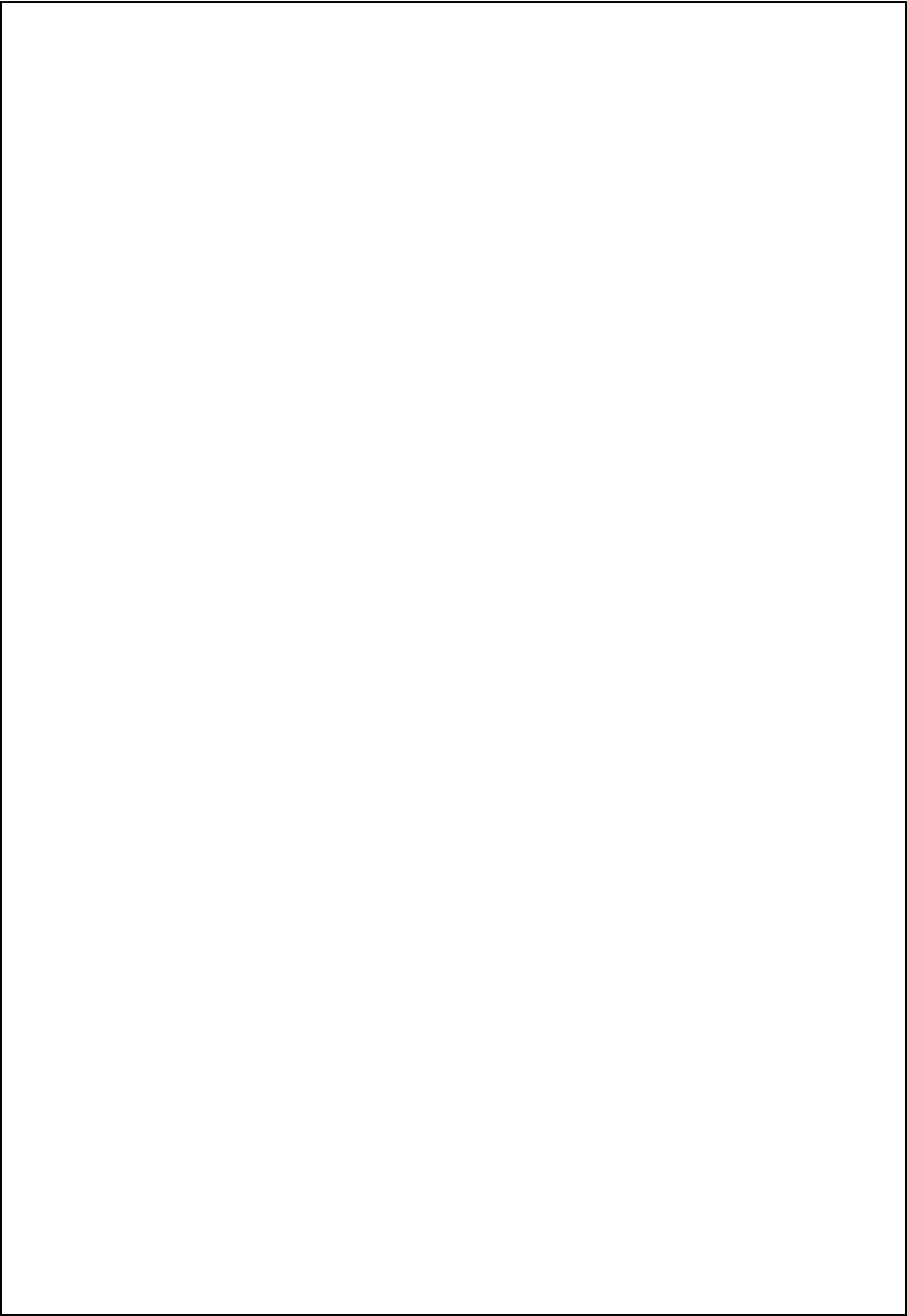
Results:

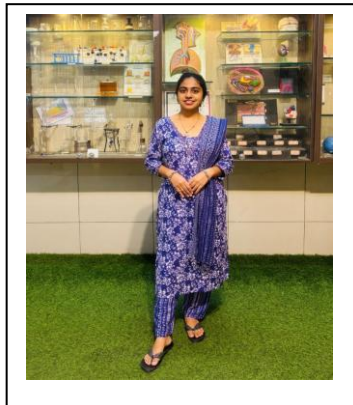
The developed UV spectrophotometric method showed a maximum absorbance at 261nm. The method was found to be linear over a concentration range of 2-10 $\mu\text{g/mL}$ with a correlation coefficient (R^2) of 0.9992. Sensitivity was confirmed with LOD and LOQ values of 0.212 $\mu\text{g/mL}$ and 0.707 $\mu\text{g/mL}$, respectively. The accuracy of the method was confirmed by recovery studies, with percentage recovery values within the acceptable limits of 98-102%. The method demonstrated good precision, with %RSD <2%. Forced degradation studies indicated that Sinomenine hydrochloride is susceptible to degradation under acidic, alkaline, and oxidative conditions, while it remained relatively stable under thermal and photolytic stress.

Conclusion:

A simple, accurate, and precise UV spectrophotometric method for the quantification of Sinomenine hydrochloride was successfully developed and validated as per ICH guidelines. The forced degradation studies demonstrated the stability-indicating capability of the method, making it suitable for routine quality control analysis and stability assessment of Sinomenine hydrochloride in bulk and pharmaceutical dosage forms.

Keywords: Sinomenine hydrochloride, UV Spectrophotometry, Method Validation, Forced Degradation, Stability-Indicating.





TITLE: Development and Validation of Analytical Method For Quantification of Berberine HCl in Medicinal Plant Extract

AUTHORS: Patil Purva Pradeep^{1*}, Shailendra S Suryawanshi²

DEPARTMENT: Department of Pharmaceutical Analysis¹.

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: purvapt175@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT:

Background:

Berberine HCL, an alkaloid found in *Berberis aristata*, exhibits various pharmacological effects. Ensuring the quality of Berberine-containing extracts is critical for therapeutic efficacy. This study focuses on developing and validating a UV spectrophotometric method for quantifying Berberine in *Berberis aristata* extracts.

Objectives:

To develop and validate a UV spectrophotometric method for Berberine quantification in *Berberis aristata* extracts, to ensure specificity, sensitivity, accuracy, precision, and ruggedness, while optimizing method parameters to meet desired performance criteria.

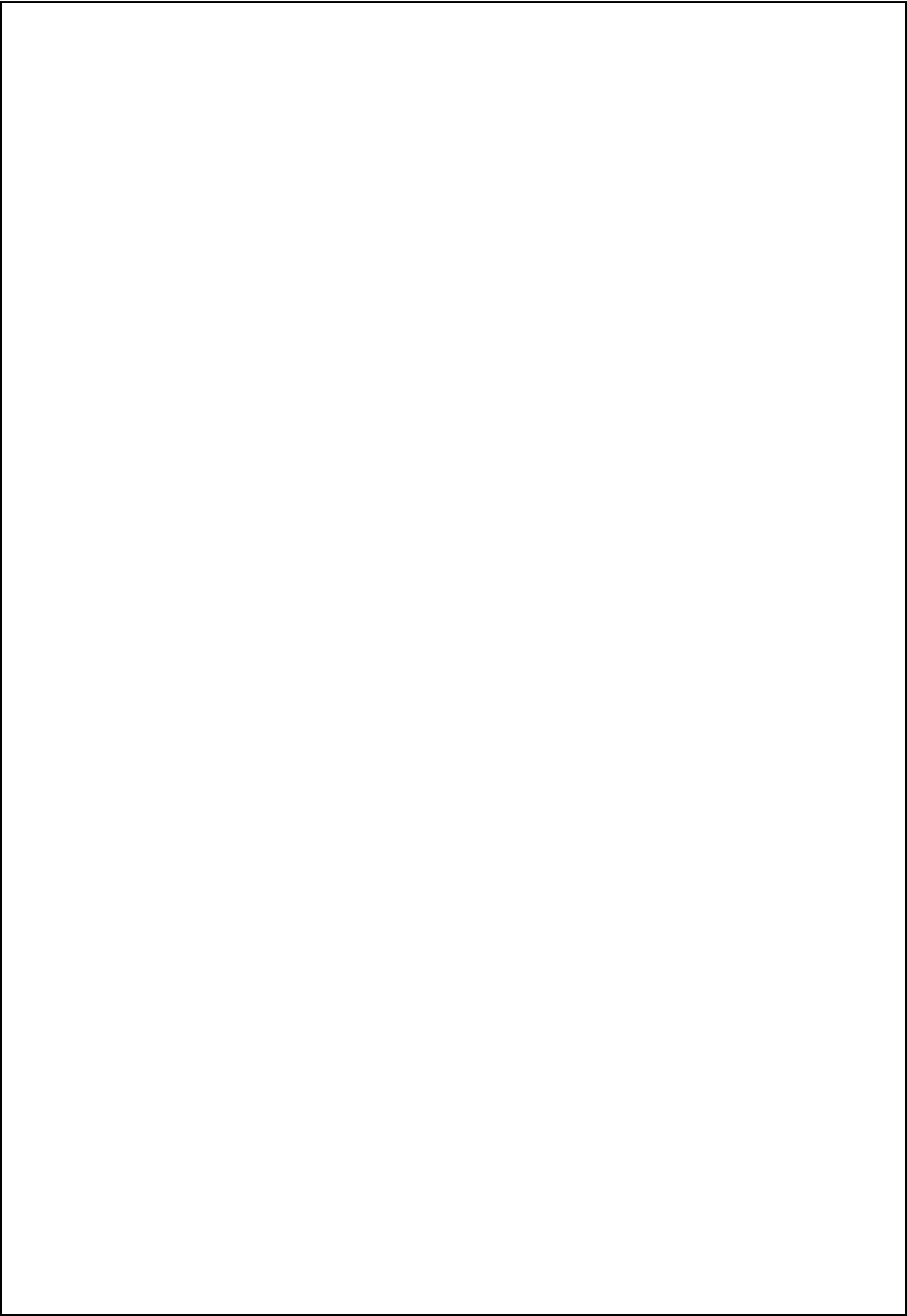
Methods: The UV spectrophotometric method was optimized for Berberine HCL detection at 347 nm. Key process parameters, such as solvent composition and pH, were evaluated. Linearity was assessed over the 2 to 10 µg/mL range, with LOD and LOQ calculated. Precision was tested intraday and interday, and ruggedness was evaluated by altering the analyst and instrumentation. Accuracy was determined through recovery studies, and the method was applied to quantify Berberine in both root and marketed extracts.

Results:

The developed UV spectrophotometric method for quantifying Berberine HCL in *Berberis aristata* extract exhibited excellent specificity with no interference at 347 nm. The method showed linearity in the concentration range of 2–10 µg/ml with an r^2 value of 0.9999. The LOD and LOQ were calculated as 0.153 µg/ml and 0.463 µg/ml, respectively. Precision studies demonstrated % RSD values less than 2% for both intraday and interday measurements. Ruggedness testing confirmed the robustness of the method with no significant variation when performed by different analysts or on different instruments. Accuracy was confirmed with recovery values ranging from 98.22% to 100.65%. The assay of the marketed extract revealed 98.87% of the theoretical concentration, while the root extract showed 4.746% of the theoretical amount.

Conclusion: The UV spectrophotometric method developed, is accurate, sensitive, and robust for the quantification of Berberine HCL in *Berberis aristata* extracts. The method provides a cost-effective, reproducible approach suitable for quality control in pharmaceutical applications, ensuring the consistent quality of Berberine-based formulations.

Keywords: Berberine HCl, *Berberis aristata*, UV spectrophotometry, method validation.





TITLE: Development and Validation of a HPTLC Method for the Quantification of Berberine by Analytical Quality by Design (AQbD) Approach.

AUTHORS: Rishita Behaniya, Sneha Mulay, Dr. Nilesh Deshmukh

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Poona College of Pharmacy, Erandwane, Pune 411038

CORRESPONDING AUTHOR: .deshmukh@bharativedyapeeth.edu

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Background: Berberine is a natural alkaloid with proven efficacy against metabolic, inflammatory, cardiovascular, and oncological disorders, making its accurate quantification essential for pharmaceutical quality control.

Objective: This study aimed to develop a simple, rapid, and robust High-Performance Thin-Layer Chromatography (HPTLC) method for berberine analysis, designed to meet industrial needs for routine quality control. The Analytical Quality by Design (AQbD) approach was employed to ensure method robustness and regulatory compliance.

Methods: Critical method parameters affecting the retardation factor (R_f) were optimized using a Saturated 16th Fraction Experimental Design. The final chromatographic separation was achieved on silica gel 60 F254 plates with a mobile phase of Toluene: Ethyl acetate: Methanol: Formic acid (6:1.3:1.6:0.7 v/v/v/v). Densitometric detection was performed at 235 nm. The method was rigorously validated according to ICH Q2(R2) guidelines.

Results: The optimized conditions yielded a sharp, well-resolved berberine peak at $R_f = 0.186$. The method demonstrated excellent linearity in the range of 45–105 ng/spot ($R^2 = 0.9981$). The limits of detection and quantification were 13.61 ng/band and 41.25 ng/band, respectively. The method proved precise (%RSD < 2%) and remained robust under deliberate, minor variations in analytical parameters.

Conclusion: The developed HPTLC method is precise, accurate, robust, and sensitive. Its simplicity and reliability make it highly suitable for the routine quality control and quantitative analysis of berberine in bulk and pharmaceutical dosage forms.

KEYWORDS: Berberine, High-performance thin-layer chromatography, Quality by Design.



TITLE: Effect of Gallic Acid on the Pharmacokinetics and Pharmacodynamics of Repaglinide in STZ-Induced Diabetic Rats: an *in-silico* and *in-vivo* Study

AUTHORS: Sanika Karalgikar, Ritesh Wali, Sugandha Mulgund

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Poona College of Pharmacy, Erandwane, Pune 411038

CORRESPONDING AUTHOR: ksanika2311@gmail.com,
sugandhamulgund@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here. DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

Herbal compounds such as gallic acid are widely recognized for their antioxidant and antidiabetic properties. However, when co-administered with conventional drugs, herb–drug interactions may arise. This study investigates the pharmacokinetic and pharmacodynamic interactions between gallic acid and repaglinide, a short-acting insulin secretagogue metabolized by CYP3A4, in streptozotocin–nicotinamide-induced diabetic Wistar rats, supported by *in silico* docking studies. Male rats were divided into six groups and treated with repaglinide (2 mg/kg) alone or in combination with gallic acid (10 and 20 mg/kg) for 28 days. Plasma repaglinide levels were quantified using a validated RP-HPLC method, and pharmacokinetic parameters (C_{max} , T_{max} , AUC, $t_{1/2}$, clearance) were evaluated. Pharmacodynamic parameters included fasting blood glucose, HbA1c, insulin, body weight, and hepatic hexokinase activity, a key enzyme in glycolysis. Docking studies using AutoDock Vina revealed that gallic acid exhibited inhibitory activity against CYP3A4 and strong activation potential for hexokinase. *In vivo*, co-administration of gallic acid significantly increased C_{max} , AUC, and $t_{1/2}$ of repaglinide, while reducing clearance, indicating improved systemic exposure. Pharmacodynamic outcomes were also enhanced, particularly at 20 mg/kg gallic acid, showing lowered fasting glucose and HbA1c, elevated insulin levels, restored hexokinase activity, and preserved pancreatic histology compared to repaglinide alone. In conclusion, gallic acid improved both pharmacokinetic and pharmacodynamic profiles of repaglinide, most likely through CYP3A4 inhibition and hexokinase activation. These findings suggest gallic acid acts as a potential bioenhancer, supporting its role in optimizing antidiabetic therapy when combined with conventional drugs.

KEYWORDS: Repaglinide, Gallic Acid, Pharmacokinetics, Pharmacodynamics RP-HPLC, Validation.



TITLE: Development & Validation of Stability Indicating HPTLC Method for Determination of Valacyclovir HCL in Bulk and tablet dosage form.

AUTHORS: Trushna Chaudhari, Dr. L. Sathiyarayanan

PRESENTING AUTHOR: Mansi Shirish Pajai

DEPARTMENT: Pharmaceutical Quality Assurance

COLLEGE ADDRESS: Poona College of Pharmacy, Erandwane, Pune 411038

CORRESPONDING AUTHOR: l.satyanarayan@bharatividyapeeth.edu

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Background:

Valacyclovir HCl is a widely used antiviral drug, especially in the treatment of herpes infections. While several analytical methods like HPLC and UV spectrophotometry are available for its estimation, there's a clear need for a simpler, more cost-effective, and eco-friendly approach especially one that can also assess stability.

Objective:

This project aimed to develop and validate a high-performance thin-layer chromatography (HPTLC) method that is not only accurate and reliable, but also capable of indicating the stability of Valacyclovir HCl in both bulk and tablet forms.

Method:

The HPTLC method was developed using silica gel 60 F254 plates and a mobile phase of methanol: ethyl acetate: water in a 7:1.5:1.5 ratio. After development, the plates were scanned at 253 nm. The method was validated following ICH Q2(R1) guidelines, covering parameters such as linearity, precision, accuracy, robustness, and sensitivity. Forced degradation studies were carried out under acidic, basic, oxidative, thermal, and photolytic conditions to test the method's stability-indicating ability.

Results:

The method showed excellent linearity (300–900 ng/spot) with a correlation coefficient greater than 0.998. It was precise and robust, with %RSD values below 2% and recovery between 98–102%. The method successfully identified Valacyclovir even in the presence of its degradation products, confirming its stability-indicating nature.

Conclusion:

This study presents a validated, eco-friendly, and affordable HPTLC method for routine analysis and stability testing of Valacyclovir HCl. The method is simple to perform, reproducible, and well-suited for use in quality control laboratories.

KEYWORDS: Valacyclovir HCl, HPTLC, HPLC, UV spectrophotometry

TITLE: QbD-Based HPTLC Method Development and Validation for Simultaneous Estimation of Fisetin and Chlorogenic Acid



AUTHORS: ADITYA MADHALE*¹,
DR. V.S.MANNUR²

DEPARTMENT: PHARMACEUTICAL QUALITY ASSUANCE

COLLEGE ADDRESS: KLE COLLEGE OF PHARMACY, BELAGAVI

CORRESPONDING AUTHOR EMAIL ID: adityamadhale@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

A robust and precise High-Performance Thin-Layer Chromatography method was developed and validated for the simultaneous estimation of Fisetin and Chlorogenic acid (CGA) using a Quality by Design (QbD) approach. A Box-Behnken design was employed to evaluate the influence of three independent variables—formic acid volume, chamber saturation time, and development distance—each varied at three coded levels (−1, 0, +1). The R_f values of Fisetin (Y₁) and CGA (Y₂) were chosen as dependent responses. Statistical optimization using Design Expert® Software (Version 13) determined the optimal chromatographic conditions to achieve maximum resolution and reproducibility. The optimized method utilized Toluene : Ethyl acetate : Formic acid (5:4:0.5 v/v/v) as the mobile phase on silica gel 60 F₂₅₄ plates, with densitometric detection at 340 nm, yielding R_f values of 0.10 ± 0.02 for Fisetin and 0.30 ± 0.02 for CGA. The linearity spanned from 100 to 500 ng/band for both standards, yielding correlation coefficients are 0.999 for Fisetin and 0.998 for CGA. The Limit of Detection (LOD) and Limit of Quantification (LOQ) were determined using linear regression data from the calibration curve 17.21 and 54.27 ng/band for Fisetin, and 23.58 and 76.55 ng/band for CGA, respectively. Precision studies (intra- and inter-day) showed %RSD below 2% for both analytes, while robustness evaluations under minor variations in chromatographic parameters also exhibited %RSD < 2%. The validated QbD-based HPTLC method is simple, reliable, and cost-effective, making it suitable for routine quality control and simultaneous analysis of Fisetin and Chlorogenic acid in pharmaceutical formulations.

KEYWORDS: HPTLC, Fisetin, Chlorogenic acid , QbD, Box–Behnken design,

TITLE: LC-MS GUIDED CHARACTERIZATION AND BIOACTIVITY ASSESSMENT OF *LEUENBERGERIA BLEO*: PHYTOCHEMICAL SCREENING, ANTIOXIDANT, ANTI-ANXIETY, ANTI-INFLAMMATORY AND MOLECULAR DOCKING STUDIES



AUTHORS: Shruti Rajan Poll¹, Vedita Hegde Desai^{2*}, Damita Cota²

1. M. Pharm (Pharmacology) Student

2. Assistant Professor, Goa College of Pharmacy

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji- Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: vedshd27@gmail.com

ABSTRACT:

Background: *Leuenbergeria bleo* (Kunth) Lodé, (Cactaceae), is traditionally used to revitalize and detoxify the body, treat haemorrhoids, headaches, and inflammatory conditions like rheumatism and asthma.

Aim: To explore the anxiolytic and anti-inflammatory effects of the ethanol extract of *Leuenbergeria bleo* leaves (EELB).

Materials and methods: Qualitative and Quantitative phytochemical screening of the extract was done and identification of the phytoconstituents was done by LC-MS analysis. Anti-oxidant activity was assessed *in vitro* using DPPH radical scavenging assay, H₂O₂ assay and FRAP assay. EELB (250 mg/Kg and 500 mg/Kg) was evaluated for anxiolytic effects using Elevated plus maze (EPM) and Light and dark box (LDB). *In-vitro* anti-inflammatory activity was assessed using Bovine serum albumin and Egg albumin denaturation assays, *in-vivo* activity was evaluated using the egg albumin-induced paw edema model. The *in-silico* study was done by Molecular docking for anxiolytic activity (GABA_A receptor) and for anti-inflammatory (COX-2 receptor)

Results: Phytochemical analysis demonstrated pharmacologically active compounds of EELB. Also, by LC-MS analysis, Quercetin, Myricetin, 6-shogaol, Syringic acid, Caftaric acid among other compounds were identified. EELB showed good antioxidant capacity, anti-anxiety activity was in a dose-dependent manner. BSA assay showed slightly better results than the egg albumin assay. Egg albumin induced paw edema model, lower dose demonstrated better activity. Alloaromadendrene showed the best binding affinity with the GABA_A receptor and Quercetin showed best binding affinity to the COX-2 target.

Conclusion: EELB showed strong antioxidant, anti-anxiety and anti-inflammatory activity that validates its traditional use in treating inflammation.

Keywords: *Leuenbergeria bleo*, Anxiety, Inflammation, Antioxidant, Molecular docking.

TITLE: Molecular Docking-Based Insights into the CNS Potential of Acetone Extract and Essential oil from *Myristica fragrans* Houtt. Leaves



AUTHORS: Bindia Naik^{*1}, Vedita Hegde Desai², Amogh Naik¹, Geerishma Gaude¹

1- Third Semester M.Pharm (Pharmacology) Students

2- Assistant Professor, Goa College of Pharmacy

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji- Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: vedshd27@gmail.com

ABSTRACT:

Background:- *Myristica fragrans* Houtt. (nutmeg) is a widely used spice with traditional neuroprotective and anxiolytic claims. Anxiolytics reduce anxiety by modulating neurotransmitter systems such as GABAergic, serotonergic, and monoaminergic pathways. While seeds and mace are well studied, the CNS potential of nutmeg leaves remains largely unexplored, offering a novel source of natural neuroactive agents.

Objective:- This study is aimed to evaluate the binding affinities of bioactive compounds from the acetone extract and essential oil of nutmeg leaves towards key CNS targets: GABA-A receptor (6X3U), serotonin 5-HT_{1A} receptor (7E2Y), and monoamine oxidase A (MAO-A, 2Z5X).

Methodology:- Phytoconstituents from the acetone leaf extract (γ -terpinene, caryophyllene, γ -eudesmol, α -eudesmol, naphthalene, myristic acid, isomallotochromanol) and essential oil of leaves (sabinene, β -pinene, limonene, β -myrcene, eugenol, germacrene D, linalool) were docked using AutoDock Vina. Docking affinities were compared with standard ligands: Diazepam (GABA-A), Buspirone (5-HT_{1A}), and Harmine (MAO-A).

Result:- Acetone extract compounds showed strong CNS receptor interactions, with α -eudesmol (−8.8 kcal/mol) binding highest to GABA-A and γ -eudesmol (−8.8 kcal/mol) to MAO-A. Essential oil constituents, notably germacrene D (−8.1 kcal/mol, GABA-A) and caryophyllene (−7.7 kcal/mol, 5-HT_{1A}), displayed comparable affinities. Several compounds approached the docking scores of reference drugs (diazepam −9.6, buspirone −8.9, harmine −8.0 kcal/mol).

Conclusion:- Nutmeg leaves contain phytoconstituents with predicted CNS activity, especially at GABA-A and MAO-A receptors. These results suggest their potential as natural anxiolytic agents, warranting further *in vitro* and *in vivo* validation.

KEYWORDS: *Myristica fragrans* Houtt., anxiolytic activity, GABA-A receptor, MAO-A, molecular docking, 5-HT_{1A} receptor, Nutmeg Leaves.



TITLE: In Silico Docking of Phytochemicals from the Ethanolic Leaf Extract of *Microcos paniculata* L. Targeting Diuretic Pathways.

AUTHORS: Geerishma Gaude^{*1}, Vedita Hegde Desai², Bindiya Naik¹, Amogh Naik¹

1- Third Semester M. Pharm (Pharmacology) Students

2- Assistant Professor, Goa College of Pharmacy

DEPARTMENT: Pharmacology.

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji- Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: vedshd27@gmail.com

ABSTRACT:

Background: Diuretics are essential in managing hypertension, heart failure and edema, but conventional agents often cause electrolyte and metabolic disturbances. This has encouraged the search for plant-based alternatives with safer profiles and traditional relevance in urinary disorders. In this study the ethanolic leaf extract of *Microcos paniculata* L. was evaluated using molecular docking to predict its possible diuretic mechanism.

Aim and Objective: This study aims to assess the diuretic potential of 25 phytoconstituents identified from ethanolic leaf extract of *Microcos paniculata* L. through molecular docking against key renal targets using standard diuretic drugs as references.

Method: 25 phytoconstituents from ethanolic leaf extract of *Microcos paniculata* L. were docked against four renal targets: 3HS4- Carbonic anhydrase II with Acetazolamide, 9COE- Na⁺/K⁺/2Cl⁻ cotransporter with Furosemide, 9BWT- Na⁺/Cl⁻ cotransporter with Hydrochlorothiazide, 3VHU- Mineralocorticoid receptor with Spironolactone. Docking scores were compared with standard drugs to identify potential lead compounds and predict their mechanism of action.

Result: Several constituents demonstrated appreciable binding affinity across all four targets. Among them Friedelin exhibited highest binding score (-10.3) towards 9COE surpassing Furosemide. Quercetin, Apigenin also demonstrated notable interactions with Mineralocorticoid receptor while moderate activity was observed with Carbonic anhydrase II and Na⁺/Cl⁻ cotransporter. These results indicate loop diuretic action as the major mechanism of the tested phytoconstituents.

Conclusion: The ethanolic leaf extract of *Microcos paniculata* L. exhibits good in-silico evidence of diuretic activity particularly via loop diuretic pathway. These findings provide a scientific basis for its further *in-vivo* evaluation.

KEYWORDS: Diuretic Activity, In Silico, *Microcos paniculata* L., Carbonic Anhydrase II, Na⁺/K⁺/2Cl⁻ cotransporter, Na⁺/Cl⁻ cotransporter, Mineralocorticoid receptor.

TITLE: In Silico Screening of Diuretic Leads from *Averrhoa carambola* L. Ethanolic Leaf Extract Targeting Diuretic Pathways



AUTHORS: Amogh Naik ^{*1}, Vedita Hegde Desai ², Geerishma Gaude ¹, Bindiya Naik ¹

1. Third Semester M. Pharm (Pharmacology) Students

2. Assistant Professor, Goa College of Pharmacy

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji- Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: vedshd27@gmail.com

ABSTRACT:

Background: Diuretics are widely used to manage hypertension, edema, and heart failure. Natural products are increasingly investigated for their diuretic potential due to their availability and fewer side effects. *Averrhoa carambola* leaves have been used for various medicinal purposes; however, their diuretic properties have not been thoroughly explored.

Objective: This study is aimed to screen the diuretic potential of 22 phytoconstituents isolated from the ethanolic extract of *Averrhoa carambola* leaves by assessing their binding affinity with known diuretic targets through molecular docking.

Methodology: The 22 constituents were docked against four diuretic-related protein targets: 3HS4 (Carbonic anhydrase II), 9C0E (NKCC1), 9BWT (Na⁺/Cl⁻ cotransporter), and 3VHU (Mineralocorticoid receptor).

Docking scores were compared to those of standard drugs to identify promising lead compounds. Binding affinities were analysed for their relevance to diuretic mechanisms.

Result: Several constituents exhibited strong binding affinity toward targets 3HS4, 9C0E, and 9BWT, with docking scores comparable to or better than standard drugs. Carambolaflavone A showed the highest affinity (−10.1) toward 9BWT, while Carambolaside derivatives also demonstrated favorable binding energies across multiple targets. In contrast, binding with the 3VHU was weak, suggesting limited involvement. The results highlight that the most promising mechanism of action is the inhibition of sodium and chloride transporters, especially the NCC, which may lead to increased excretion of sodium and water, contributing to diuresis.

Conclusion: The findings suggest that *Averrhoa carambola* leaf constituents, particularly Carambolaflavone A and Carambolaside derivatives, may exert diuretic effects through transporter inhibition. Further experimental validation is recommended to confirm their therapeutic potential.

KEYWORDS: Diuretic activity, In silico, *Averrhoa carambola*, Carbonic anhydrase II, Na⁺/Cl⁻ cotransporter, NKCC1, Mineralocorticoid receptor.



TITLE: EVALUATION OF ANXIOLYTIC POTENTIAL OF *AZOLLA PINNATA* R.BR THROUGH IN VITRO AND IN SILICO MOLECULAR DOCKING STUDIES

AUTHORS: Shubhang Hudekar, Mayuri Naik, Shailaja Mallya

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji-Goa-403001

CORRESPONDING AUTHOR EMAIL ID: hudekarshubhang18@gmail.com

ABSTRACT

Background: *Azolla pinnata* R.Br. an aquatic fern belonging to the Salviniaceae family, is phytochemically abundant but possesses untapped neuropharmacological potential. Its ethanolic (EEAP) and methanolic (MEAP) extracts were investigated because of the connection between oxidative stress and anxiety disorders and the need for new, natural anxiolytics.

Aim and Objectives: This study aimed to evaluate in vitro antioxidant capacity and investigate a potential in silico anxiolytic mechanism of the ethanolic (EEAP) and methanolic (MEAP) extracts of *Azolla pinnata* R.Br.

Methods: Phytoconstituents were identified using LC-MS. Antioxidant potential was assessed via DPPH and hydrogen peroxide (H₂O₂) radical scavenging assays. Molecular docking against the GABA_A-Cl receptor (PDB ID: 8OQA) predicted binding affinities. Blood-Brain Barrier (BBB) permeability (logBB) and CNS penetration (logPS) were predicted using the pkCSM web server.

Results: LC-MS revealed numerous flavonoids and phenolic acids. MEAP showed superior antioxidant activity, with IC₅₀ values of 9.498±0.156µg/mL(DPPH) and 8.338±0.303µg/mL(H₂O₂). Docking studies showed several compounds, notably Epicatechin (-9.7 kcal/mol) and Luteolin (-9.2 kcal/mol), had stronger binding affinities to the GABA_A receptor than Diazepam (-8.1 kcal/mol), suggesting a potent modulatory effect. Caffeic acid showed favourable predicted BBB permeability (logBB 0.647) and CNS penetration (logPS -2.608).

Conclusion: The potent antioxidant activity of MEAP and strong GABA_A receptor binding of its phytoconstituents underscore the therapeutic potential of *A. pinnata* as a source for developing novel anxiolytic agents that may offer a dual mechanism of action through both antioxidant and GABAergic pathways.

KEYWORDS: *Azolla pinnata*, Antioxidant, Molecular Docking, GABA_A Receptor, Anxiolytic, pkCSM, Phytochemicals

TITLE: An Integrative Approach Combining Network Pharmacology and *in-vivo* Evaluation of harmaline: A new hope in Diabetic Neuropathy



**AUTHORS: Dr. Pallavi A. Patil, Ms. Fariah Rizwani,
Mr. Vedant Dhoke**

DEPARTMENT: Pharmacology

**COLLEGE ADDRESS: BHARATI VIDYAPEETH'S COLLEGE OF
PHARMACY sector 8 C.B.D Belapur Navi Mumbai 400614**

CORRESPONDING AUTHOR EMAIL ID: bvcop.pharmacology123@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Diabetic neuropathy (DN), a debilitating complication of diabetes mellitus, arises from chronic hyperglycemia-induced oxidative stress and neuroinflammation, leading to progressive nerve damage. Harmaline, a β -carboline alkaloid derived from *Peganum harmala* L., exhibits potent anti-inflammatory, neuroprotective, and antidiabetic properties, making it a promising candidate for DN therapy. This study investigates the therapeutic potential of harmaline in streptozotocin (STZ)-induced diabetic neuropathy using an integrative *in-silico*, and *in-vivo* approach. Network pharmacology and molecular docking identified key DN-related targets of harmaline PRKCZ, HSP90AA1, SLC2A1, KLKB1, and NFKB1 with binding energies ranging from -5.557 to -8.248 kcal/mol. Albino Wistar rats were divided into five groups: vehicle control, STZ control, STZ + glibenclamide, and STZ + harmaline (5 mg/kg and 10 mg/kg). Behavioral tests (Von Frey, Tail immersion, Hot Plate, Rotarod, Acetone Drop) assessed sensory and motor function. The evaluation involves glucose levels, oxidative stress markers, inflammatory cytokines (TNF- α , IL-6, IL-1 β), BDNF and Histopathological evaluation. Harmaline significantly improved behavioral responses ($p < 0.001$), reduced hyperglycemia, oxidative stress ($p < 0.01$), and pro-inflammatory cytokines ($p < 0.001$), and restored tissue integrity. *In-silico* findings supported its multi-target binding profile, while *in-vivo* data confirmed its potential to mitigate neuropathic pain. Harmaline demonstrates significant therapeutic potential against STZ-induced diabetic neuropathy through multi-modal mechanisms involving antioxidant defense, anti-inflammatory action, and β -cell preservation. These findings position harmaline as a compelling candidate for future clinical development in neurodegenerative and metabolic disorders.

KEYWORDS: Harmaline, Diabetic neuropathy, Oxidative stress, Network Pharmacology

TITLE: Exploring the Anti- Arthritic Efficacy of *Curcuma caesia* Essential oil in CFA Induced Rat Model



AUTHORS: Rutuja Mohite, Chaitali Murdio, Swati Dhande , Sampada Bhosale

DEPARTMENT: PHARMACOLOGY

**COLLEGE ADDRESS: Bharati Vidyapeeth College of Pharmacy,
Sector 8 , C.B.D. Belapur, Navi Mumbai-
400614**

CORRESPONDING AUTHOR EMAIL ID: sampada.bhosale@bvcop.in

ABSTRACT: (Not more than 250 words)

Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by persistent joint inflammation, pain, and progressive cartilage and bone damage, mediated by pro-inflammatory cytokines such as TNF- α and IL-1. Current therapies, including NSAIDs and DMARDs, provide relief but are associated with significant adverse effects, necessitating safer alternatives. *Curcuma caesia*, commonly known as black turmeric, is an aromatic rhizomatous herb traditionally used for treating inflammatory disorders. Its essential oil (CCEO) contains bioactive compounds such as 1,8-cineole, camphor, and ar-turmerone, reported for their antioxidant, anti-inflammatory, and analgesic activities. The present study was designed to evaluate the analgesic, anti-inflammatory, and anti-arthritic effects of CCEO in experimental rat models. Essential oil was extracted from authenticated *C. caesia* rhizomes by hydro-distillation and assessed for acute toxicity as per OECD 425 guidelines, confirming safety up to 2000 mg/kg. Analgesic activity was evaluated using acetic acid-induced writhing and hot plate tests, while anti-inflammatory efficacy was assessed by formaldehyde-induced paw edema. Anti-arthritic potential was further examined using complete Freund's adjuvant (CFA)-induced arthritis in rats, with parameters including paw volume, paw thickness, arthritic index, hematological, biochemical, radiological, and histopathological changes. CCEO exhibited dose-dependent analgesic and anti-inflammatory effects, with the highest dose (400 mg/kg) showing significant improvement comparable to diclofenac sodium. In CFA-induced arthritis, CCEO attenuated paw swelling, reduced arthritis scores, restored hematological and biochemical parameters, and improved joint integrity. These findings suggest that CCEO exerts therapeutic effects through inhibition of inflammatory mediators, antioxidant mechanisms, and modulation of immune responses, indicating its potential as a complementary therapy for RA management.

KEYWORDS: _ Rheumatoid arthritis, *Curcuma caesia*, essential oil, analgesic, anti-inflammatory, anti-arthritic, CFA-induced arthritis.



TITLE: Cardioprotective Potential of Himalaya Liv 52 Against Isoproterenol- Induced Myocardial Infarction in Rats.

AUTHORS: Sujata Gadade, Anwesha Singh, Swati Dhande

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Bharati Vidyapeeth's college of pharmacy, sector-8, CBD-Belapur, Navi Mumbai 400614.

CORRESPONDING AUTHOR EMAIL ID: sampada.bhosale@bvcop.in

ABSTRACT:

Cardiovascular diseases remain a leading cause of global morbidity and mortality, with myocardial infarction (MI) being a major contributor. MI, characterized by ischemia-induced necrosis and oxidative stress, leads to structural and functional cardiac damage. This study aimed to evaluate the cardioprotective potential of Himalaya Liv 52, a standardized polyherbal formulation, against isoproterenol (ISO)-induced MI in Sprague-Dawley rats. The objectives included assessment of Liv 52 on cardiac biomarkers, electrocardiographic (ECG) parameters, oxidative stress markers, and histopathological changes. ISO administration produced significant myocardial injury, as evidenced by elevated biomarkers (SGOT, LDH, CK-MB, Troponin-T), depletion of glutathione (GSH), ST-segment elevation, QRS amplitude reduction, and tachycardia, along with histological necrosis and inflammatory infiltration. Liv 52 treatment showed a clear dose-dependent protective effect. Both low and high doses significantly reduced biomarker levels, with high-dose Liv 52 markedly lowering SGOT, LDH, CK-MB, and Troponin-T ($p < 0.001$). Antioxidant potential was evident through restoration of GSH levels. ECG findings indicated improved QRS amplitude, reduced ST elevation, and stabilization of heart rate. Histopathological analysis confirmed near-normal myocardial histology in high-dose Liv 52-treated rats. These results suggest that Liv 52 exerts cardioprotection through antioxidant, anti-inflammatory, and membrane-stabilizing mechanisms, thereby attenuating ISO-induced myocardial injury. The study highlights the potential of Liv 52 as a promising polyherbal formulation for cardiovascular protection, meriting further investigation in preclinical and clinical settings.

Keywords: Liv 52, myocardial infarction, cardioprotection, isoproterenol.

TITLE: EVALUATION OF THE ANXIOLYTIC POTENTIAL OF THE ETHANOLIC EXTRACT OF *AZOLLA PINNATA* R.BR ON WISTAR ALBINO RATS



AUTHORS: Shrutika jalmi, Mayuri Naik, Shailaja Mallya

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji-Goa-403001

CORRESPONDING AUTHOR EMAIL ID: shrutikajalmi17@gmail.com

ABSTRACT

Background: *Azolla pinnata* R.Br. is a free-floating aquatic fern from the Salviniaceae family. It is widely distributed across tropical and subtropical regions and is known for its rich phytochemical profile and environmental adaptability. Given the growing need for potent and safe therapeutic agents derived from natural sources, particularly for the management of anxiety.

Aim and Objectives: The aim was to comprehensively evaluate the invitro antioxidant potential ,in vivo anxiolytic efficacy, and the underlying mechanism of action of the Ethanolic extract of *Azolla pinnata*.

Methods: Phytochemical Screening using LC-MS was performed to identify and quantify components. The in-vitro antioxidant potential was assessed using DPPH and hydrogen peroxide radical scavenging assays. For in vivo study Wistar rats treated with EEAP (100/200 mg/kg) for 14 days and anxiolytic activity assessed via Elevated plus Maze, light dark model and Opto- varimax open field test.

Results: Phytochemical analysis confirmed that EEAP contains triterpenoids, phenolics, and flavonoids. In vitro assays showed that EEAP demonstrated radical scavenging activity. In vivo EEAP at 200mg/kg dose enhanced anxiolytic activity across the behavioral models

Conclusion: The ethanolic extract of *Azolla pinnata* possesses both antioxidant and significant anxiolytic properties . its therapeutic action is likely linked to its phytochemical content and its ability to interact with GABAergic system validating its potential for further development as an anti anxiety agent.

KEYWORDS: *Azolla pinnata* R.Br., Antioxidant, Ethanolic Extract, Anxiolytic, GABAergic ,Elevated Plus Maize.



TITLE: Evaluation of In Vivo Anxiolytic and In Vitro Antioxidant Activities of the Methanolic Extract of *Azolla pinnata* R.Br

AUTHORS: Prapti Budke, Mayuri Naik, Shailaja Mallya

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji-Goa-403001

CORRESPONDING AUTHOR EMAIL ID: praptibudke@gmail.com

ABSTRACT

Background: The aquatic fern *Azolla pinnata* R.Br, known for its rich phytochemical profile and ecological adaptability, remains an underexplored source of neuroactive agents. This study investigated the anxiolytic and antioxidant potential of the methanolic extract of *Azolla pinnata* (MEAP) in Wistar albino rats.

Aim and Objectives: This study aimed to evaluate the antioxidant and anxiolytic potential of the methanolic extract of *Azolla pinnata* (MEAP) and explore its underlying mechanism of action.

Methods: Phytochemical screening via LC-MS identified MEAP as rich in various bioactive components, including triterpenoids, phenolics, and flavonoids, with particularly high concentrations of phenolics and flavonoids. The in-vitro antioxidant potential was evaluated using standard DPPH and hydrogen peroxide radical scavenging assays. The in-vivo anxiolytic effects were assessed over 14 consecutive days using validated behavioral models: the Elevated Plus Maze (EPM), Light Dark Model (LDM), and Opto-Varimex Open Field Test (OFT), employing doses of 100 mg/kg and 200 mg/kg body weight

Results: MEAP demonstrated superior in-vitro antioxidant activity with low IC₅₀ values (DPPH=9.498 µg/mL). In-vivo trials showed that MEAP at the 200 mg/kg dose exhibited significantly enhanced anxiolytic activity ($p < 0.01$) across all behavioral assessments, particularly by increasing the percentage of time spent in the open arms of the EPM.

Conclusion: The findings confirm that the methanolic extract of *Azolla pinnata* is a promising natural anxiolytic agent. Its significant anti-anxiety activity is likely due to its high antioxidant capacity, attributed to its rich phenolic and flavonoid content, along with its potential to modulate the GABAergic system.

KEYWORDS: *Azolla pinnata*, Methanolic extract, Anxiolytic activity, Antioxidant potential, Flavonoids, GABAergic system

TITLE: Davana Essential Oil Niosomes: A Novel Approach to Mitigating Diabetes-Induced Myocardial Infarction through Endocannabinoid System Modulation.



**AUTHORS: Dr. Pallavi A. Patil, Ms. Sonali Thakare,
Ms. Nasreen Rafique**

DEPARTMENT: Pharmacology

**COLLEGE ADDRESS: BHARATI VIDYAPEETH'S COLLEGE OF
PHARMACY sector 8 C.B.D Belapur Navi Mumbai 400614**

CORRESPONDING AUTHOR EMAIL ID: bvcop.pharmacology123@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Myocardial infarction (MI) remains a major cause of mortality, with diabetic patients at elevated risk due to accelerated atherosclerosis, endothelial dysfunction, and oxidative stress. Endocannabinoid system (ECS) plays a significant role in regulation of cardiovascular functions through activation of CB2 receptors. CB2 receptors has been shown to have anti-inflammatory and cardioprotective effects. The aim of present research was targeting ECS, a novel approach for managing myocardial infarction. Present study investigated the cardioprotective potential of Davana essential oil (DEO)-loaded niosomes in an isoproterenol-induced MI model in diabetic rats. Diabetes was induced using streptozotocin in high-fat diet-fed rats, and DEO-loaded niosomes were optimized for particle size, entrapment efficiency, and *in vitro* release. Molecular docking suggested that DEO components interact with CB2 receptors, contributing to anti-inflammatory actions. Pharmacological evaluation demonstrated that DEO-loaded niosomes significantly improved lipid profiles, reduced cardiac injury markers (CK-MB, LDH), attenuated pro-inflammatory cytokines (TNF- α , IL-6), normalized ECG changes, and restored antioxidant defenses (MDA, GSH, catalase) compared to DEO alone. These results indicate that DEO-loaded niosomes exert cardioprotective effects by modulating the endocannabinoid system, suppressing oxidative stress and inflammation, and mitigating fibrosis. Collectively, this work highlights DEO-loaded niosomes as a promising nanocarrier-based therapeutic approach for managing diabetic myocardial infarction.

Keywords: Davana essential oil, niosomes, myocardial infarction, diabetes, CB2 receptor, oxidative stress.



TITLE: Targeting the P2X7/NLRP3/Caspase-1 Axis: Anti-Seizure and Neuroinflammatory Modulation by a Natural Isoflavone in PTZ- Induced Epilepsy

AUTHORS: Dr. Baban S Thawkar, Mr. Harsh K Yadav,
Ms. Diksha S Borse

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Sector-8, C.B.D. Belapur, Navi Mumbai-400614

CORRESPONDING AUTHOR EMAIL ID: baban.thawkar@bvcop.in

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Epilepsy is a chronic neurological disorder characterized by recurrent seizures, with strong associations to oxidative stress, neuroinflammation, and excitotoxicity. The P2X7 receptor, an ATP-gated ion channel, plays a pivotal role in neuroinflammatory cascades contributing to epileptogenesis. The present study evaluated the neuroprotective potential of a natural isoflavone in a pentylenetetrazol (PTZ)-induced kindling model of epilepsy in rats. Animals received the isoflavone (20 and 40 mg/kg, p.o.) for 15 days, while sodium valproate (300 mg/kg, p.o.) served as the standard control. Behavioral outcomes were assessed using seizure scoring, the Morris water maze for spatial learning and memory, and the novel object recognition test for recognition memory. Biochemical analyses of brain homogenates revealed that PTZ kindling markedly increased oxidative stress markers (MDA, NO, MPO) and reduced antioxidant defenses (GSH, CAT). Additionally, elevated levels of IL-1 β , P2X7 receptor expression, and glutamate were observed in the disease group. Treatment with the natural isoflavone significantly attenuated oxidative damage, restored antioxidant activity, and downregulated neuroinflammatory mediators in a dose-dependent manner. Histopathological analysis further confirmed reduced neuronal injury, consistent with the observed biochemical and behavioral improvements. In conclusion, these findings demonstrate that the natural isoflavone confers antiepileptic and neuroprotective effects against PTZ-induced kindling by modulating oxidative stress and suppressing P2X7-mediated neuroinflammation. These results highlight its potential as a promising therapeutic candidate for the management of epilepsy

KEYWORDS: Epilepsy, PTZ kindling , Isoflavone, Oxidative stress , P2X7 receptor ,Seizure Neuroprotection



TITLE: Targeting P2X7 Receptor–Mediated Neuroinflammation and NOX-2 driven Oxidative Stress: A Flavonoid Glycoside Alleviates Depression in CUMS Rats

AUTHORS: Dr. Baban S Thawkar, Mr. Nisarg S Sawant,
Ms. Fariha Khatoun

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Sector 8, CBD Belapur, Navi Mumbai, Maharashtra, 400614

CORRESPONDING AUTHOR EMAIL ID: baban.thawkar@bvcop.in

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Depression is a chronic psychiatric disorder characterized by persistent low mood and anhedonia, strongly associated with oxidative stress, neuroinflammation, and neurotransmitter imbalances. Among inflammatory mediators, the P2X7 receptor plays a crucial role in ATP-gated neuroinflammatory cascades, contributing significantly to depressive pathology.

The present study evaluated the antidepressant potential of a flavonoid glycoside in a chronic unpredictable mild stress (CUMS)-induced model of depression in rats. Animals were treated with flavonoid glycoside (25, 50, and 100 mg/kg, p.o.) for two weeks during the stress paradigm, while fluoxetine (10 mg/kg, p.o.) served as the standard control. Behavioral assessments included sucrose preference test (SPT) for anhedonia, open field test (OFT) for locomotor activity, forced swim test (FST) for despair behavior, and tail suspension test (TST) for immobility.

Biochemical analyses revealed that CUMS exposure significantly increased oxidative stress markers (MDA, NO, MPO) and suppressed endogenous antioxidant defenses (SOD, CAT, GSH). Elevated levels of IL-1 β , P2X7 receptor expression, and NOX2 were observed, along with decreased serotonin, dopamine, and glutamate levels in the disease group. Treatment with the flavonoid glycoside markedly attenuated oxidative damage, restored antioxidant enzyme activity, downregulated neuroinflammatory mediators, and improved neurotransmitter balance in a dose-dependent manner. Histopathological evaluation confirmed reduced neuronal degeneration in the hippocampus, supporting the biochemical and behavioral findings.

In conclusion, the flavonoid glycoside exhibits significant antidepressant and neuroprotective effects against CUMS-induced depression by modulating oxidative stress and suppressing P2X7-mediated neuroinflammation, suggesting its promise as a novel therapeutic candidate for depression.

KEYWORDS: Depression; Flavonoid glycoside; P2X7 receptor; NOX2; Neuroinflammation; Oxidative stress; Chronic unpredictable mild stress (CUMS); Antidepressant-like activity

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025

TITLE: EVALUATION OF ANALGESIC ACTIVITY OF ETHANOLIC LEAF EXTRACT OF *HOLOSTEMMA ANNULARE* IN WISTAR ALBINO RATS.

AUTHORS: Krupa D. Asewar, Dr. Damita Cota, Shejal Suhas Naik, Dr. Madhusudan P. Joshi

COLLEGE ADDRESS: Goa College Of Pharmacy, 18th June Road, Panaji-Goa-403001

DEPARTMENT: Pharmacology

CORRESPONDING AUTHOR EMAIL ID: asewarkrupa@gmail.com

ABSTRACT

Background: *Holostemma annulare* (Roxb.) K. Schum, a member of the Apocynaceae family, is widely distributed in South and Southeast Asia and traditionally used to promote vitality, relieve anxiety, and manage pain. The present study investigates the central analgesic activity of the ethanolic leaf extract of *Holostemma annulare* (EEHA) in rats, along with phytochemical screening, to validate its use in traditional pain management.

Aim and Objectives: This study aimed to evaluate Analgesic activity of EEHA in Wistar Albino rats. The in-vitro, in-vivo and in-silico approaches were performed to determine the possible antioxidant and analgesic activity of EEHA.

Methods: The analgesic activity was evaluated using Hot plate analgesiometer for duration of 7 days using pentazocine as the standard. Statistical analysis was performed using One way ANOVA/Dunnett's test. Molecular docking studies were performed to identify the potential lead analgesic compound, phytoconstituents were docked with kappa Opioid receptor and Sigma-1 Receptor.

Results: In the Hot Plate Analgesiometer EEHA demonstrated significant analgesic activity ($p < 0.0001$) over 7 days, indicating central analgesic effects. Molecular docking demonstrated strong binding to GABA_A, kappa-opioid, and sigma-1 receptors, supporting extract's analgesic potential.

Conclusion: EEHA possesses notable central analgesic activity, as demonstrated by increased pain threshold in the hot plate test. The docking results suggest that the analgesic effect may be mediated via kappa-opioid and sigma-1 receptor pathways.

KEYWORDS: *Holostemma annulare*, antioxidant, analgesic activity, analgesiometer, Molecular docking.

TITLE: EVALUATION OF ANALGESIC ACTIVITY OF ETHANOLIC EXTRACT OF *ACACIA AURICULIFORMIS* LEAVES.



AUTHORS: Sunidhi Komarpant, Arati Dhatkar, Dr. Liesl Mari Fernandes E Mendonca

DEPARTMENT: Pharmacology

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji-Goa-403001

CORRESPONDING AUTHOR EMAIL ID: sunidhikomarpant15@gmail.com

ABSTRACT

Background: *Acacia auriculiformis* (Fabaceae) has been traditionally used for pain and inflammatory disorders.

Aim and Objectives: The present study aimed to evaluate the analgesic activity of its ethanolic leaf extract of *Acacia auriculiformis* (EEAA) and elucidate its mechanism through molecular docking using Kappa opioid receptor.

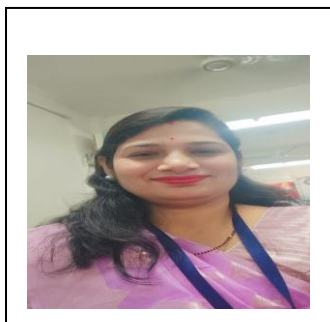
Methods: Leaves were collected, authenticated, and extracted with ethanol. Preliminary Phytochemical screening was carried out as per established procedures. LC-MS study was further performed on the EEAA extract. Male Wistar rats (150–250 g) were divided into four groups (n = 6): control (1% Tween 80), standard (Pentazocine 10 mg/kg), EEAA 200 mg/kg, and EEAA 400 mg/kg. Extracts were administered orally, and analgesic activity was evaluated on Days 1 and 7 using Hot Plate and Tail Immersion tests. Data was analyzed using one-way ANOVA followed by Dunnett's test. Molecular docking was performed using AutoDock Vina to predict interactions of identified phytoconstituents with the Kappa opioid receptor.

Results: phytochemical screening revealed the presence of flavonoids, phenolics, tannins, alkaloids and triterpenoids. LC-MS analysis revealed quercitrin, kaemferol, epicatechin, procyanidin B2 and B4, teracacidin and auriculoside. The pharmacological screening of analgesic potential of EEAA demonstrated a significant dose-dependent increase in reaction time ($p < 0.050$). In the Tail Immersion test, reaction time increased from 4.18 ± 0.20 s to 7.91 ± 0.25 s at 400 mg/kg. Docking showed the highest binding affinity for auriculoside (-8.4 kcal/mol) with the Kappa opioid receptor, supporting its central analgesic action.

Conclusios : The ethanolic extract of *A. auriculiformis* leaves demonstrated significant, dose-dependent central analgesic activity, likely mediated via the kappa-opioid receptor. The findings highlight the role of flavonoid- and phenolic-rich ethanolic extract as potential leads for safer, plant-derived analgesics.

KEYWORDS: *Acacia auriculiformis*, ethanolic extract, analgesic activity, hot plate test, tail immersion, pain.

TITLE: Towards Sustainable Agro-Pharmaceuticals: Comparative Potential of Gajarghaas (*Parthenium hysterophorus*), Neem (*Azadirachta indica*), and Tulsi (*Ocimum sanctum*) as Eco-Friendly Herbal Insecticides and Their Residual Toxicity on Consumable Crops.



AUTHORS: Prof. Devyani Kanungo

DEPARTMENT: M. L. Schroff School of Pharmacy

COLLEGE ADDRESS: Dr. C. V. Raman University, Village Balkhadsura Post- Chhaigaon Makhan, Khandwa, M. P. -450771

CORRESPONDING AUTHOR EMAIL ID: devyaninigam29@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

In the present study, a natural herbal insecticide was developed using gajarghas (*Parthenium hysterophorus*) neem (*Azadirachta indica*), and tulsi (*Ocimum sanctum*). A field trial was conducted to evaluate its effectiveness in pest control. The experiment involved six treatments: T₀ (control – no insecticide), T₁ to T₄ (different combinations of the herbal formulation), and T₅ (a standard chemical insecticide). Each treatment was applied to 1200 plants. Observations were made on pest infestation, crop damage, and overall plant health. Among all treatments, T₄ was found to be the most effective. It not only outperformed the other herbal treatments (T₁–T₃) but also showed better results than the chemical insecticide (T₅), demonstrating strong pest-control potential. Safety tests on the harvested produce confirmed the absence of toxic residues, especially from *Parthenium*, ensuring the crops were safe for human consumption. Furthermore, the cost of the herbal insecticide was significantly lower than that of the chemical alternative. This makes the T₄ formulation not only effective and safe but also economical. These results suggest that the T₄ herbal insecticide is a promising, eco-friendly, cost-effective, and sustainable alternative to conventional chemical pesticides.

KEYWORDS: Natural insecticide, *Parthenium*, Neem, Tulsi, Herbal formulation, Pest control, Field trial, Eco-friendly.



TITLE: REPURPOSING OF DRUGS FOR IN-VITRO
ANTI-PLASMODIAL ACTIVITY AGAINST PLASMODIUM
FALCIPARUM

AUTHORS: Deep Shetgaonkar , Sakshi chodankar , Dr. Arun Joshi

DEPARTMENT: Department of Pharmacognosy, Goa College of
pharmacy

COLLEGE ADDRESS: 18th June road , Panaji , goa , 403001

CORRESPONDING AUTHOR EMAIL ID: dshet001@gmail.com

ABSTRACT:

Malaria, caused by the protozoan *Plasmodium falciparum*, remains a global health burden, particularly due to rising resistance to current antimalarial drugs. In this context, drug repurposing of natural phytoconstituents offers a promising alternative approach. The present study was undertaken to evaluate the in vitro anti-plasmodial activity of selected compounds, including both synthetic drugs and plant-derived phytoconstituents, against the *Plasmodium falciparum* clinical isolate. The selected compounds—**Valacyclovir** and the phytoconstituents **Gramine**, **Puerarin**, **Alpha-asarone**, **Flavokawain A**, and **Troxerutin**—were chosen based on their structural features and previously reported pharmacological activities.

Preliminary screening for anti-plasmodial activity was performed using the growth inhibition drug assay. Drug solutions were prepared in either DMSO or water, and parasites were cultured in human RBCs as per standard WHO Mark III Protocol. Each compound was tested at varying concentrations to determine its IC_{50} value using GraphPad Prism. Among the tested compounds, **Valacyclovir** ($IC_{50} = 0.2471\mu M$) and **Puerarin** ($IC_{50} = 0.5323\mu M$) showed the most potent in vitro activity, comparable to that of Chloroquine ($IC_{50} = 0.2186\mu M$). **Troxerutin**, **Flavokawain A**, and **Gramine** exhibited moderate activity with IC_{50} values of $0.6479\mu M$, $0.785\mu M$, and $0.9221\mu M$ respectively, while **Alpha-asarone** showed relatively lower activity ($IC_{50} = 1.267\mu M$).

The promising results, especially of **Valacyclovir** and **Puerarin**, may be attributed to their structural compatibility with targets involved in the parasite's nucleotide synthesis and redox regulation. These findings support the rationale for repurposing selected compounds as potential antimalarial leads and pave the way for further mechanistic and structural optimization studies.

KEYWORDS: *Plasmodium falciparum*, In-vitro activity, Valacyclovir, Puerarin, Anti-malarial activity, IC_{50} value.

TITLE: Sustainable water purification using Moringa Oleifera Oil: A Natural and Eco-Friendly Approach



AUTHORS: Prof. Megha Soni

DEPARTMENT: M. L. Schroff School of Pharmacy

**COLLEGE ADDRESS: ____ Dr. C. V. Raman University Village
Balkhandsura Post Chhaigaon Makhan Khandwa Madhya Pradesh**

CORRESPONDING AUTHOR EMAIL ID: meghasoni21184@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

This study examines the potential of *Moringa oleifera* seed oil as a natural, low-cost method for water purification. The research focuses on removing microbial contaminants such as *Escherichia coli* and *Entamoeba histolytica*, along with physical and chemical impurities from various water sources. Laboratory analysis and user feedback were used to assess biological, physical, and chemical parameters. Experiments were conducted on four water samples: Narmada river water, Sakta water, RO water, and other contaminated sources, with Bisleri bottled water serving as a standard reference. Results showed that moringa oil improved water quality by reducing microbial load and enhancing overall safety. In addition to testing purification efficiency, the study also aims to design a low-cost purification system accessible to all, ensuring safe drinking water at minimal expense. This approach has the potential to reduce waterborne diseases and improve public health, particularly in resource-limited communities.

KEYWORDS: *Moringa oleifera*, Natural water purification, Microbial contamination, Water quality, Public health, Sustainable water treatment



TITLE: SUSTAINABLE NANO-GREEN MANUFACTURING OF ZINC OXIDE NANOPARTICLE AND CITOSAN NANOCOMPOSITES FROM *ALLIUM CEPA* WASTE FOR ENHANCED AGRICULTURAL PRODUCTIVITY

AUTHORS: Saurabh Naik, Sanjana Naik, Dr. Shailendra Gurav

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: shailendra.gurav@nic.in

ABSTRACT:

This study introduces an eco-friendly method for synthesizing nanocomposites using *Allium cepa* (AC) in combination with zinc oxide (ZnO) and chitosan (CS). Two distinct nanomaterials were developed—AC-ZnO nanoparticles (AC-ZnONPs) and AC-CS/ZnO nanocomposites (AC-ZnONCs), and thoroughly characterized using UV-visible spectroscopy, X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), and Transmission Electron Microscopy (TEM). These analyses confirmed the variations in morphology and particle dimensions. SEM analysis showed that AC-ZnONPs had a clustered spheroidal structure, whereas AC-ZnONCs displayed an oval shape. TEM provided further validation, depicting the spheroidal form of AC-ZnONCs at the nanoscale. According to particle size analysis (PSA), AC-ZnONPs had an average diameter of 190 nm, polydispersity index (PDI) of 0.382, and zeta potential of -21.4 mV. In comparison, AC-ZnONCs had a mean particle size of 232 nm, lower PDI of 0.272, and zeta potential of 18.4mV.

The AC-ZnONCs demonstrated enhanced antibacterial and antioxidant capabilities. Seed germination and pot experiments were conducted using *Vigna radiata* to determine the optimal foliar application concentration. In the seed germination and pot experiments, a dosage of 250 mg/L was the most effective for both nanomaterials, especially in boosting the plant growth parameters. At this concentration, seedlings treated with AC-ZnONPs achieved average root and shoot lengths of 5.83 cm and 19.33 cm, respectively. Those treated with AC-ZnONCs showed slightly greater growth, with average root and shoot lengths of 6.6 cm and 23.66 cm. Pot trials involving six treatment groups further confirmed the superior performance of AC-ZnONCs, which consistently delivered better growth outcomes than other formulations.

Keywords: *Allium cepa*; Nanofertilizer; Design of experiment approach; Environmental remediation



TITLE: ALIZARIN-BASED SMART SENSING CHITOSAN CONJUGATED NANOCOMPOSITE FILM: ECO-SYNTHESIS, CHARACTERIZATION, AND ASSESSMENT OF FOOD PACKAGING POTENTIAL

AUTHORS: Harshita Shet*, Mrunali Chari, Shailendra Gurav¹

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: shailendra.gurav@nic.in

ABSTRACT:

The study investigates the environmentally friendly synthesis of CS-conjugated zein (ZE)-derived zinc oxide nanocomposites (ZE-ZnONCs) for food packaging applications, addressing the rising demand for sustainable food packaging and the intensifying environmental concerns. The efficient synthesis of ZE-ZnONPs and ZE-CS/ZnONCs employing a Box-Behnken design was validated by observable colour changes, UV-visible spectroscopy, and X-ray diffraction, corroborating the crystalline structure of ZnO. SEM and TEM studies confirmed that the nanoparticles and nanocomposites were stable, with size ranges of 286.7 nm and 312.9 nm, polydispersity index (PDI) values of 0.283 and 0.454, and zeta potentials of -24.9 mV and +10.06 mV, respectively. Elemental composition of ZE-ZnONPs was verified through EDX analysis. The percent of drug encapsulation efficiency (% EE) for the optimized ZE-ZnONPs batch was 97.641%. ZE-ZnONPs and ZE-CS/ZnONCs demonstrated excellent antioxidant activity, as evidenced by effective radical scavenging in DPPH and ABTS assays, and notable antibacterial activity against foodborne pathogens. *Capsicum annum* (chillies) were preserved for up to 16 days using the ZE-CS/ZnONC - 7.5% film. This extended shelf life of fresh foods could be attributed to the superior mechanical, thermal, and barrier qualities of the ZE-CS/ZnONC films. Additionally, incorporating Alizarin (AZ) as a pH-responsive indicator within the film enabled real-time freshness monitoring of *Fenneropenaeus indicus* (Indian shrimp) through colour change, while also preserving the seafood for up to 20h at ambient temperature. Overall, ZE-CS/ZnONC films offer a viable and sustainable food packaging alternative that facilitates food preservation, freshness monitoring and waste minimization.

Keywords: Zein; Zinc Oxide Nanoparticles; Chitosan Nanocomposites; Intelligent Food Packaging Film; Shelf Life.



TITLE: GREEN-ENGINEERED CHITOSAN/ZINC OXIDE NANOCOMPOSITES FOR WASTE WATER TREATMENT: OPTIMIZATION VIA RESPONSE SURFACE METHODOLOGY

AUTHORS: Manjusha Gaude*, Mekhala Salgaonkar, Shailendra Gurav¹

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: shailendra.gurav@nic.in

ABSTRACT:

This research outlines the eco-friendly synthesis of Zinc Oxide (ZnO) nanoparticles (SP-ZnONPs) using *Strychnos potatorum* (SP), optimized via Response Surface Methodology and the subsequent development of CS-based nanocomposites (SP-CS/ZnONCs), which were evaluated for their environmental remediation potential. The biosynthesized nanoparticles and their nanocomposites underwent physicochemical characterization and were tested for their effectiveness in purifying river water, degrading dyes photocatalytically, and exhibiting antioxidant and antibacterial properties. A visible colour transformation indicated the initial formation of SP-ZnONPs and SP-CS/ZnONCs, which was further validated through UV-Visible spectroscopy. XRD analysis confirmed the crystalline structure of SP-ZnONPs embedded within the SP-CS/ZnONCs. Scanning and transmission electron microscopy corroborated their spheroidal morphology. Dynamic light scattering measurements revealed particle sizes of 289.4 nm and 365.3 nm, respectively. The polydispersity indices (PDI) recorded were 0.136 and 0.271, respectively. Zeta potential measurements showed values of -21.1 mV for the nanoparticles and 14.2 mV for the nanocomposites, indicating colloidal stability. SP-ZnONPs and SP-CS/ZnONCs exhibited significant antioxidant activity in DPPH and ABTS assays and demonstrated notable antibacterial effects against selected pathogenic strains. The SP-CS/ZnONCs achieved a high photocatalytic degradation rate of 99.54% for Bromophenol blue dye after 70 min of light exposure, outperforming SP-ZnONPs (60%) and the SP extract alone (47%). Furthermore, applying SP-CS/ZnONCs in treating river water improved key water quality parameters, including pH, dissolved oxygen, electrical conductivity, total dissolved solids, turbidity, and salinity. In a nutshell, SP-CS/ZnONCs demonstrated substantial potential for dye photodegradation, water purification, and bioactive applications due to their antioxidant and antimicrobial effectiveness.

Keywords:

Strychnos potatorum; Zinc oxide nanoparticles; Photodegradation; Water purification; Antioxidant activity

TITLE: Characterization of Bio-Synthesized Crystalline Copper Nanoparticles from Cow Urine Distillate and the Efficacy of the Distillate for Glycemic and Lipid Modulation.



AUTHORS: Gauri Pai Angle^{1*}, Shailendra S Gurav²

COLLEGE ADDRESS:

^{1*}PES's Rajaram Bandekar College of Pharmacy, Ponda, Goa

² Department of Pharmacognosy, Goa College of Pharmacy, Panaji, Goa

CORRESPONDING AUTHOR EMAIL ID: gauri.angle@gmail.com

(Kindly note: All correspondence shall be done only via the email id provided here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words)

The present research successfully validates that cow urine distillate (CUD) can be used for a simple, affordable production of copper nanoparticles (CUD-CuNPs) and that it possesses the ability to prevent diabetes by modulating glycemic and lipid parameters and providing cytoprotection. The study investigates the effect of different process variables: reductant concentration, pH, reaction temperature, and reaction time, employing a factorial design approach (Box-Behnken design) on the synthesis of CUD-CuNPs. The synthesized nanoparticles were spherical and crystalline, as confirmed by TEM-SAED, SEM-EDX, and XRD. They had an average size of 232.76 nm, a polydispersity index of 0.421, and a zeta potential of -16.45 mV. In DPPH, nitric oxide, and H₂O₂ scavenging assays, CUD-CuNPs exhibited considerably stronger radical scavenging activity than CUD. This enhanced potency indicates a promising avenue for utilizing biosynthesized CUD-CuNPs in developing therapeutic drugs. The antidiabetic effects were then assessed using established *in-vitro* and *in-vivo* methods. Furthermore, CUD-CuNPs significantly suppressed the activity of α -amylase and α -glucosidase enzymes, with IC₅₀ values of 30.88 ± 0.00 μ g/mL and 24.94 ± 0.00 μ g/mL, respectively. In diabetic rats, both CU and CUD significantly mitigated diabetes by maintaining body weight ($p < 0.05$), reducing blood sugar ($p < 0.001$), CUD uniquely improved the dyslipidemic profile ($p < 0.001$) and HbA1c levels ($p < 0.001$), with CUD being more potent suggesting a more comprehensive therapeutic effect. Augmenting its therapeutic potential, the distillation of cow urine leads to a more effective strategy for preventing diabetic effects through superior glycemic and lipid parameter modulation, as well as enhanced cytoprotection and antioxidative actions.

Key words: Cow urine distillate, Copper nanoparticles, Box-Behnken design, Scavenging assays, Glycemic modulation, Dyslipidemic

TITLE: Phytochemical Profiling and Systems Pharmacology-Driven Molecular Modeling with *In-vitro* Validation of the Multi-Target Antipsoriatic Potential of *Symplocos*

racemosa Bark Extract



AUTHORS: Sheetal Patil,¹ Archana Patil^{2*}

DEPARTMENT: Department of Pharmaceutics

COLLEGE ADDRESS: KLE College of Pharmacy Belagavi

CORRESPONDING AUTHOR EMAIL ID: archanapatil@klepharm.edu

ABSTRACT:

Psoriasis, a multifactorial immune-mediated dermatosis marked by aberrant keratinocyte proliferation and dysregulated inflammatory cascades, demands the development of safer, mechanism-driven therapeutics. *Symplocos racemosa* (SR) (Lodhra), a medicinal plant of ethnopharmacological relevance, was investigated to elucidate its molecular basis in psoriasis mitigation. The ethanolic bark extract underwent LC–MS profiling, unveiling a spectrum of bioactive phytoconstituents. Network pharmacology analysis, integrating SwissTargetPrediction, Way2Drug, and GeneCards databases, identified overlapping targets with psoriasis-related proteins, with AKT1, TNF, and GAPDH emerging as pivotal nodes in the STRING-derived protein–protein interaction network. Compounds with the highest docking scores, determined via Schrödinger Suite 2020-1, were subjected to molecular dynamics simulations to probe conformational stability and interaction fidelity. Delphinidin-3-O-(2"-O- β -xylopyranosyl- β -glucopyranoside) exhibited the most robust binding, characterized by minimal protein RMSD (~ 2.0 Å), low ligand drift (< 3.5 Å), and sustained hydrogen-bonding and hydrophobic contacts with critical residues such as PHE111, GLN63, and HIS101. *In vitro* cytotoxicity evaluation on HaCaT keratinocytes revealed a concentration-dependent reduction in cell viability from 98.76% at 31.25 $\mu\text{g/mL}$ to 49.81% at 1000 $\mu\text{g/mL}$, yielding an IC_{50} of approximately **820 $\mu\text{g/mL}$** , indicative of moderate cytotoxic potential with a wide safety margin.

Furthermore, extract-treated cells preserved monolayer architecture, suppressed apoptotic body formation, and attenuated inflammatory responses compared to psoriasis-induced controls. Collectively, the integration of phytochemical, systems pharmacology, computational, and cellular evidence substantiates *S. racemosa* bark extract as a promising multi-target antipsoriatic candidate warranting further translational investigation.

KEYWORDS: *Symplocos racemosa*; Psoriasis, Network Pharmacology; Half Maximal Inhibitory Concentration (IC_{50}).



TITLE : SYNTHESIS AND CHARACTERIZATION OF SILVER NANOPARTICLES USING GRACILARIA FOLIIFERA

AUTHORS: Vedant Kirlapalkar , Arpita Shetye , Swizel Dias , Tanuja Gaude , Rifate Ali , Anant Bhandarkar

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy Panaji Goa.

COLLEGE ADDRESS: 18th June road, Panaji, Goa, 403001

CORRESPONDING AUTHOR EMAIL ID: anantpharm@gmail.com

ABSTRACT:

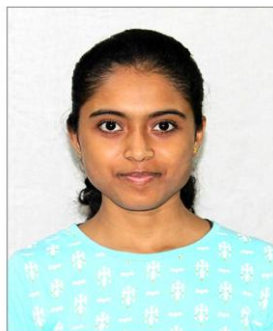
Sea weeds play a major role in marine ecosystems as a source of food and contains potential bioactive molecules. *Gracilaria foliifera* was extracted using hydromethanol solution. The phytochemical screening of the extract revealed the presence of carbohydrates, proteins, amino acids, polyphenols, flavonoids. The synthesis of nano-silver particles using the extract was done. The synthesis was carried out at different temperature of 60, 70, 80°C and pH 9, 11, 12 with constant rpm 1500 for each batch by keeping constant salt concentration (5 mM) and extract concentration (150 mg) . Characterization of the nanoparticles were conducted for optimized batches using analytical techniques. The synthesized nanoparticle was subjected to Larvicidal activity against third instar larvae of *Culex quinquefasciatus* and *Anopheles stephensi*.

The synthesized Silver nanoparticles of *G.foliifera* revealed IR peak at 3371.57 cm⁻¹ (O-H stretching), 2931.80 cm⁻¹ (C-H stretching), 1635.64cm⁻¹ (N-H bending), 1573.91 cm⁻¹(-C=N stretching), 1300 cm⁻¹ (N-O stretching), 1195.87 cm⁻¹ (C-H stretching), 1149.57 cm⁻¹ (C-H stretching).

G. foliifera, batch synthesized at 70°C having a pH 11 showing yield of 73.3 % was selected as the optimized batch. Particle size analysis of optimized batches of *G. foliifera* had shown a particle size of 237.1 nm. The XRD patterns analysis showed diffraction peaks at 37.5°, 65°, and 77.5° confirms the crystalline nature of synthesized particles. The nanoparticles were of cuboidal shape. Sea weeds extract contain bio organic components, which usually play multiple roles as reducing, capping as well as stabilizing agents for metal compounds into silver nanoparticles. The larvicidal activity shows the synthesized nanoparticles has LC₅₀ value of 255.81 ppm and LC₉₀ of 601.90 against *Culex quinquefasciatus* and LC₅₀ value of 763.19 ppm and LC₉₀ of 1892.47 ppm against *Anopheles stephensi*.

Keywords: Gracilaria foliifera, Silver nitrate, Nano particles Larvicidal ,

TITLE: SYNTHESIS, CHARACTERISATION AND LARVICIDAL POTENTIAL OF SILVER NANOPARTICLES OF *FICUS MICROCARPA*



AUTHORS: Anselyn Fernandes*, Arpita Shetye, Rifate Ali, Swizel Dias, Tanuja Gaude, Anant Bhandarkar

DEPARTMENT: Department of Pharmacognosy, Goa College of Pharmacy Panaji Goa.

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road, Panaji, Goa, 403001 India

CORRESPONDING AUTHOR EMAIL ID: anantpharm@gmail.com

ABSTRACT:

The present study focused on the green synthesis and characterization of silver nanoparticles (AgNPs) using *Ficus microcarpa* leaf extract as a natural reducing and stabilizing agent. The drug was extracted using a hydroalcoholic solvent and subjected to FTIR analysis, which revealed functional groups such as O–H, C–H, and C=O stretching vibrations. The phytochemical screening revealed the presence of flavonoids, terpenoids, and phenolic compounds that facilitated the bioreduction of silver ions.

The biosynthesis of nano silver process was optimized by varying temperature and pH, with the most effective batch obtained at 70°C and pH 9, yielding 80% nanoparticles. The synthesized AgNPs were characterized using multiple analytical techniques. FTIR spectra of the nanoparticles showed disappearance of shifts in characteristic peaks compared to the crude extract, indicating involvement of phytoconstituents in reduction and capping. Particle size analysis revealed an average size of 340.7 nm, while zeta potential measurement of –20.54 mV confirmed good colloidal stability. SEM analysis displayed cuboidal-shaped particles with smooth surfaces, whereas XRD diffraction peaks at 38.18°, 46.36°, 67.48°, and 79.8° established the crystalline nature of the AgNPs.

The larvicidal activity showed IC₅₀ value of 58.63ppm and IC₉₀ of 82.86ppm against *Culex* and IC₅₀ value of 58ppm and IC₉₀ of 82ppm against *Aedes aegyptii*. The study demonstrated that *Ficus microcarpa* extract is a reliable and sustainable bioresource for producing silver nanoparticles without the use of hazardous chemicals.

KEYWORDS: *Ficus microcarpa*, silver nanoparticles, green synthesis, phytochemicals, FTIR, SEM, XRD, particle size, zeta potential, eco-friendly nanotechnology, biomedical applications, antimicrobial potential.



TITLE: EVOLVULUS ALSINOIDES ENDOPHYTES:
PHYTOCHEMICAL AND PHARMACOLOGICAL INVESTIGATION

AUTHORS: Sahil Gaonkar, Rukma Nagvekar, Arun B. Joshi

DEPARTMENT: Department of Pharmacognosy, Goa College of
Pharmacy

COLLEGE ADDRESS: 18th June road , Panaji,Goa , 403001

CORRESPONDING AUTHOR EMAIL ID: joshiarun0264@gmail.com

ABSTRACT:

Evolvulus alsinoides (Shankhpushpi), a controversial plant belongs to the family *Convolvulaceae*, is found across tropical Africa, Bangladesh, Philippines, Thailand, and India. Traditionally valued for cognitive and respiratory health, it remains underexplored for its endophytic potential. Endophytes—beneficial microorganisms within plants, can produce bioactive metabolites with pharmacological value.. This study focused on the isolation and characterization of endophytes from leaves and stems of *E. alsinoides* and evaluated their phytochemical and anticancer activities.

In the present study, isolation, identification, fermentation and preparation of crude methanolic endophytic extract was carried out. This extract was then subjected to preliminary phytochemical screening, total phenolic and flavonoid content, and further fractionated by open column chromatography. The methanolic endophytic extract was subjected to *In-vitro* antioxidant activity by DPPH radical scavenging assay and cytotoxic activity via MTT assay against SK-N-SH cell lines (neuroblastoma).

The isolated endophyte was identified as *Aspergillus flavus*, and fermentation yielded crude methanolic extract. Preliminary phytochemical screening of the endophytic extract confirmed the presence of alkaloids, flavonoids, terpenoids, and steroids. The total phenolic content and total flavonoid content of the methanolic endophytic extract was found to be 73.68 ± 5.1 mg of GAE /g and 68.58 ± 1.8 mg of QUE/g respectively. Open Column chromatography led to the isolation of Luteolin, Caffeic acid, 1,3-di-O-caffeoylquinic acid methyl ester. The DPPH assay showed strong antioxidant activity with IC_{50} of 12.251 ± 0.042 μ g/mL. Anticancer evaluation revealed significant antiproliferative activity against SK-N-SH cells with IC_{50} of 166.5 ± 0.52 μ g/mL.

Keywords: *Evolvulus alsinoides*, Luteolin, Caffeic acid, 1,3-di-O-caffeoylquinic acid methyl ester, Kaempferol-3-o- β -glucopyranoside, Quercetin-3-o- β -glycopyronoside, SK-N-SH, Neuroblastoma cell lines.

TITLE: ISOLATION OF FLAVANOIDS AND THEIR CYTOTOXIC POTENTIAL OF FLOWERS OF *RHODODENDRON ARBOREUM*



AUTHORS: Dattaraj Naik, Vedita Gauns, Arun B. Joshi

DEPARTMENT: Department of Pharmacognosy

COLLEGE ADDRESS: Goa College of Pharmacy, 18th June Road,
Panaji – Goa403001

CORRESPONDING AUTHOR EMAIL ID: joshiarun0264@gmail.com

ABSTRACT:

Rhododendron arboreum (Buransh tree), belonging to the family Ericaceae, is widely distributed in the Himalayan region and traditionally valued for its antioxidant, cardioprotective, anti-inflammatory, and antimicrobial properties. The flowers are particularly rich in anthocyanins, flavonoids, and phenolic acids, which contribute to their phytochemical and therapeutic potential. This study aimed to evaluate the physicochemical, phytochemical, and cytotoxic properties of *R. arboreum* flowers.

Plant material was collected from Uttarakhand and authenticated. Physicochemical parameters were assessed as per WHO guidelines. Hydro-alcoholic extraction was performed by maceration, followed by preliminary phytochemical screening, estimation of phenolic, flavonoid, and anthocyanin contents, and TLC profiling. Phytoconstituents were isolated by column chromatography and characterized using IR, ¹HNMR, ¹³CNMR, and mass spectroscopy. Cytotoxic evaluation of the crude extract and isolated compound (RAV-I) was carried out against HepG2 (liver cancer) and SK-N-SH (neuroblastoma) cell lines using the MTT assay, with Cisplatin as the standard.

The powdered material showed a moisture content of 10.75% and total ash of 2.73 ± 0.37%, with acid-insoluble ash at 0.43 ± 0.076% and water-soluble ash at 1.6 ± 0.27%. Extractive values were alcohol-soluble 11.8 ± 1.08%, water-soluble 14.3 ± 1.6%, and ether-soluble 3.93 ± 0.25%. Quantitative analysis revealed phenolic content of 112.96 mg/g, flavonoid content of 111.66 mg/g, and anthocyanin content of 100.193 mg/g. Column chromatography yielded three compounds: Quercetin, Quercetin-3-O-rhamnoside, Cyanidin-3-O-rhamnoside. The hydro-alcoholic extract (REEVG) showed IC₅₀ values of 177.33 ± 2.66 µg/mL (HepG2) and 152.69 ± 1.10 µg/mL (SK-N-SH), while RAV-I exhibited 153.08 ± 1.52 µg/mL and 182.54 ± 1.70 µg/mL, respectively.

KEYWORDS: *Rhododendron arboreum*, Anthocyanins, Quercetin, Quercetin-3-O-rhamnoside.

TITLE: ISOLATION, CHARACTERIZATION, AND ANTIPROLIFERATIVE OF OLEANOLIC ACID FROM *FICUS CARICA* LINN

AUTHORS: Pranjali Sutar, Dr. Sneha Agrawal, Dr. Ruchi Shivhare



DEPARTMENT: M. Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector-8, C.B.D. Belapur, Navi Mumbai -400 614, India.

CORRESPONDING AUTHOR EMAIL ID: pranali.sutar04@gmail.com

ABSTRACT:

Ficus caria is Moraceae family plant which has many traditional medical purposes. This plant containing huge amount of phytoconstituents that are potentially effective in various diseases. The aim of the study is to isolate, characterized and evaluated antiproliferative activity of *Ficus caria* Linn. The plant *Ficus caria* was extracted in ethanol for 48 hours by the maceration followed by solvent-solvent extraction. The isolated oleanolic acid was characterized by using UV-spectroscopy, FT-IR, and HPTLC. Further, the study was extended for the molecular docking of isolated compound against various enzyme of antiproliferatives and in vitro evaluation by potato dextrose broth method inoculated with yeast cells. The analytical methods confirmed the isolated oleanolic acid when compared with standard marker. Docking result revealed its prominent interaction against selected proteins. This oleanolic acid has shown significant antiproliferative action. Oleanolic acid, isolated from *Ficus carica*, showed potential as an antiproliferative agent which support further research into Oleanolic acid's applications in medicine and healthcare.

KEYWORDS: *Ficus Carica*; Oleanolic acid; Antiproliferative effects



TITLE: EXTRACTION OF FLAVONOIDS FROM LEAVES OF CASSIA OCCIDENTALIS L. AND EVALUATION OF ITS IN-VITRO HEPATOPROTECTIVE ACTIVITY

AUTHORS: Divya Ratnakumar Patil^{1*}, Shailendra S. Suryawanshi², Vrushali Patil³

DEPARTMENT: Pharmaceutical Analysis

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar,
Belagavi 590010.

CORRESPONDING AUTHOR EMAIL ID: divyapatil1@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Liver diseases remain a major global health burden, with limited treatment options and significant adverse effects associated with conventional therapies. In this context, natural bioactive compounds such as flavonoids have emerged as promising hepatoprotective agents due to their antioxidant and cytoprotective properties. The present study focuses on the extraction, isolation, and evaluation of flavonoids from the leaves of *Cassia occidentalis* L. and their in-vitro hepatoprotective activity.

Leaves of *Cassia occidentalis* were shade-dried, powdered, and extracted using methanol under reflux conditions. The crude extract was subjected to liquid-liquid fractionation, and the flavonoid-rich fraction was isolated and concentrated. Preliminary phytochemical screening confirmed the presence of flavonoids, alkaloids, tannins, phenols, terpenoids, and saponins. The methanolic extract demonstrated significant hepatoprotective effects in HepG2 cell lines, as assessed by MTT assay, showing dose-dependent cytoprotection against induced toxicity. Moreover, at higher concentrations, the extract also exhibited selective cytotoxicity against HepG2 cancer cells, suggesting a dual therapeutic potential in both hepatoprotection and anti-cancer activity.

These findings scientifically validate the traditional use of *Cassia occidentalis* in liver disorders and highlight flavonoids as key bioactive agents contributing to its therapeutic efficacy. The study also emphasizes the eco-friendly extraction of natural flavonoids and their potential role as hepatoprotective leads for further in-vivo investigations. Future research should aim at isolating specific flavonoid constituents, elucidating their mechanisms of action, and establishing their pharmacological significance in the management of hepatic disorders and hepatocellular carcinoma.

KEYWORDS: *Cassia occidentalis*, flavonoids, hepatoprotective, HepG2 cells, cytotoxicity.

TITLE: “Elucidating the Mechanism of *Syzygium cumini* Against Alzheimer’s Disease Using Network Pharmacology, Molecular Docking, and Experimental Validation”



AUTHORS: Priyanka Kamaria,^{1*}, Uttam Kumar², Aparajita Neogi³, Neha Gouli⁴

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: KLE College of Pharmacy, Rajajinagar, Bengaluru. KLE Academy of Higher Education and Research, Belgavi. 590010, Karnataka, India.

CORRESPONDING AUTHOR EMAIL ID: kamaria.priyanka@gmail.com

ABSTRACT:

Syzygium Cumini(SC) has established efficacy in diabetes management and has shown potential in Alzheimer's disease (AD) treatment. Despite this, the precise pharmacological mechanisms underlying its therapeutic effects in AD remain unclear. Present study aims to investigate the pharmacological mechanisms and to identify key proteins and active ingredients of *Syzygium Cumini* in treating AD using network pharmacology and molecular docking analysis. Bioactive compounds from SC were extracted from the IMPPAT 2.0 and KNApSack databases. Rigorous screening based on drug likeness, bioavailability scores, and toxicity parameters identified eight promising candidates. Swiss target prediction and the STITCH database were utilized to predict 500 targets for the eight compounds. Genes associated with AD were extracted from Gene Cards and OMIM databases, leading to the identification of 261 common gene targets through Venn diagram analysis. GO and KEGG pathway enrichment analyses were conducted, and a protein-protein interaction (PPI) network was constructed. Hub genes were identified based on degree centrality using Cytoscape and the CytoHubba plugin. The study revealed that SC treatment for AD primarily targets two key proteins, ESR1 and HSP90AA1, utilizing eight active ingredients:(-)-Globulol, BETA-OCIMENE, Epi-Beta-Bisabolol, Ascorbic Acid, Citric Acid, Nicotinic Acid, Riboflavin, and Thiamine. Docking studies highlighted the high binding affinity of (-)-Globulol and Riboflavin to ESR1 and HSP90AA1, with binding scores -7.6 and -7.8, respectively. To validate these findings, an ethanolic extract of *S. cumini* seeds was prepared and subjected to cholinesterase inhibition and antioxidant assays. The extract demonstrated significant in vitro activity, supporting the predicted neuroprotective potential of its constituents.

KEYWORDS: *Syzygium Cumini*(SC), Alzheimer's Disease (AD), Network Pharmacology, Molecular Docking, Experimental Validation.



TITLE: Anti-Obesity Potential of Senna tora (L) Roxb: An Integrative Study using Phytochemical and Computational Approaches.

AUTHORS: Pramada Naik, Mrs. Gayatri Athlekar, Dr. Vijay Jagtap

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: Yashvantrav Bhonsale College of Pharmacy, Bhonsale Knowledge City, Sawantwadi, Sindhudurg, 416510, Maharashtra.

CORRESPONDING AUTHOR EMAIL ID: pramadanaik55@gmail.com

(Kindly note: All correspondence shall be done only via the email ID provided here.

DO NOT USE ANY OTHER EMAIL ID for communication.)

ABSTRACT: (Not more than 250 words)

The study investigates the anti-obesity potential of Senna tora plants, native to the Western Ghats region, utilizing phytochemical and computational approaches. Methanolic extracts were rich in Flavonoids, tannins, phenolics, and dietary fibre and showed lipase inhibitory activity. A novel anthraquinone derivative was identified with strong inhibitory effects.

Network pharmacology and docking analyses revealed that several compounds target multiple obesity-related genes and pathways (apoptosis, metabolism, inflammation, hormone regulation). Docking results showed binding strength comparable to the standard drug orlistat. Overall, Senna tora is validated as a promising natural source of an anti-obesity agent, warranting further in vivo and clinical studies.

KEYWORDS: Anti – Obesity, Senna tora, Anthraquinone derivative.



TITLE: Cefdinir with metal complexation: synthesis, identification, characterization, method validation and investigation of antibacterial activity.

AUTHORS: Mrs. Saumya Vernekar

Dr. Sanjay Pai P N

Dr. Gopal Krishna Rao

DEPARTMENT: Dept of Pharmaceutical chemistry.

COLLEGE ADDRESS: PES's Rajaram and Tarabai Bandekar college of Pharmacy.

CORRESPONDING AUTHOR EMAIL ID: lotlikar.reema@gmail.com

ABSTRACT: (Not more than 250 words)

Cefdinir, a third-generation oral cephalosporin antibiotic, exhibits broad-spectrum antibacterial activity, which can be modulated through complexation with transition metal ions. Like many β -lactam antibiotics, its clinical effectiveness can be limited by poor stability, resistance mechanisms, and reduced bioavailability. Metal complexation has emerged as a promising strategy to modify the pharmacological properties of compounds, since coordination with transition metal ions is likely to modify electronic distribution and also solubility, and influence membrane permeability. In this study, cefdinir-metal complexes were synthesized and systematically characterized using spectroscopic and physicochemical techniques, including melting point, solubility, Elemental analysis for carbon, hydrogen, nitrogen determination, Metal determination by atomic absorption spectroscopy, UV-Visible spectroscopy, FTIR, XRD, SEM images and EDX data to confirm the composition of the complexed antibiotics. Jobs method was used to define mole ratio of the ligand and the metal. Method validation was carried out and parameters like linearity, LOD and LOQ were established according to ICH guidelines Q2R1. The antibacterial activity of the complexes was evaluated against selected Gram-positive and Gram-negative bacterial strains, and the results were compared with the free ligand. The findings revealed that metal complexation significantly influenced the biological efficacy of cefdinir, with certain complexes displaying enhanced antibacterial activity relative to the parent drug like zinc and nickel. These results suggest that metal coordination not only alters the structural and electronic properties of cefdinir but also provides a potential route to improve its therapeutic performance.

KEYWORDS: Cefdinir, cephalosporins, characterization, validation, antibacterial activity.

TITLE: In -Silico Studies for Modified Structure Of Glitazar.



AUTHORS: Atmaja Sawant, Mrs Gayatri Athlekar, DrVijay Jagtap.

DEPARTMENT: Pharmaceutical Chemistry.

COLLEGE ADDRESS: Yashwantrao Bhonsale College Of Phramacy, Bhonsale Knowledge City, Sawantwadi, Sindhudurg 416510, Maharashtra.

CORRESPONDING AUTHOR EMAIL ID: atmajasawant@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAID ID for communication)*

ABSTRACT: (Not more than 250 words)

Obesity and diabetes are common and need effective drug. To treat them, scientists use drugs that act on two proteins. Called PPAR alpha and PPAR gamma. PPAR alpha and PPAR gamma protein help control blood sugar fat, and inflammation. Glitarzar act on both proteins but only Saroglitazar has succeed in trials.

Research checked why other drugs failed using ADME studies and computer simulation i.e. Molecular Docking to see how these drugs interact with their target compared to Saroglitazar. We found similar interaction, which suggest the modified drug may have better effectiveness and safety.

KEYWORDS: Diabetes, Obesity, Glitazar, Saroglitazar.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: Synthesis, characterization and anti-inflammatory evaluation of ferulic acid loaded silver nanoparticles.

AUTHORS: Ms. Prajakta Pujari*, Dr. Meenaxi Maste and Dr. Preeti Salve

DEPARTMENT: Department of Pharmaceutical Chemistry

COLLEGE ADDRESS: KLE College of Pharmacy, Belagavi – 590 010

CORRESPONDING AUTHOR EMAIL ID: prajaktapujari1107@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

In order to alleviate inflammation, the current study investigated the synthesis of silver nanoparticles (AgNPs) using ferulic acid (FA). Reaction temperature, silver nitrate (AgNO_3) concentration, FA concentration, AgNO_3 to FA concentration ratio, reaction time, and pH were among the optimization conditions that were examined. Dynamic light scattering examination showed a particle size of 153.5 nm with a PDI of 0.5987, zeta potential analysis showed a peak at -30 mV, and UV-visible spectroscopy revealed the presence of FA-AgNPs with an absorption peak at 454 nm. XRD and TEM investigations confirmed the nanoparticles' spherical form and face-centered cubic structure, with sizes ranging from 22 to 54 nm. The extract and FA-AgNPs were shown to be non-toxic in cytotoxicity studies performed on L929 cell lines. The *in-vitro* studies demonstrated that albumin denaturation was significantly inhibited. Studies performed *in-vivo* showed that FA-AgNPs significantly reduced paw edema in a carrageenan-induced model with more noticeable effects. X-ray images showed a reduction in bone erosion and soft tissue edema. All factors taken into account, silver nanoparticles showed improved anti-inflammatory properties, highlighting the potential for synergy between nanotechnology and a bioactive compound-based strategy to increase drug absorption and effectiveness.

KEYWORDS: Ferulic acid, silver nanoparticles, synergistic activity, inflammation, carrageenan-induced model.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: Design, Docking studies of coumarin and thiazolidinedione
molecular hydrides.

AUTHORS: Sumit Sudhir Maldikar, Gayatri Athalekar, Dr. V. A. Jagatap.

DEPARTMENT: Pharmaceutical Chemistry.

COLLEGE ADDRESS: Yashwantrao Bhonsale College of Pharmacy is:
Bhonsale Knowledge City (BKC), Building No. 2, Charathe, Vazarwadi, Tal. Sawantwadi, Dist.
Sindhudurg, 416510, Maharashtra

CORRESPONDING AUTHOR EMAIL ID: gayatriathalekar17@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

In the view of developing a new scaffold with a multi-target approach for Diabetes type 2, we have designed 32 derivatives of Coumarin in attachment with TZD.

The molecular docking study was conducted on 32 compounds against 6 therapeutic protein targets: Aldose reductase (3RX3), Alpha amylase (4W93), Alpha glucosidase (5NN8), DPP-IV (4A5S), PPAR gamma (5Y2T) & PTP-1B (1C83).

The 5 molecules especially show strong binding affinities (up to -10.8 kcal/mol) with good binding interactions including hydrogen bonds, hydrophobic contact, salt bridge, and π stacking. These 5 molecules can be further chemically optimized as promising molecules.

KEYWORDS: Molecular docking, antidiabetic, multi-target, coumarin.



TITLE: Designing, synthesis and evaluation of novel DHPM-Pyrazole-Thiazole hybrids as potent Eg5 inhibitors to combat breast cancer

AUTHORS: Raj Kothari, Dhirajkumar Nikam

DEPARTMENT: M. Pharmacy (Pharmaceutical Chemistry)

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy, Sector-8, CBD Belapur, Navi Mumbai-400614, Maharashtra.

CORRESPONDING AUTHOR EMAIL ID: rajbkothari2004@gmail.com

ABSTRACT: (Not more than 250 words)

According to the data retrieved by WHO in 2022, breast cancer accounted for approximately 0.68 million deaths globally. This data underscores breast cancer's continued prominence as a global health issue for women, thereby necessitating the development of potent, selective, and minimally invasive anticancer drugs. Among various heterocyclic scaffolds, dihydropyrimidinones (DHPMs), pyrazoles, and thiazoles have attracted attention among researchers due to their diverse biological functions. In this study, we have incorporated the design and synthesis of DHPM-pyrazole-thiazole hybrids as potential Eg5 inhibitors for breast cancer therapy. A series of derivatives (3a-3j) were synthesized using the three-step Biginelli protocol, followed by performing various spectroscopic techniques such as FTIR, ¹H NMR, ¹³C NMR and mass spectrometry for structural characterization. These derivatives were evaluated against the breast adenocarcinoma cell line (MCF-7) by employing Sulforhodamine B (SRB) assay. Among all synthesized derivatives, compound 3i demonstrated superior growth inhibitory activity (GI₅₀ = 22.86 μM), outperforming Monastrol (GI₅₀ = 32μM), employed as a reference standard. Molecular docking studies of Eg5 (PDB ID: 1Q0B) explored anticancer potential by comparing binding interactions with the mitotic inhibitor Monastrol. Moreover, docking results also confirmed that compound 3i (ΔG = -7.95 Kcal/mol) interacts effectively with key amino acid residues of Eg5 protein, such as GLU-116, GLY-118, TYR-211, and ARG-119. Compound 3i binds effectively to the Eg5 allosteric site, exhibiting high cytotoxicity, positioning it as a promising anticancer drug candidate. Therefore, drugs with a DHPM scaffold targeting the Eg5 receptor serve as a promising therapeutic option for combating breast cancer.

KEYWORDS: Breast cancer, DHPMs, Eg5 inhibitor, MCF-7, Monastrol.

TITLE: Aptamer-Guided Methyl- β -Cyclodextrin Systems: A Precision Platform for Lipid-Rich Disease Intervention and Translational IP Potential



AUTHORS: Ruqaiyah Naib, Varun Vaswani, Dr. Ganesh Narayanan, Dean R&D

DEPARTMENT: 1. Biotechnology, Sage University, Bhopal
2. S. S. in Physics, Vikram University, Ujjain

COLLEGE ADDRESS: 1. SAGE University, Katara Hills, Bhopal
2. Vikram University, Dewas Road, Ujjain

CORRESPONDING AUTHOR EMAIL ID: nganeshresearch@gmail.com

ABSTRACT: (Not more than 250 words)

Targeted drug delivery is vital to modern therapeutics, yet many potent agents suffer from poor tissue specificity and off-target toxicity. Methyl- β -cyclodextrin (M β CD), a cyclic oligosaccharide with potent cholesterol-depleting activity, has shown promise for lipid-rich pathologies such as atherosclerotic plaques and certain cancers but remains clinically limited by dose-related cytotoxicity and lack of targeted accumulation.

We present a novel aptamer-guided M β CD platform. Aptamers—synthetic nucleic acid ligands with high affinity and specificity for cellular or extracellular biomarkers—provide programmable recognition, facile chemical modification and reduced immunogenicity compared with antibodies. Conjugating or encapsulating M β CD within aptamer-functionalised nanocarriers enables selective delivery to diseased tissues, minimising systemic exposure while preserving efficacy.

Although multiple patents exist (notably Omid C. Farokhzad, Vaishali Bagalkot, and collaborators, 2007) on cyclodextrin derivatives, drug–nucleic acid complexes and aptamer-decorated carriers, no patent or publication discloses an aptamer-functionalised M β CD system specifically engineered for targeted cholesterol depletion or plaque clearance. Our platform uniquely integrates M β CD's lipid-sequestering capacity with aptamer precision targeting and modular nanocarrier design to address cardiovascular indications.

The study highlights the mechanistic rationale, emerging design variations and clear opportunities for patentable innovation in aptamer–M β CD delivery—particularly for cardiovascular disease, where unmet need and intellectual-property whitespace are greatest—and outlines a roadmap for robust IPR strategies to secure and accelerate clinical translation of this new therapeutic paradigm.



TITLE: SCHIFF BASE DERIVATIVES TARGETING GLUT1 AND α -AMYLASE: AN APPROACH TO ANTIDIABETIC DRUG DEVELOPMENT.

AUTHORS: Soumya A Biradar^{1*}, Rohan A Singadi², Basavaraj M Dinnimath³

DEPARTMENT:

Department of Pharmaceutical Analysis¹, Department of Pharmaceutical Chemistry².

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: soumyabiradar112002@gmail.com

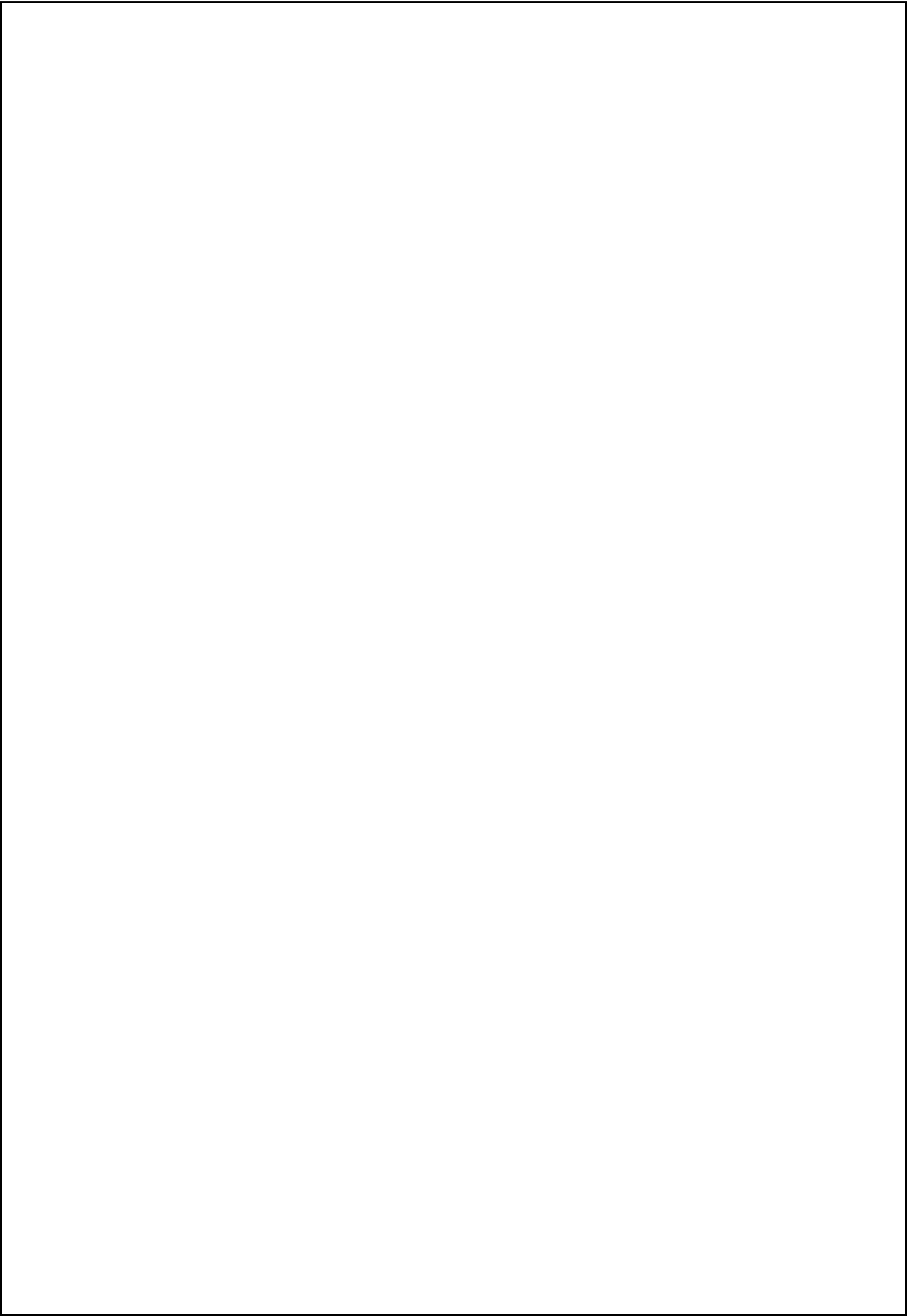
*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Diabetes is one of the fastest growing global health crises of the 21st century, with its prevalence expected to rise from 171 million in 2000 to 366 million by 2030. Diabetes is a chronic health condition characterized by elevated levels of blood sugar (glucose). This occurs when the body either doesn't produce enough insulin (a hormone that regulates blood sugar) or cannot effectively use the insulin. This study focuses on the synthesis, characterization, and evaluation of novel Schiff base derivatives for their antidiabetic potential. The structures of the synthesized compounds were confirmed through TLC, melting point analysis, IR, and ¹H NMR spectroscopy. Purification of the synthesized compounds was carried out by recrystallization. Seven novel Schiff base derivatives were synthesized and subjected to ADMET analysis and molecular docking studies against **GLUT1, alpha-amylase** target protein. Energy profiling such as binding free energy, strength and stability like binding affinity and binding constant of complexes and orientation of bound molecules, such information was obtained using scoring function and molecular docking.

Docking studies was performed using glide module of Schrodinger's molecular modelling software. (Schrodinger, Inc., USA, 2020-2), All the docking interactions (2D and 3D) were evaluated using maestro graphical user interface of Schrodinger's. Among them, compounds **C2, C4, and C6** exhibited excellent antidiabetic activity These findings highlight Schiff bases as promising candidates for diabetes treatment, warranting further pharmacological investigation.

Keywords: Antidiabetic, Schiff base Derivatives, Molecular Docking, ADMET Studies.



TITLE: To Design and Synthesized 1,2,4 triazole substituted pyrazoline derivatives.



AUTHORS: Samruddhi Dhawade, Rizwan khan, Mrunmayee Toraskar.

DEPARTMENT: Pharmaceutical Chemistry (M pharmacy).

COLLEGE ADDRESS: Bharati vidyapeeth's College of pharmacy
Sector 8, CBD, Navi Mumbai 4000614.

CORRESPONDING AUTHOR EMAIL ID: samruddhidhawade89@gmail.com

ABSTRACT:

Cancer continues to be a major global health concern, driven by abnormal cell growth and disrupted signaling pathways. Among these, the epidermal growth factor receptor (EGFR) plays a central role in tumor growth, making it a key target for new therapeutic strategies. In this work, we designed and synthesized a series of 1,2,4-triazole substituted pyrazoline derivatives, a versatile scaffold known for its broad biological potential. The structures of the synthesized compounds were confirmed using standard analytical techniques. Molecular docking studies revealed strong binding with the EGFR active site, indicating potential inhibitory activity. Encouraged by these findings, the compounds were tested on cancer cell lines, where several displayed notable cytotoxic effects and signs of apoptosis. Zebrafish embryos were then used as a rapid in vivo model to evaluate toxicity, safety, and anti-angiogenic effects, providing a bridge between lab-based and whole-organism studies. In silico ADME analysis suggested favorable drug-like behavior, supporting their potential for further exploration. These results open new possibilities for optimizing 1,2,4-triazole-based molecules and exploring their role in future anticancer drug discovery, with ongoing studies focused on refining their activity and safety profile.

KEYWORDS: Cancer, EGFR, 1,2,4-triazole derivative, molecular docking, cytotoxicity, apoptosis, Zebrafish embryos, in vivo model, ADME analysis, Drug discovery.

TITLE: Genotoxic Effects of Nitrosamines from Tea Extract on Allium cepa Root Meristem Cells



AUTHORS: Shraddha Parshe, Yashashree Sawant, Deepali Jagdale

DEPARTMENT: Pharmaceutical Chemistry (M. Pharmacy)

COLLEGE ADDRESS: Bharati Vidyapeeth College of Pharmacy
CBD Belapur, Navi Mumbai, Pin Code:- 400614

CORRESPONDING AUTHOR EMAIL ID: shraddhaparshe17@gmail.com

ABSTRACT:

Nitrosamines are potent genotoxic and mutagenic agents formed through the reaction of amines with nitrites, often detected in processed foods and beverages, including tea. The present study investigates the effect of nitrosamines derived from tea extract on the mitotic activity of Allium cepa root meristem cells, a well-established cytogenetic model. Onion bulbs were exposed to varying concentrations of nitrosamine-containing tea extracts, and parameters such as root growth inhibition, mitotic index, and chromosomal aberrations were analyzed. Results indicated a dose-dependent reduction in root growth and a significant increase in the mitotic index compared to the control. Cytological analysis revealed multiple genotoxic manifestations, including chromosome bridges, laggards, stickiness, micronuclei, and disturbed spindle formation, with higher concentrations leading to complete mitotic arrest. These findings suggest that nitrosamines from tea extract exert mutagenic effects on plant root tip cells, reflecting their potential genotoxic hazard in biological systems. The study highlights the importance of monitoring nitrosamine formation in commonly consumed beverages and provides a simple plant bioassay model for assessing dietary mutagens.

KEYWORDS: Nitrosamine, Mutagenic, Genotoxic, Mitotic, Allium Cepa, Spindle Formation.

TITLE: Synthesis and Chemical Characterazation of Theophylline Nitrosamine and Its Estimation in Tea Extract



AUTHORS: Vaibhav Hande, Yashashree Sawant, Deepali Jagdale

DEPARTMENT: Pharmaceutical Chemistry (M. Pharmacy)

COLLEGE ADDRESS: Bharati Vidyapeeth College of Pharmacy
CBD Belapur, Navi Mumbai, Pin Code:- 400614

CORRESPONDING AUTHOR EMAIL ID: vaibhavhande96@gmail.com

ABSTRACT:

Nitrosamines are a well-recognized class of chemical impurities with strong mutagenic and carcinogenic potential, typically formed by the reaction of amines with nitrosating agents under acidic conditions. Theophylline, a xanthine derivative widely prescribed for asthma and chronic obstructive pulmonary disease (COPD), is also naturally present in several daily life sources such as tea, coffee, and cocoa etc. This raises additional concern as compounds commonly consumed in the diet or used as therapeutics may be susceptible to nitrosamine formation.

In the present work, the formation of a theophylline-based nitrosamine was synthesized under controlled laboratory conditions using nitrosating agents and different reaction conditions. The progress of the reaction was monitored using thin-layer chromatography (TLC). The resulting derivative was isolated and characterized using spectroscopic methods, including UV, IR, and NMR analysis. Preliminary HPTLC quantification of the synthesized N-Nitrosamine derivative was done. Quantification of theophylline nitrosamine in the tea extract was done using the developed HPTLC method. These results confirm the formation of nitrosamine derivatives in commonly consumed plant-based products, highlighting the potential for dietary exposure to genotoxic compounds.

The study highlights the potential risk of nitrosamine formation in both pharmaceutical and naturally occurring sources of theophylline. These findings contribute to a broader understanding of pharmaceutical risk assessment and support ongoing regulatory initiatives to control their presence in drug products and food systems.

KEYWORDS: Nitrosamine, mutagenic, carcinogenic, Theophylline, HPTLC.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025

TITLE: Docking based identification of Quinoline derivatives as PDGFR inhibitors



AUTHORS: Chaitali S Prabhu Tendulkar, S G Vasantharaju

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: PES's Rajaram and Tarabai Bandekar College of Pharmacy, Farmagudi, Ponda Goa

CORRESPONDING AUTHOR EMAIL ID: chaitalisptendulkar@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Platelet-derived growth factor receptors (PDGFRs) are key mediators of tumor growth and angiogenesis, making them attractive targets for anticancer therapy. Existing tyrosine kinase inhibitors (TKIs), though effective, are often limited by resistance and adverse effects, increasing the need for new, selective agents. This study aimed to explore quinoline derivatives as potential PDGFR inhibitors through molecular docking.

The crystal structure of PDGFR was refined using Schrödinger Maestro, and a focused library of quinoline derivatives was screened by Glide XP docking. Docking scores and binding free energies were benchmarked against the reference drug Imatinib. Protein–ligand interactions at the active site were analyzed to identify critical binding residues, while ADME properties were predicted using the QikProp module.

Several quinoline derivatives demonstrated strong binding affinity, with docking scores comparable to or exceeding those of Imatinib. Binding poses revealed stable interactions with essential residues within the PDGFR active site, closely resembling the interaction profile of the standard inhibitor. Favorable ADME predictions further supported their potential as drug-like candidates.

Overall, the in-silico findings highlight the quinoline scaffold as a promising template for the design of selective PDGFR inhibitors. The top-ranking compounds identified in this study warrant further synthesis and biological evaluation to validate their anticancer potential.

KEYWORDS: Quinoline, Docking, PDGFR, anticancer rajmayanna48@gmail.com

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: Structure-Based Docking and Identification of Triazine Derivatives as potential PARP inhibitors

AUTHORS: Ashwini Anil Jadhav , Suvarna G Kini

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: PES's Rajaram and Tarabai Bandekar College of Pharmacy Ponda Goa.

CORRESPONDING AUTHOR EMAIL ID: ashwinijdhv7@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Poly (ADP-ribose) polymerase (PARP) is a key enzyme in DNA damage repair and an important therapeutic target in oncology, particularly for tumors with defective homologous recombination repair mechanisms. Triazine-based scaffolds, known for their diverse pharmacological potential, have recently emerged as promising candidates for PARP inhibition. The present study aimed to identify triazine derivatives with potential inhibitory activity against the PARP-2 enzyme using computational methods. The crystal structure of PARP-2 (PDB ID: 4ZZX, resolution 1.65 Å) was retrieved and prepared using the Protein Preparation Wizard in Maestro 11.8. A focused triazine derivative library was generated using LigPrep, followed by molecular docking with Glide SP and XP modes. The top-ranked molecules were further assessed through MM-GBSA binding free energy calculations using the Prime module, and their interactions with the active site residues were analyzed. Six triazine-based compounds demonstrated strong binding affinity and stable interactions within the catalytic pocket of PARP-2, comparable to the reference inhibitor Olaparib. The MM-GBSA results supported their favorable energetic profiles, suggesting stable and effective protein–ligand complex formation. Overall, this in-silico study highlights triazine scaffolds as promising leads for the development of PARP-2 inhibitors, warranting further optimization and validation for potential application in cancer therapy.

KEYWORDS: PARP-2 inhibitors, Triazine derivatives, Molecular docking

TITLE: Design and Synthesis of Derivatives of 1,2,4 Triazole as Potential Anti Tubercular agents



AUTHORS: Swapnil Patil, Sambodhan Dhawane, Mrunmayee Toraskar

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: Bharati Vidyapeeth's College Of Pharmacy,
Sector-8, C.B.D. Belapur, Navi Mumbai -400614

CORRESPONDING AUTHOR EMAIL ID: sp6241818@gmail.com

Abstract: Tuberculosis (TB) continues to pose a major global health challenge, with drug-resistant strains undermining current therapies. Targeting DprE1, a flavoenzyme essential for Mycobacterium tuberculosis cell-wall arabinogalactan biosynthesis, offers a promising strategy for new anti-TB agents. We designed and synthesized a focused library of eight novel 1,2,4-triazole–chalcone hybrids (F1–F8) through a multistep route: Claisen–Schmidt condensation of substituted benzaldehydes with 4-aminoacetophenone yielded chalcones, which were converted to pyrazolines and subsequently elaborated to triazoles via chloro-acetylation and cyclization in dry DMF. Isolated yields ranged from 60–75%. All compounds were purified to $\geq 95\%$ (HPLC) and fully characterized by FT-IR, ¹H NMR, and HR-MS. Molecular docking against the DprE1 crystal structure (PDB 4P8H) revealed favorable binding conformations, corroborated by ADME predictions that indicated good drug-likeness and oral bioavailability. In vitro screening using the Microplate Alamar Blue Assay against M. tuberculosis H37Rv showed moderate inhibitory activity, with compound F5 emerging as the most promising candidate. This modular synthetic route enables facile structural diversification and positions triazole–chalcone hybrids as synthetically accessible scaffolds for further optimization. The work underscores their potential both as lead structures in anti-TB discovery and as intellectual-property-relevant chemical entities for India's future drug innovation pipeline.

KEYWORDS: Tuberculosis, DpreE1, 1,2,4-Triazole chalcone hybrids, multistep synthesis, Molecular docking

TITLE: *IN-SILICO* AND *IN-VITRO* STUDIES ON SUBSTITUTED 2-PHENYLINDOLE DERIVATIVES AS POSSIBLE ANTIBACTERIAL AGENTS



AUTHORS: Prachita Gauns Dessai*, Sahili Naik

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: P.E.S.'s Rajaram and Tarabai Bandekar
College of Pharmacy, Farmagudi, Ponda-Goa

CORRESPONDING AUTHOR EMAIL ID: prachitagaunsdessai@gmail.com

ABSTRACT:

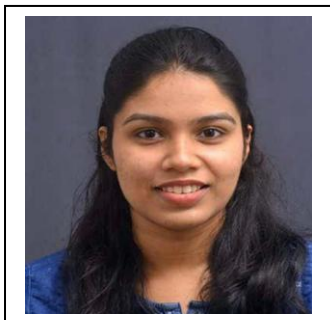
This research explored the antibacterial property of phenyl indole derivatives with computational evaluation using Schrodinger software and by conducting ADMET studies. The compounds were synthesized and characterized by IR, NMR, UV and mass spectroscopic data.

The reactions involve condensation of 2,4-dinitrophenylhydrazine with 4-hydroxyacetophenone with loss of water molecule to give A1. The A1 undergoes cyclisation to obtain A2 which is used as starting material to synthesize derivatives. Diazotization of p-amino benzoic acid in presence of nitrous acid gives diazonium salt couples with the 3rd position carbon of A2 with loss of hydrochloric acid to give A3. Compound A2 undergoes electrophilic substitution reaction at 3rd position with bromine to give A4. Compound A3, carboxylic acid group undergoes esterification reaction with substituted alcohol by loss of water molecule resulting in formation of (Aa1/Aa2/Aa3). The substituted aniline attacks the 3rd position carbon of A4 with elimination of bromine to obtain Ab1 to Ab7 derivatives.

On molecular docking studies, the compound (**Aa3**) with MolDock score (-120.501) showed highest binding affinity with E.coli and compound (**Ab2**) with MolDock score -133.294 showed the highest binding affinity with S.aureus and these were found to be most potent amongst all the synthesized compounds. It showed better results than the active ligands 2HU_401[A] (-74.7141) and CPF_1020[G] (-85.2655) of Ecoli and S.aureus respectively. *In vitro* antibacterial activity was performed on the synthesized compounds against gram positive E.coli and gram negative S.aureus using norfloxacin, ciprofloxacin, vancomycin, chloramphenicol, ampicillin, penicillin. Amongst all the synthesized compounds **Ab4** was found to most potent with zone of inhibition (**23mm**) against E.coli. Except for **Ab1** i.e. aniline substituted compound, with zone of inhibition of **15mm**, all other compounds did not show significant effect on Gram positive S.aureus. indicating that they could be narrow spectrum.

KEYWORDS: Phenylindole, antibacterial activity, molecular docking, ADMET, E.coli, S.aureus

**TITLE: IN SILICO DOCKING, SYNTHESIS,
CHARACTERIZATION AND EVALUATION OF NOVEL PYRAZOLE DERIVATIVES
AS ANTIBACTERIA AGENTS**



AUTHORS: __ Ms. Sahili Sadanand Naik, Ms. Prachita Gauns Dessai

DEPARTMENT: _Dept. of Pharmaceutical Chemistry

**COLLEGE ADDRESS: PES's Rajaram and Tarabai Bandekar college
of pharmacy , Farmagudi Ponda Goa.**

CORRESPONDING AUTHOR EMAIL ID: sahilinaik012sai@gmail.com

ABSTRACT: The current research work deals with the synthesis of various heterocyclic aromatic compounds containing pyrazole nucleus and characterisation by IR, NMR and Mass spectroscopic data and computational evaluation of their antibacterial activity using molegro virtual docker (MVD) software. The sequence of reactions involves condensation of ethyl acetoacetate and hydrazine hydrate under acidic conditions to give 3-methyl-1H-pyrazol-5(4H)-one (I) which then undergoes N acylation with chloroacetyl chloride along with glacial acetic acid in the presence of sodium acetate trihydrate to give 1-(Chloroacetyl)-3-methyl-4H-pyrazol-5-one(II) which further on reaction with substituted anilines/amines gives IIIA, IIIB, IIIC, IIID, IIIE, IIIF, IIIG, IIHH as the formed derivatives. All the synthesised compounds were characterised by TLC and by using IR, NMR and Mass spectroscopic data.

Molecular docking studies of the title compounds were carried out using Molegro Virtual Docker software. All the synthesised compound exhibited well conserved hydrogen bonding with one or more amino acid residues in the active pocket of DNA gyrase domain and active ligand with PDP-ID 1KZN. The (IIIB) is found to be more potent with the MolDock score of -120.174 in comparison to standard drugs Ampicillin, Chloramphenicol, Ciprofloxacin, Norfloxacin, Penicillin,

Antibacterial activity was performed by determining the zone of inhibition of all the synthesized compounds. The compounds were evaluated against gram positive bacteria, Staphylococcus aureus. and Gram negative bacteria Escherichia coli. Out of the eight synthesized compound one compound showed excellent result against both gram positive and negative bacteria which was comparable to the standards.

Keywords : Pyrazole, Antibacterial, Spectroscopic analysis, Molecular docking studies, ADME, Toxicity.



TITLE: Glycerol-Mediated Copper Catalysis for Clean Oxime-to-Amide Conversion: toward Greener Amide Synthesis

AUTHORS: Mr. Raveendra Hullolikar, Dr. Gopal Krishna Rao, and Dr. Ramesha A.R.

DEPARTMENT: Pharmaceutical Chemistry

COLLEGE ADDRESS: Goa College of Pharmacy,
Panjim, Goa, India-403001

CORRESPONDING AUTHOR EMAIL ID: raveendralh@gmail.com

ABSTRACT:

A sustainable and efficient catalytic system has been developed for the conversion of various aromatic and heteroaromatic oximes into their corresponding amides through a copper (II) sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)-catalyzed rearrangement in glycerol as an environmentally benign solvent. The *in-situ* activation of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ at 135–140 °C generates catalytically active metallic copper, enabling a smooth Beckmann-type rearrangement without the need for strong acids or hazardous dehydrating reagents.

Reaction optimization identified 5 mol % CuSO_4 and glycerol as the ideal catalytic combination, providing excellent substrate compatibility and selectivity. Under these conditions, a series of oximes—benzaldoxime, p-anisalaldoxime, p-chlorobenzaldoxime, pyridine-2-aldoxime, pyridine-4-aldoxime and thiophene-2-carboxaldoxime—were successfully converted into their corresponding amides in 60–80 % isolated yields. Reaction monitoring by TLC confirmed clean transformation with minimal by-product formation.

The method offers significant advantages, including the use of a non-volatile, recyclable solvent, simple workup, and avoidance of corrosive acid catalysts. The method demonstrates that CuSO_4 /glycerol constitutes an inexpensive, efficient, and environmentally responsible catalytic system capable of promoting oxime-to-amide transformations with excellent substrate tolerance

Overall, this work highlights a green, operationally simple, and scalable pathway for amide bond formation, aligning strongly with the principles of sustainable and atom-economic organic synthesis.

KEYWORDS: Copper catalysis; oxime-to-amide rearrangement; Beckmann-type reaction; glycerol solvent; sustainable synthesis.

TITLE: IP Strategy for Carbon Capture Machines Near Industrial Plants: Supporting India' 2047 Vision- A Case Study of Madhya Pradesh.



AUTHORS: Prof. Aayushi Laad

DEPARTMENT: Pharmacy

COLLEGE ADDRESS: Dr. C.V. Raman University Khandwa

CORRESPONDING AUTHOR EMAIL ID: aayu.laad@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

India ambitious 2047 Vision aims for a sustainable, technologically advanced, and energy- flexible economy. In leading to this is carbon capture, utilization, and storage (CCUS), especially in industrial sectors. This paper proposes a strategic IP (Intellectual Property) framework to accelerate the development and set up of carbon capture machines (CCMs) near industrial plants, with a case study of Madhya Pradesh—a state with a growing industrial base and strategic geographical advantages for CO₂ storage. The paper outlines key innovations, IP protection mechanisms, policy recommendations, and implementation strategies aligned with India's net-zero goals (to keep global warming to no more than 1.5° C emissions need to be reduced by 45% by 2030 additionally the study explores convenient of installing artificial carbon capture machines near industrial plants to enhance CO₂ reduction.

KEYWORDS: Carbon Capture Utilization and Storage (CCUS), IP (Intellectual Property), CCM (Carbon Capture Machines), CO₂ Emission.

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR !!
Nov. 04-05, 2025

**TITLE: Artificial Intelligence in Healthcare: Enabling Precision
Medicine and Next-Generation Patient Care.**



**AUTHORS: Kum. Sajan Kambli, Mrs. Gayatri Athalekar,
Dr. Vijay Jagtap.**

DEPARTMENT: Pharmaceutical Chemistry

**COLLEGE ADDRESS: Yashwantrao Bhonsale College of Pharmacy,
Sawantwadi, Dist. Sindhudurg**

CORRESPONDING AUTHOR EMAIL ID: sajankambli35@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

Artificial Intelligence (AI) is rapidly reshaping the landscape of modern healthcare by enhancing clinical outcomes, reducing operational costs, and improving overall system efficiency. This study presents a comprehensive overview of AI applications that enhance diagnosis, treatment optimization, and disease prevention through the integration of genomics, clinical data, and real-world evidence. Techniques such as machine learning, deep learning, and natural language processing are enabling the identification of complex patterns in high-dimensional biomedical datasets, thereby supporting more accurate disease risk prediction and drug response modelling. In addition, AI is playing a growing role in pharmacovigilance by improving the detection and management of adverse drug reactions through automated signal detection and real-time surveillance. In hospital pharmacy settings, AI contributes to medication error reduction, inventory optimization, and personalized drug dispensing, further advancing patient safety and operational efficiency.

Although AI has massive potential to transform healthcare, it also brings several significant challenges such as data privacy concerns, algorithmic bias, and lack of transparency can reduce trust and lead to unequal or inaccurate clinical outcomes. Overdependence on AI tools may reduce human clinical judgment and introduce ethical dilemmas in decision-making. Additionally, the high cost of implementation, cybersecurity risks, and unclear regulatory guidelines cause significant barriers to safe and fair implementation.

KEYWORDS: Artificial Intelligence (AI), Machine Learning, Deep Learning, Natural Language Processing (NLP), Healthcare Transformation, Clinical Outcomes, Disease Prediction

TITLE: From Ayurveda to CDSCO: Charting the Modern Course of Herbal Drug Development in India



AUTHORS: Shraddha Patil, DR. Sneha Agrawal

DEPARTMENT: M. Pharmacy- Quality Assurance

COLLEGE ADDRESS: Bharati Vidyapeeth's College of Pharmacy,
Sector-8, C.B.D. Belapur, Navi Mumbai -400614, India

CORRESPONDING AUTHOR EMAIL ID: patilshraddha2022@gmail.com

ABSTRACT:

AI screens large natural product databases faster than traditional methods. The pre-clinical study requirements for phytopharmaceuticals are multifaceted. They include quality and standardization assessments of the herbal source, which encompass authentication, processing, and comprehensive chemical characterization using chromatographic techniques. In India, the preclinical evaluation of phytopharmaceuticals is governed by the Central Drugs Standard Control Organisation (CDSCO), not by the Indian Pharmacopoeia (IP), which primarily sets quality standards for herbal ingredients. CDSCO has initiated a project for a unified digital ecosystem, the DDRS, to consolidate existing portals and serve as a single-window system for all regulatory activities. CDSCO has not yet issued specific, comprehensive guidelines for the use of AI and ML in drug discovery and development, including for phytopharmaceuticals.

Regulatory bodies mandate toxicity studies of phytopharmaceuticals to evaluate potential adverse effects. These include acute oral toxicity, repeated dose toxicity (sub-chronic), genotoxicity, and, where applicable, reproductive and developmental toxicity. For instance, models can predict the binding affinity of natural compounds to specific disease targets, prioritizing the most promising drug candidates for experimental testing. By using AI to generate high-quality, standardized data, companies can streamline their submissions to CDSCO, potentially leading to faster review and approval timelines for new phytopharmaceuticals. The need for AI/ML data and model validation ensures that AI-derived insights are reliable and trustworthy.

KEYWORDS: CDSCO, DDRS, Artificial Intelligence (AI) / Machine Learning (ML), Toxicity Studies.

TITLE: Design and Validation of a Survey-Based Questionnaire of Pharmaceutical Supply Chain Stakeholders Regarding Substandard, Spurious, Falsely Labeled, Falsified, and Counterfeit (SSFFC) Drugs.



Shailee Dewan*, Pradeep M. Muragundi

DEPARTMENT: Department of Pharmaceutical Regulatory Affairs and Management

COLLEGE ADDRESS: Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal -576104, Karnataka, India

CORRESPONDING AUTHOR EMAIL ID: pradeep.mm@manipal.edu

ABSTRACT:

INTRODUCTION

Substandard, spurious, falsely labeled, falsified, and counterfeit (SSFFC) drugs are a major threat to public health and compromise the integrity of pharmaceutical supply chains globally. An understanding of stakeholders' knowledge, attitudes, and practices (KAP) along the supply chain is essential to develop effective interventions and enhance drug safety measures.

OBJECTIVE

To design and validate a survey questionnaire to assess the KAP of pharmaceutical supply chain stakeholders toward SSFFC medicines.

METHODS

A comprehensive literature and expert opinion was conducted out to prepare the content of the questionnaire. The first draft was validated with 15 stakeholders, and three members from each category such as raw materials suppliers, regulatory bodies, quality control or quality assurance personnel, Wholesaler or distributor and pharmacy retailers of the pharmaceutical supply chain. The survey questionnaire was finalized on the basis of their feedback to ensure content validity, relevance, and clarity. The final version was subjected to psychometric review and a copyright has been initiated for protecting the final version of each work.

RESULTS

The process of validation of the questionnaire involved content validity. Stakeholder feedback increased its applicability to various supply chain stakeholders. The final tool is considered reliable and effective for measuring KAP regarding SSFFC drugs.

CONCLUSION

The validated questionnaires provide a standardized tool to assess gaps and strengths of the pharmaceutical supply chain's response towards SSFFC medicines. It can be utilized for research, policy development, and capacity-building initiatives that target enhancing drug safety, quality, identity and supply chain integrity.

KEYWORDS: Validation, Survey-Based Questionnaire, Substandard and Spurious drugs.

TITLE: Poster on Research Article “Detection and analysis methods of heavy metals in plants.



AUTHORS: Mrs. Advika Anant Arolkar, Mrs. Gayatri Athalekar,
Dr. Vijay A Jagtap

DEPARTMENT: Pharmaceutical Chemistry
COLLEGE ADDRESS: Yashwantrao Bhonsale College of
Pharmacy, Sawantwadi

CORRESPONDING AUTHOR EMAIL ID: advikaarolkar@gmail.com
(Kindly note: All correspondence shall be done only via the email id provided
here.

DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: (Not more than 250 words) Heavy metal (HM) stress in plants can result in HM accumulation, posing serious risks to human health via the food chain. Therefore, it is critical to develop reliable techniques to detect and analyze HM absorption, distribution, accumulation, chemical form, and transport in plants. These methods not only aid in understanding plant HM response mechanisms but also support the cultivation of low-HM crops. Although the topic has gained attention, comprehensive summaries of analytical methods remain limited. This review outlines recent detection and analysis techniques for quantifying HM concentrations in plants, including ICP-MS, AAS, AFS, XAS, XRF, LA-ICP-MS, NMT, and omics-based approaches. These methods provide insights into the spatial distribution, chemical forms, and transport mechanisms of HMs. The paper clarifies the principles, advantages, limitations, and applications of each technique and offers guidance for selecting appropriate methods in future research. Additionally, with advancements in optical instrumentation, optical imaging spectroscopy has emerged as a promising tool due to its in-situ, real-time, and non-destructive capabilities. Coupled with artificial neural networks and machine learning algorithms, its detection accuracy has significantly improved, making it competitive with traditional chemical analysis techniques. This review also compares spectroscopy and conventional methods, highlights the role of AI in enhancing detection, and discusses strategies to overcome current limitations such as low sensitivity and high instrument costs. Overall, the paper promotes innovation in HM detection technologies and provides insights for future research on HM accumulation and reduction in plants.

KEYWORDS: Heavy metals (HMs), Plant stress, HM detection techniques, Machine learning, Artificial neural networks, HM accumulation, Spectroscopy, Non-destructive detection, Metal transport in plant, HM toxicity, Precision agriculture



TITLE: STRATEGIC BRAND MANAGEMENT IN GENERIC PHARMACEUTICALS: BUILDING RECOGNITION AND TRUST

AUTHORS: Shivam Karande, Abhishek Kamat, Shueb Ansari, Krishna Agrahari, Dr. Rajkumar Dube

DEPARTMENT: M. Pharmacy – Pharmaceutics

COLLEGE ADDRESS: HSNCB's Dr. L. H. Hiranandani College of Pharmacy, CHM Campus, Ulhasnagar

CORRESPONDING AUTHOR EMAIL ID: Shivam.karande@dlhhcop.org

ABSTRACT:

India, being the world's leading manufacturer and exporter of generic medicines, faces a paradox: despite cost-effectiveness, quality assurance, and comparable therapeutic outcomes, awareness and acceptance of generics remain limited. Generic medicines, produced after patent expiry of branded drugs, are priced lower as they bypass extensive clinical trials and marketing costs borne by innovators. However, issues such as differences in appearance, lack of trust, and limited prescription by healthcare providers hinder their widespread adoption. To address these challenges, the Government of India has launched initiatives like the Pradhan Mantri Bharatiya Janaushadhi Pariyojana (PMBJP) to promote accessibility and awareness. Effective strategies to enhance acceptance include active involvement of doctors and pharmacists in patient education, pharmacy students conducting community campaigns, and pharmaceutical companies providing detailed bioequivalence data in multilingual information leaflets with user-friendly visuals. Additionally, continuous advertisements across media platforms, public displays in healthcare and community spaces, and incorporation of QR codes linking to bioequivalence reports can build transparency and trust. Such measures would strengthen recognition of generic medicines as safe, effective, and economical alternatives to branded drugs, ultimately improving healthcare affordability and accessibility.

KEYWORDS: Generic medicines, Branded drugs, Bioequivalence, Cost-effectiveness, Awareness, PMBJP, Patient counseling, Trust, Accessibility.

**TITLE: COMPARATIVE ANALYSIS OF THE PRESCRIBING PATTERNS FOR
CARDIOVASCULAR MEDICATIONS IN PUBLIC AND PRIVATE HEALTHCARE
SETTINGS IN THE STATE OF GOA**

AUTHORS: TANISHQ KURDIKAR, GIANINE MEGAN LOBO, FELICIA MASCAREHNAS,
ADITI PARAB, DR. LIESL M.F. MENDONCA, DR. PADMANADB V RATABOLI



DEPARTMENT: PHARMACOLOGY DEPARTMENT

COLLEGE ADDRESS: GOA COLLEGE OF PHARMACY, 18TH JUNE ROAD,
PANAJI- GOA, 403001 INDIA

CORRESPONDING AUTHOR EMAIL ID: tanishqkurdikar@gmail.com

ABSTRACT:

Cardiovascular diseases (CVDs) are the foremost contributors to global morbidity and mortality, and in India, variations in prescribing trends between public and private healthcare pose challenges for treatment safety, affordability and effectiveness. This study assessed 400 prescriptions for cardiovascular conditions collected between February and April 2025 from Goa Medical College (public), Healthway Hospital and Campal Clinic (private) using indicators of rational drug use such as adherence to the National List of Essential Medicines (NLEM), use of fixed-dose combinations (FDCs), incidence of polypharmacy, Drug–drug interactions (DDIs) and prescription errors. Polypharmacy (≥ 5 drugs per prescription) was more common in government prescriptions (73.5% vs. 55.5%) reflecting the greater prevalence of comorbidities treated in the public sector. Private facilities on the other hand demonstrated higher adherence to the National List of Essential Medicines (60% vs. 49.42%). Drug–drug interactions were observed more frequently in private prescriptions (5% vs. 0.5%), whereas prescription errors occurred more often in the public sector (13.5% vs. 9%). A stronger dependence on fixed-dose combinations and branded formulations was noted in the private sector often without sufficient justification adding risks of inappropriate dosing and increased financial burden. In contrast, the public sector primarily emphasized generic prescribing and applied a more restrained use of FDCs in closer alignment with WHO recommendations on rational drug use. The study highlights clear disparities in prescribing practices, emphasizing the need for uniform treatment guidelines, electronic prescribing platforms and enhanced prescriber training to advance safer and more cost-effective cardiovascular care in India.

KEYWORDS: Cardiovascular diseases, Polypharmacy, Drug–drug interactions, Prescription, Public, Private, healthcare

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसितभारत२०४७): Role of IPR !!
Nov. 04-05, 2025



TITLE: Valorising Cashew Apple Pomace in a Ragi-based Probiotic Dessert with High Calcium for Dietary Nutrient Gap Mitigation

DEPARTMENT: Postgraduate (Co-Ed) Department of Food Technology

COLLEGE ADDRESS: Carmel College of Arts, Science, and Commerce for Women, Nuvem, Goa, India 40360

CORRESPONDING AUTHOR EMAIL ID: * mariacordeiro@carmelcollegegoa.org

AUTHORS: Shriya Gaunekar, Naomi Moraes and Maria Carina Cordeiro*

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT: (Not more than 250 words)

The core objective of this study was to evaluate and address the nutritional deficiencies inherent in a diet through the development of fortified, plant-based food products. Probiotic desserts were selected as a delivery system to provide essential nutrients often lacking in diets, alongside the addition of beneficial gut-friendly bacteria. The products were developed using ragi (*Eleusine coracana*) extract fortified with cashew apple pomace. Essential preparatory steps included drying the cashew apple pomace to reduce moisture content, pasteurisation of ragi extract and conducting microbial analysis to evaluate the safety before use. Ragi was soaked and sprouted to improve the nutrient content and then subjected to extract preparation.

Two products were formulated, product 1 (FP 1) utilised pasteurised and soaked ragi extract, while product 2 (FP 2) used pasteurised and sprouted ragi extract. FP 1 demonstrated significantly superior sensory acceptability across all evaluated attributes, including taste, appearance, texture, mouthfeel, and sweetness. The analysis of the both final products showed a superior nutrient profile in terms of calcium content and the viable count study indicated that both the products met the standard guidelines of a probiotic product. This research intended to expand the corpus of information on functional foods and provide new perspectives on cutting-edge methods for developing and assessing probiotics and plant-based component products.

KEYWORDS: Probiotic dessert, Ragi (*Elusine coracana*), Cashew apple pomace (*Anacardium occidentale*), microbial analysis, sensory evaluation.



TITLE: Bioprospecting Coastal Goa: Pyocyanin-Enabled Intelligent Film as a Sustainable Solution for Food Safety and Packaging Waste Mitigation

AUTHORS: Mehda Ali Khan¹, Anuja Bicholkar¹, Nupur Nargundkar¹, Nezlyn Cressida D'Souza^{1,2}, Maria Carina Cordeiro¹ and Amrita Kharangate Lad²

DEPARTMENT: ¹Postgraduate (Co-Ed) Department of Food Technology, Carmel College of Arts, Science, and Commerce for Women, Nuvem, Goa, India 403604

²Department of Biochemistry, School of Chemical Sciences, Goa University, Taleigao, Goa, India 403201

COLLEGE ADDRESS: Carmel College of Arts, Science, and Commerce for Women, Nuvem, Goa, India 403604

CORRESPONDING AUTHOR EMAIL ID:

nezlyndsouza@carmelcollegegoa.org

(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)

ABSTRACT: This study addresses critical national challenges related to growing environmental concerns associated with synthetic packaging materials and packaging waste, through an indigenous, sustainable innovation, directly contributing to the vision of Developed India 2047. Biodegradable antimicrobial packaging material powered by natural pigments serves as a suitable solution. A novel strain of *Pseudomonas aeruginosa* NCD-01 (accession number: PV854192.1) was successfully isolated and characterized from the Coastal Sand Dune Rhizospheric Soil of Utorda Beach, Goa. This strain was identified as a potent producer of pyocyanin, a blue-green phenazine pigment exhibiting notable antimicrobial properties. The pigment was extracted, purified, and characterised using UV-Visible spectrophotometry, Fourier Transform Infrared (FTIR) spectroscopy, and Thin Layer Chromatography (TLC), with bioautography employed to confirm its antimicrobial activity. The stability of pyocyanin was assessed across varying pH levels and temperatures, revealing optimal performance under acidic to neutral conditions. Subsequently, a biodegradable film matrix was developed and infused with the purified pigment. The resulting film demonstrated effective antimicrobial activity against common food pathogens *Staphylococcus aureus* and *Salmonella enterica*, alongside favourable physicochemical properties, including moisture content and visual appearance. These findings underscore the potential of pyocyanin as a functional additive in active biodegradable packaging systems, positioning it as a potent alternative to conventional synthetic preservatives and packaging materials. This research moves beyond pure discovery by translating a local Goan bioresource into a commercially viable product with significant industrial utility, primarily in sustainable food packaging and food safety.

KEYWORDS: Pyocyanin, *Pseudomonas aeruginosa*, Active packaging film, Phenazine pigment, Food safety

10th Annual International Conference on IPR
DEVELOPED INDIA 2047 (विकसित भारत २०४७): Role of IPR!!
Nov. 04-05, 2025



TITLE: Investigating the Antifungal Activity of *Buchanania cochinchinensis* oil and *Piper nigrum* oil by Invitro and Insilico Network Pharmacology Approach.

AUTHORS: Herakal Rakshita Shivanand^{1*}, Somesh G Mannur², Dr. S.K. Nimbal³

DEPARTMENT: Department of Pharmaceutical Analysis¹.

COLLEGE ADDRESS: KLE College of Pharmacy, JNMC Campus, Nehru Nagar, Belagavi. 590010.

CORRESPONDING AUTHOR EMAIL ID: rakshitaherakal@gmail.com

*(Kindly note: All correspondence shall be done only via the email id provided here.
DO NOT USE ANY OTHER EMAIL ID for communication)*

ABSTRACT:

Background: The increasing prevalence of antifungal resistance necessitates the discovery of newer, safer, and more effective antifungal agents. Plant-derived essential oils, rich in bioactive compounds, are a promising alternative to synthetic antifungal drugs.

Objective: This study aimed to investigate the antifungal activity of *Buchanania cochinchinensis* oil and *Piper nigrum* oil using both in vitro and in silico (network pharmacology) approaches to validate their potential as natural antifungal agents.

Methods: The antifungal efficacy was evaluated through Minimum Inhibitory Concentration (MIC) by serial dilution and Zone of Inhibition (ZOI) by disc diffusion method against *Aspergillus niger*. For in silico analysis, 2D structures of bioactive phytoconstituents were retrieved from PubChem, with drug-likeness assessed via Molsoft. Target proteins were identified using GeneCards and UniProt, while pathway enrichment and interaction studies were performed using STRING and KEGG databases. Compound–target–pathway networks were constructed and analyzed in Cytoscape 3.6.1.

Results: Both *B. cochinchinensis* and *P. nigrum* oils showed significant antifungal activity. MIC values were 2000 µg/ml and 1000 µg/ml respectively, with ZOI measurements ranging from 0.9–1.1 cm for *B. cochinchinensis* and 1.0–1.3 cm for *P. nigrum*, compared to Itraconazole standard (1.7–1.8 cm). Network pharmacology revealed multiple phytochemicals targeting key antifungal-related pathways, including membrane integrity and ergosterol biosynthesis, suggesting multi-target mechanisms. **Conclusion:** The study confirms that *Buchanania cochinchinensis* and *Piper nigrum* oils possess notable antifungal activity, with *P. nigrum* showing comparatively higher potency. Integration of in vitro and in silico findings establishes their potential as cost-effective natural antifungal candidates for future therapeutic development.

Keywords: *Buchanania cochinchinensis*; *Piper nigrum*; *Aspergillus niger*; Minimum Inhibitory Concentration (MIC); Zone of Inhibition (ZOI); Network pharmacology.

