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COLLEGE OF PHARMACY. (AUTONOMOUS)
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AFFILIATIONS - Affiliated to University of Mumbai.
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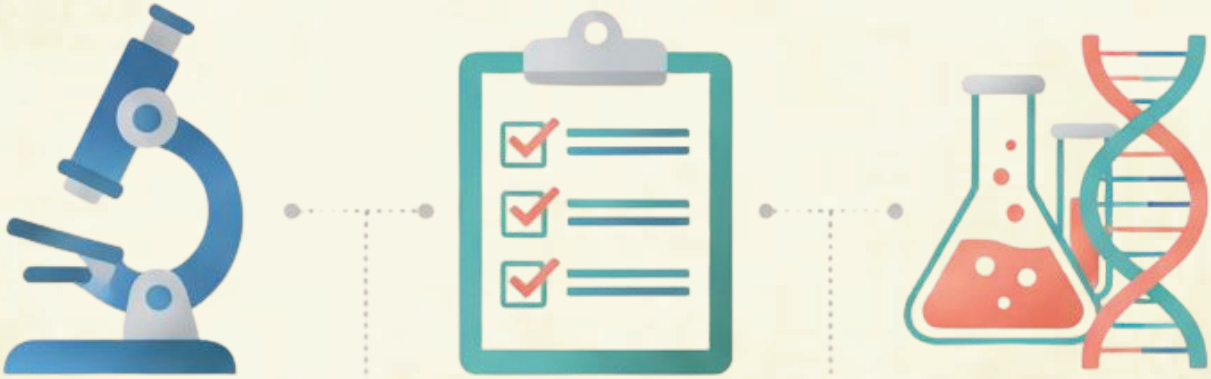
1 DAY NATIONAL LEVEL SYMPOSIUM

ORGANISED BY

Quality Control, Quality Assurance & Herbal Drug Technology Club

ABSTRACT BOOK



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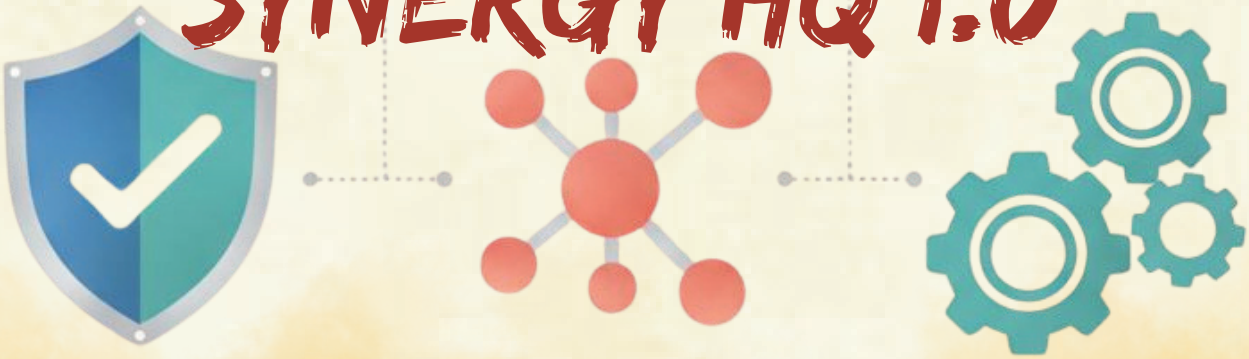

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FORWORD

Dr. Supriya Shidhaye
Principal

It is with great pleasure and pride that I present the Abstract Book for SynergyHQ, an interactive symposium dedicated to fostering innovation, interdisciplinary research and excellence in the field of Quality Assurance and Herbal Drugs Technology. SynergyHQ serves as a vibrant platform that brings together students, researchers, academicians, and industry professionals to engage in meaningful scientific discourse and knowledge exchange.

In an era marked by rapid advancements in pharmaceutical sciences, the role of analytical research and quality-driven development has become more critical than ever. The poster themes featured in this abstract book—Drug Safety and ADR Monitoring, Novel Drug Delivery Systems, Innovations in Drug Discovery, Nutraceuticals and Cosmeceuticals, AI-Powered Process Development, Quality by Design (QbD) in Pharmaceutical Research, and Pharmacognosy with Traditional Knowledge in Modern Drug Development—reflect the evolving landscape of healthcare and highlight the integration of science, technology, and traditional wisdom.

The contributions compiled herein demonstrate the research acumen, creativity, and analytical capabilities of the participants. They emphasize contemporary approaches to ensuring drug safety and efficacy, harnessing artificial intelligence for optimized pharmaceutical processes, advancing delivery systems, and exploring the immense potential of herbal medicines and nutraceuticals through scientific validation. Such initiatives play a vital role in bridging the gap between academic research and real-world pharmaceutical applications.

I sincerely appreciate the efforts of the organizing committee, faculty mentors, evaluators, and participants whose dedication and enthusiasm have contributed to the success of SynergyHQ. I am confident that this abstract book will serve as a valuable resource and a source of inspiration for budding researchers and professionals alike.

I wish all the participants great success and hope that SynergyHQ continues to grow as a dynamic forum for innovation, collaboration, and scientific excellence in pharmaceutical sciences.

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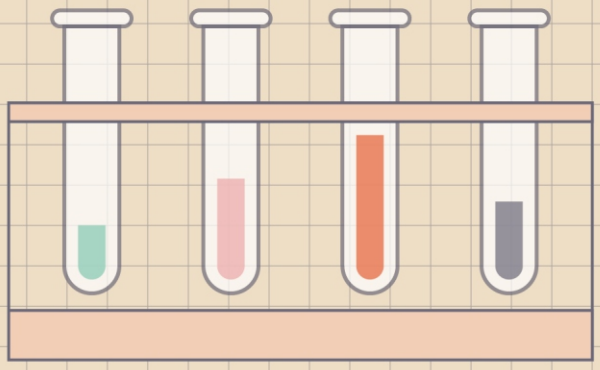

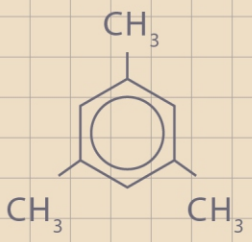

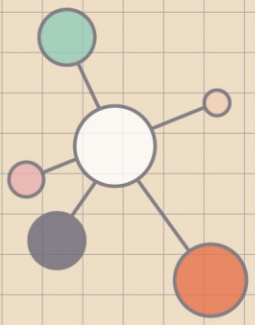

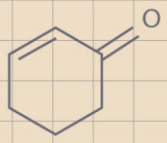

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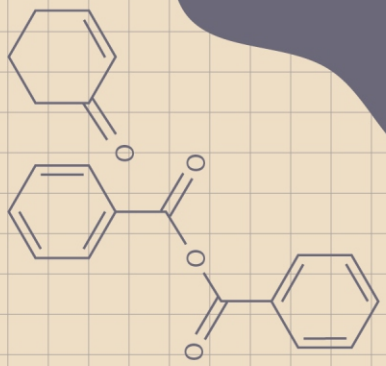

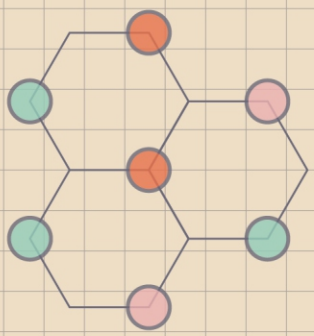

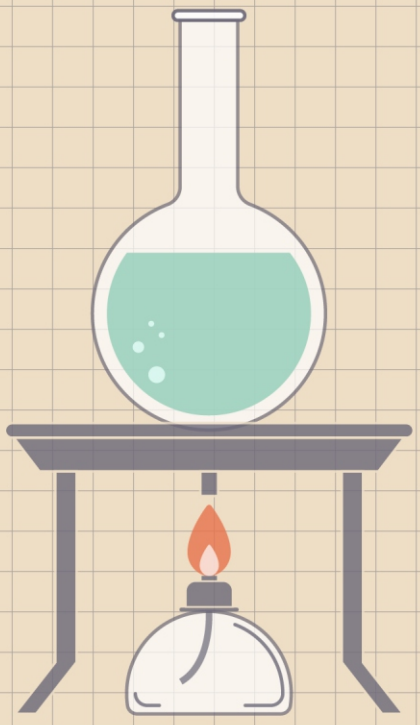

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QbD-GUIDED SYNTHESIS AND BIOLOGICAL EVALUATION OF BIOGENIC POLYHERBAL SILVER NANOPARTICLES FOR HOLISTIC CARDIO PROTECTION.

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ABSTRACT

The surge in post-COVID-19 cardiac complications underscores the urgent need for safe and effective cardioprotective interventions. This study reports a Quality by Design (QbD)-guided green synthesis of polyherbal silver nanoparticles (PHAgNPs) utilizing extracts from 13 Indian medicinal plants: Terminalia chebula, Sida cordifolia, Terminalia arjuna, Hemidesmus indicus, Tinospora cordifolia, Shilajit, Trapa bispinosa, Terminalia bellerica, Tribulus terrestris, Phyllanthus emblica, Glycyrrhiza glabra, Commiphora mukul, and Withania somnifera.

The QbD framework enabled precise optimization of synthesis parameters to ensure controlled particle size, enhanced stability, reproducibility, and sustained release of bioactives. Comprehensive characterization of PHAgNPs was carried out using UV-Vis, FTIR, XRD, SEM, TEM, DLS, zeta potential, and DSC techniques. Simultaneous RP-HPLC was employed for the standardization of key phytoconstituents using three marker compounds.

Safety was assessed through in vitro cytotoxicity studies on H9C2 cardiomyoblast cells using the Trypan Blue exclusion assay. Cardioprotective efficacy was evaluated in vivo using an isoproterenol-induced myocardial infarction model in Wistar rats across six experimental groups: normal, disease control, standard drug, polyherbal extract, blank silver nanoparticles, and PHAgNPs. Treatment with PHAgNPs resulted in significant improvements in hemodynamic parameters, cardiac biomarkers (CK-MB, Troponin I, LDH, H-FABP), and oxidative stress markers (MDA, SOD, CAT, GSH). Histopathological analysis further confirmed substantial myocardial protection.

The sustained release profile of PHAgNPs enhances their therapeutic potential, positioning this QbD-driven polyherbal nanomedicine as a promising candidate for holistic cardioprotection.

Keywords: Polyherbal silver nanoparticles, Quality by Design (QbD), RP-HPLC, Cardioprotection.

ISOLATION, EXTRACTION, AND SCREENING OF ANTI-DIABETIC ACTIVITY OF AN HERBAL EXTRACT

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ABSTRACT

Herbal medicines remain the primary healthcare choice for nearly 80% of the global population, yet their clinical translation is hindered by inconsistent quality and lack of validated analytical methods. Wattakaka volubilis (Green Wax Flower), a traditional antidiabetic remedy rich in flavonoids, phenolics, and saponins, offers immense therapeutic potential.

This project was intended to develop a reliable method for the extraction, isolation, and identification of the main bioactive compound in Wattakaka volubilis.

Bioassay-guided sequential extraction was performed, and individual extracts were screened for antidiabetic activity to determine the glucose uptake. The most bioactive fraction was purified through chromatography to obtain a single flavonoid glycoside of confirmed purity.

The isolated compound was further identified using advanced spectroscopic and mass spectrometric methods.

Thus, the project was able to determine the most bioactive extract of Wattakaka volubilis for antidiabetic activity and isolate the main compound responsible for the same.

Keywords: Herbal, Traditional, Extraction, Bioactivity

MICROFORMULATIONS FOR TARGETED VITILIGO TREATMENT: ENHANCING EFFICACY AND PATIENT OUTCOMES.

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ABSTRACT

Vitiligo, affecting 0.5–2% of the global population, is a chronic dermatological condition characterized by the loss of melanocytes, resulting in depigmented skin patches. Current therapeutic approaches often produce inconsistent repigmentation, emphasizing the need for more robust and reproducible treatment strategies. This research applies the principles of Quality by Design (QbD) to the development of an optimized microemulgel for site-specific drug delivery, aiming to enhance the therapeutic efficacy of clobetasol propionate, a potent immunosuppressant commonly used in vitiligo management.

A combination microemulsion was systematically formulated and optimized using the Design of Experiments (DoE) framework, with a Central Composite Design (CCD) employed to identify critical formulation parameters. Key quality attributes such as droplet size, stability, solubility, and pharmacokinetic performance were rigorously evaluated. By integrating QbD principles, the study ensures a thorough understanding of the formulation-process relationship, allowing for controlled variability, improved reproducibility, and enhanced therapeutic outcomes. The optimized microemulgel is designed to maximize the synergistic effects of the active drug, targeting melanocyte regeneration and addressing challenges in repigmentation.

By focusing on risk assessment, process optimization, and predefined quality targets, this research demonstrates the value of QbD in rational pharmaceutical design. The findings highlight a structured, science-driven approach to improving drug delivery systems for vitiligo, ultimately aiming to enhance patient safety, efficacy, and quality of life.

Keywords: Quality by Design (QbD), Design of Experiments (DoE), Vitiligo therapy, Formulation optimization developed as a biomimetic delivery system composed of over 90% naturally derived ingredients. The formulation incorporates an advanced porous polymer matrix along with a lipid-based carrier system prepared using plant-derived sterols for improved penetration, controlled release, and enhanced biocompatibility compared with conventional products. The formulation was evaluated through SEM (surface morphology, particle size), zeta

COMPUTATIONAL STUDIES AND SYNTHESIS OF POTENTIAL ANTIVIRAL COMPOUNDS

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ABSTRACT

The COVID-19 pandemic has emphasized the critical need for effective antiviral agents targeting key viral enzymes. In this study, a new class of sulfonamide-based compounds was designed with the aim of inhibiting an essential enzyme involved in viral replication. Computational tools were employed to identify promising candidates based on their binding potential and predicted pharmacological properties. Selected compounds were synthesized and evaluated through molecular modeling and structure–activity relationship studies. Among the designed molecules, one derivative demonstrated particularly strong inhibitory potential, making it a promising lead for further development. This work highlights the effectiveness of integrating computational design with experimental validation in the search for novel antiviral therapeutics.

REVOLUTIONIZING PHARMA RESEARCH AND TECHNOLOGY: THE RISE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT

Artificial intelligence (AI) is becoming a revolutionary force in the field of pharma research and technology, radically reshaping drug discovery, development, and healthcare practices. This literature review provides a comprehensive overview of the application of AI across the pharma value chain, across areas such as target discovery, lead optimization, clinical trials, personalized medicine, and manufacturing. Advances brought about through machine learning, deep learning, and natural language processing have enabled quicker and more precise predictions about drug-target interactions, toxicity profiles, and clinical activity. AI-based virtual screening and generative modeling have accelerated the detection and optimization of lead candidates, whereas AI-boosted clinical trial design and participant stratification have resulted in superior success rates and minimized costs. AI has, in addition, propelled personalized medicine through the incorporation of multi-omics data and support in the identification of biomarkers. In pharma manufacturing, AI is a driving force in the optimization of process operations, quality control, and predictive maintenance. Despite this, ethical concerns, regulatory hurdles, and the need for transparent and interpretable models remain key challenges. Future directions identify the future possibility of next-generation AI algorithms, quantum computing, and collaborative environments in driving precision medicine and responsible innovation. Successful pharma applications of AI require intersectoral collaborations, harmonized regulations, and a delicate balance between technological innovation and ethical considerations in providing widespread benefits for all stakeholders.

Keywords: AI; Pharma Value Chain; Generative Modeling; Predictive Maintenance.

NUTRACEUTICALS & COSMECEUTICALS: THE NEXT HORIZON.

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ABSTRACT

Psidium guajava (guava) is a tropical plant extensively cultivated for its edible fruit and widely recognized for its diverse pharmacological properties. Analytical methods play a crucial role in identifying and quantifying its bioactive constituents, particularly quercetin, a flavonoid responsible for many of the plant's therapeutic effects. The present study aimed to compile and evaluate various analytical techniques for the characterization of guava leaves, emphasizing the identification of quercetin. Both literature-based and experimental approaches were employed using thin-layer chromatography (TLC), ultraviolet (UV) spectrophotometry, high-performance liquid chromatography (HPLC), and high-performance thin-layer chromatography (HPTLC). In HPLC analysis, a 4 × 125 mm Hypersil ODS column was used with a mobile phase consisting of 0.5% ortho-phosphoric acid in water and methanol at a flow rate of 1 mL/min. The column was equilibrated and washed for 20 and 18 minutes, respectively, at 25 °C. HPTLC was performed on silica gel 60 F254 precoated plates (10 × 10 cm) using toluene:acetone:formic acid (38:10:5) as the solvent system. UV-spectrophotometric analysis of the guava leaf extract revealed absorption maxima (λmax) at 212, 256, and 372 nm, corresponding to the characteristic absorption pattern of quercetin. The HPLC and HPTLC analyses confirmed the presence of quercetin with well-defined and reproducible chromatographic profiles, validating the reliability and precision of the applied methods. These analytical results confirm that Psidium guajava leaves contain quercetin as a major bioactive compound. Overall, the study emphasizes the feasibility of developing a novel, cost-effective, and time-efficient analytical methodology for the standardization of Psidium guajava leaves, ensuring consistent quality control for their pharmacological and industrial applications and supporting further research into their therapeutic potential.

Keywords: Psidium guajava, quercetin, HPLC, HPTLC.

DEVELOPMENT AND EVALUATION OF NANOCARRIER BASED DRUG DELIVERY SYSTEM

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ABSTRACT

Psoriasis is a persistent inflammatory autoimmune dermatosis characterized by hyperproliferation of keratinocytes and inflammatory responses, that has a huge impact on the patient's health. Traditional treatment approaches include topical corticosteroids, biologics and phototherapy that has undesirable effects such as skin atropy, nephrotoxicity and systemic effects that can diminish long term efficacy of the agent. Thus, there is a need to develop new drug delivery system that can improve the efficacy of the therapeutic agent while also reducing the adverse effects.

This study developed and tested a hyaluronic acid (HA) conjugated clobetasol propionate (CP) loaded chitosan nanoparticle hydrogel for targeted psoriasis. Chitosan, owing to its biocompatibility, penetration-enhancing and anti-inflammatory properties was employed as a polymeric carrier. HA targeted overexpressed CD44 receptors, in psoriatic skin, thus improving drug retention and site-specific delivery. CP, a potent corticosteroid served as the active therapeutic agent.

The nanoparticles were prepared using the ionic gelation method, optimized for particle size, zeta potential, and entrapment efficiency and further incorporated into a hydrogel base. The optimized formulation exhibited particle size around 150 nm, entrapment efficiency >90% and favorable zeta potential, with TEM confirming spherical morphology. In vitro diffusion studies demonstrated sustained drug release, best fitting the Higuchi release model, indicating diffusion-controlled kinetics.

In vivo evaluation using an imiquimod-induced psoriasis model in BALB/c mice revealed significant therapeutic efficacy of this hydrogel formulation compared to the marketed formulation. Reduction in Psoriasis Area Severity Index (PASI), decreased spleen weight and favorable histopathological outcomes confirmed its superior antipsoriatic activity.

The developed formulation exhibited enhanced penetration, sustained release, targeted delivery with minimum side effects. This nanocarrier-based hydrogel system holds strong potential as a safer and more effective alternative to traditional psoriasis treatment.

Keywords: Psoriasis, clobetasol propionate, chitosan nanoparticle hydrogel, hyaluronic acid

HPLC METHOD DEVELOPMENT AND PURITY PROFILING OF NOVEL FLUORO– AND NITRO–SUBSTITUTED FLAVONES

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ABSTRACT

Flavones, a subclass of natural flavonoids found abundantly in fruits, vegetables, and herbs, demonstrate important pharmacological activities, including antioxidant, anti-inflammatory, neuroprotective, anticancer, and cardioprotective effects. They are extensively studied for their therapeutic potential in treating cardiovascular diseases, neurodegenerative disorders, diabetes, cancer, and polycystic ovarian syndrome (PCOS), a hormonal and metabolic disorder that affects women's reproductive health. In the present study, two substituted flavones were identified and analysed: 2-(3-fluorophenyl)-4H-1-benzopyran-4-one (Molecule 1) and 2-(4-nitrophenyl)-4H-chromen-4-one (Molecule 2). High-Performance Liquid Chromatography (HPLC) analysis was performed under optimized chromatographic conditions to evaluate their purity and retention behavior. Molecule 1 exhibited two distinct retention times at 5.517 min and 8.763 min with a chromatographic purity of 87.26%, while Molecule 2 showed a retention time of 6.963 min and a chromatographic purity of 95.38%. System suitability testing, performed as per ICH Q2 (R1) guidelines with six replicate injections, met all acceptance criteria (%RSD < 2, NTP ≥ 2000, symmetry factor approximately 1), confirming the robustness and reliability of the HPLC method for both Molecule 1 and 2.

Keywords: Flavones, HPLC, Purity evaluation, Bioactivity

ONYCHOHERBAL GLAMOUR SHIELDS

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ABSTRACT

The project titled OnychoHerbal Glamour Shields presents an innovative therapeutic–cosmetic approach for the treatment of onychomycosis, a persistent fungal infection of the human nails. The concept involves the design of an artificial nail integrated with a drug-releasing membrane placed on the natural nail surface, enabling localized and sustained drug delivery. Two herbal essential oils, extracted through steam distillation, were selected for their potent antifungal and anti-inflammatory properties and were found to act synergistically against Trichophyton rubrum, the primary causative organism of onychomycosis.

The oils underwent preliminary phytochemical and chemical tests, Thin Layer Chromatography (TLC) for component identification, and UV-Visible spectroscopic analysis for quantitative evaluation. A matrix-type polymeric drug release membrane was then formulated using suitable biocompatible polymers. The membrane was evaluated for thickness, tensile strength, flexibility, folding endurance, and moisture permeability to ensure mechanical stability and controlled release. In vitro diffusion studies using the Franz diffusion cell confirmed a sustained and consistent release profile of the herbal actives. The antifungal assay demonstrated strong inhibition against Trichophyton rubrum, and Minimum Fungicidal Concentration (MFC) studies established the synergistic efficacy of the combined oils. Further, anti-inflammatory activity supported their therapeutic potential, while the chorioallantoic membrane (CAM) assay confirmed the formulation's non-irritant and biocompatible nature. A cost analysis indicated the formulation to be economical and feasible for practical application.

The OnychoHerbal Glamour Shield was successfully formulated as a dual-purpose medicated artificial nail offering both cosmetic appeal and therapeutic benefit. It provides an effective, natural, and patient-friendly alternative for onychomycosis treatment, combining sustained herbal drug delivery, proven synergistic activity, and aesthetic enhancement into a single innovative product.

Keywords: Onychomycosis, Herbal formulation, Artificial nail, Essential oils

A-QBD DRIVEN STABILITY INDICATING RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS ESTIMATION OF OFLOXACIN AND ORNIDAZOLE AND CHARACTERIZATION OF THE DEGRADATION PRODUCTS BY LC-MS ANALYSIS

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ABSTRACT

The present study reports the development of a robust, stability-indicating RP-HPLC method for the simultaneous estimation of Ofloxacin and Ornidazole in combined dosage forms. An Analytical Quality by Design (AQbD) framework was applied to ensure method robustness and reliability. Critical method parameters including mobile phase composition, pH, and flow rate were optimized using a Box–Behnken design. The optimized method employed a HiQ Sil C18HS column with a mobile phase of Acetonitrile: Methanol: Water (55:25:20 v/v/v) at pH 3.0 and a flow rate of 1.4 mL/min, achieving sharp peaks and adequate resolution (Rs > 7). Validation as per ICH Q2(R1) guidelines confirmed specificity, linearity (R2 > 0.99), precision (%RSD < 2), accuracy (98–102% recovery), and robustness. Forced degradation studies under acidic, basic, oxidative, thermal, and photolytic conditions demonstrated the method's stability-indicating capability. Ornidazole was particularly unstable under basic conditions. LC-MS/MS analysis enabled characterization of major degradation products, including a key Ornidazole degradant at m/z 202.0836, providing insights into degradation pathways. The developed method is suitable for routine quality control, stability testing, and regulatory submissions of formulations containing Ofloxacin and Ornidazole.

Keywords: Ofloxacin, Ornidazole, AQbD, Forced degradation study, LC-MS/MS.

QUALITY BY DESIGN (QBD): TRENDING PLATFORM TOWARDS PRODUCT DEVELOPMENT

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ABSTRACT

The pharmaceutical sector has been swiftly evolving away from the conventional trial-and-error method and toward systematic, evidence-based strategies that ensure a product's efficacy, safety, and quality. Quality by Design (QbD) has emerged as a potent industrial concept in this context, where it is applied to eliminate variability and streamline processes. QbD reduces formulation and manufacturing risks by incorporating quality factors into a product's early stages of development. The importance of it is emphasized by the improved regulatory compliance, the better understanding of the processes, and the high cost-efficiency, at the same time maintaining the product performance consistency. The most important part of the QbD paradigm is the definition of the Target Product Profile (TPP) that is further complemented by the identification of Critical Quality Attributes (CQAs), Critical Material Attributes (CMAs), and Critical Process Parameters (CPPs). These elements create a systematic approach to risk assessment, development of a risk control strategy and optimization of the process. Other tools like Design of Experiments (DoE) and statistical modelling also support product development by facilitating identification of sources of errors and determinants of variability in formulation to a greater extent. This approach will enable industries to achieve strong process control, a decrease in the number of batch failures, and an increase in the management of product lifecycle. Lastly, QbD is a paradigm shift in the development of pharmaceutical products because it insures that products are designed with inherent quality. This systematic, science-oriented and risk-based approach makes it a modern and invaluable platform in promoting pharmaceutical innovation and protecting patient safety.

Keywords: Product Development, Elements of QbD, Optimization, , Pharmaceutical Formulation.

ANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF NUTRACEUTICAL: EPIGALOCATECHIN-3-GALATE (EGCG)

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ABSTRACT

A new rapid, economical, and isocratic high performance liquid chromatography (HPLC) method was developed for the determination of Epigallocatechin-3-gallate (EGCG), a major polyphenol in green tea. EGCG is a gallate ester formed by formal condensation of gallic acid with (3R)-hydroxyl group of epigallocatechin and is known for its diverse biological roles, including antineoplastic, antioxidant, neuroprotective, Gero protective, and apoptosis-inducing activities. It naturally occurs in the leaves of Camellia sinensis (family: Theaceae), an evergreen shrub widely consumed worldwide in the form of green tea. Chromatographic separation was achieved isocratically on a Top-Chromato packed peerless basic C18 column (250 × 4.6 mm, 5 µm particle size) at 30 °C using water and acetonitrile as the mobile phase at a flow rate of 1.0 ml/min, with detection carried out at 274 nm. EGCG exhibited excellent linearity over the concentration range of 10–60 µg/ml, with LOD is 1.672 µg/ml and LOQ is 5.078 µg/ml. The method demonstrated high accuracy (99.44 – 100.98 %) and precision with, system precision and method precision values of 0.935 % and 1.1865 respectively.

The developed HPLC method is simple, robust, and reliable, making it suitable for routine quality control, standardization, and quantification of EGCG in green tea formulations and related pharmaceutical preparations.

Key words: Epigallocatechin-3-gallate (EGCG), High-Performance Liquid Chromatography (HPLC), Polyphenols; Method validation.

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OPTIMIZATION AND EVALUATION OF SUSTAINED RELEASE TABLETS UTILIZING ARTIFICIAL NEURAL NETWORK MODELING.

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ABSTRACT

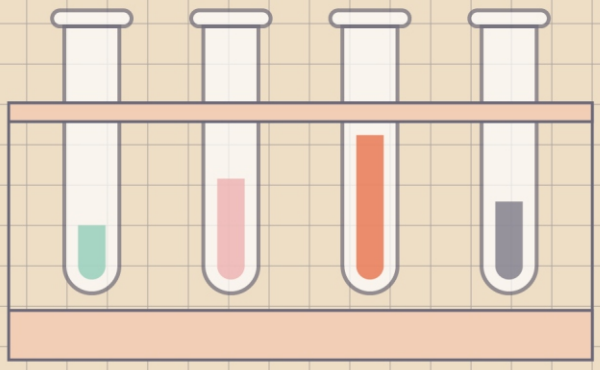
The present research focuses on the optimization and evaluation of sustained release tablets using Artificial Neural Network (ANN) modeling to achieve precise formulation design and performance prediction. Sustained release dosage forms are intended to maintain therapeutic drug concentrations for an extended duration, minimizing dosing frequency and enhancing patient compliance. Traditional optimization approaches, such as factorial or response surface designs, are often limited in handling complex, nonlinear relationships among formulation variables and responses. To overcome these limitations, ANN modeling was employed as a powerful computational tool capable of learning intricate input–output patterns through data-driven training.

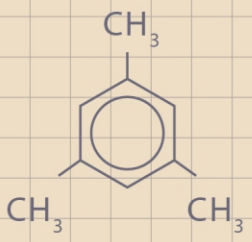
In this study, sustained release tablets were formulated using a suitable model drug and hydrophilic polymer matrix. Critical formulation variables such as polymer concentration, compression force, and granule size were systematically varied. The dependent responses evaluated included drug release rate, hardness, friability, and disintegration time . Experimental data were used to train, validate, and test the ANN model using a multilayer perceptron (MLP) architecture. The trained model demonstrated high prediction accuracy with correlation coefficients (R^2) exceeding 0.98 between predicted and experimental values. Sensitivity analysis identified polymer concentration as the most influential variable governing drug release kinetics.

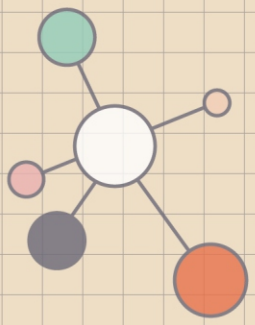
Optimized tablets exhibited controlled and reproducible release profiles following Higuchi and Korsmeyer–Peppas kinetics, confirming diffusion-controlled release behavior. ANN-based optimization significantly reduced the number of experimental trials compared to conventional statistical methods, highlighting its efficiency in pharmaceutical formulation development.

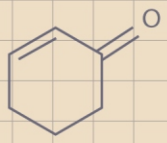
This study concludes that Artificial Neural Network modeling is a robust and reliable tool for optimizing sustained release tablet formulations, providing accurate predictions of critical quality attributes and enabling rational, cost-effective product development within the framework of Quality by Design (QbD) principles.

Key words: Artificial Neural Network, Sustained Release Tablets, Optimization, Quality by Design









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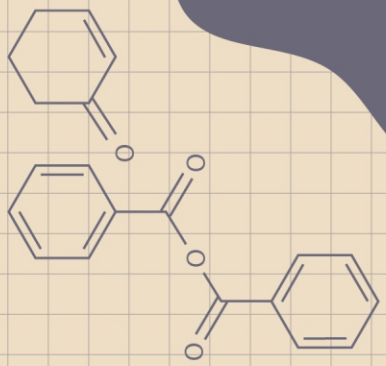

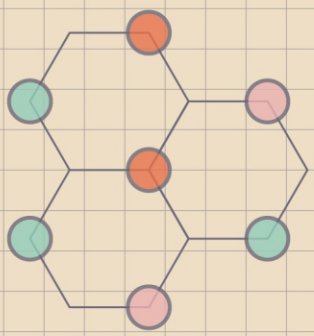

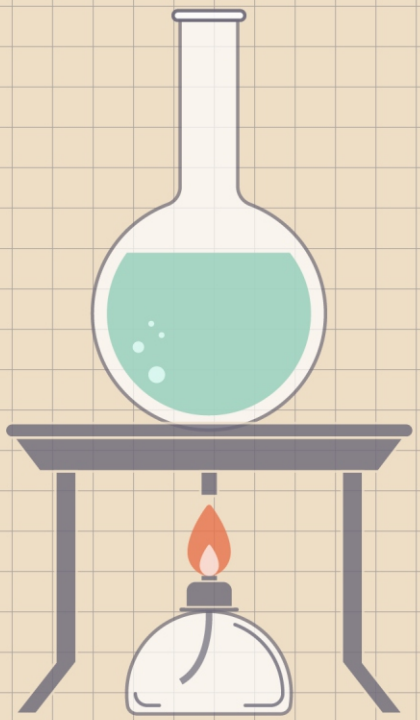

TRANSDERMAL NOVEL DRUG DELIVERY SYSTEM PSORADERM

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ABSTRACT

The development of transdermal drug delivery systems has gained significant attention due to their ability to provide sustained release, improved bioavailability, and minimized side effects. This study investigates the formulation of a transdermal patch containing the flavonoids quercetin and myricetin, two potent antioxidants with anti-inflammatory, anticancer, and cardiovascular protective properties. These compounds, however, suffer from poor oral bioavailability due to their low solubility and high first-pass metabolism. The transdermal patch is designed to enhance the absorption of quercetin and myricetin through the skin, circumventing these limitations. In this research, different formulations of transdermal patches were prepared using various polymers (e.g., hydroxypropyl methylcellulose, ethylcellulose) and permeation enhancers (e.g., DMSO, ethanol) to optimize the release and skin permeability of the active compounds. The physicochemical properties, such as patch thickness, weight uniformity, and adhesion, were thoroughly evaluated. Additionally, in vitro drug release studies were conducted using Franz diffusion cells, with the release profile of quercetin and myricetin compared to that of a conventional oral formulation. The findings demonstrated that the transdermal patches exhibited controlled, sustained release of both flavonoids, with significant enhancement in skin permeation compared to traditional methods. The study concludes that transdermal delivery of quercetin and myricetin holds great potential as an effective therapeutic approach for the management of various diseases, providing a safer and more efficient alternative to oral administration. Further in vivo studies are required to validate the clinicals efficacy of this transdermal system.

Keywords- flavonoids, quercetin, myricetin, transdermal patch.

NATLIPS : A HERBAL COSMECEUTICAL FOR LIP CARE

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ABSTRACT

Skin is the outermost layer of body which serves to protect the body from any potential harm/danger. Cosmetics are the formulation intended to be rubbed, poured, sprinkled or sprayed, introduced into or otherwise applied to the human body or any part for cleansing, beautifying, promoting attractiveness or altering the appearance. One of these are the "Herbal Cosmetics" comprising herbal constituents or either their extracts. Lipsticks are widely used to beautify the lips. But they contain harmful pigments, preservatives like Titanium Dioxide (TiO2) and Butylated hydroxytoluene (BHT) respectively which may lead to skin damage and serious health issues. This research work focuses on the development and evaluation of herbal lipstick replacing synthetic ingredients with a herbal constitute which has low side effects to the skin. Natural pigments of Tomato (Lycopene), Watermelon and Purple Cabbage (Anthocyanin) were extracted, isolated and incorporated into the herbal lipstick. Various evaluation tests were performed for the extracted natural pigments (Lycopene) and herbal lipstick. Thus incorporation of natural pigments can be used as an alternative to formulate herbal lipstick to enhance patient compliance.

Keywords- flavonoids, quercetin, myricetin, transdermal patch.

DRUG SAFETY AND ADR MONITORING IN PHARMACOVIGILANCE: EMERGING TRENDS AND APPLICATIONS

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ABSTRACT

Large Language Models (LLMs) in pharmacovigilance offer a new way to monitor drug safety. Drug safety is crucial for ensuring that the benefits of a drug outweigh its risks throughout its lifecycle. Adverse Drug Reaction (ADR) monitoring is a key part of pharmacovigilance. It involves continuously collecting, detecting, assessing, and preventing adverse effects or other drug-related issues. Effective ADR monitoring helps find previously unrecognized reactions, assess how often they happen and how serious they are, and encourage safer use of medicines. This study examines how LLMs can be used, focusing on tirzepatide, a dual GIP/GLP-1 receptor agonist for type 2 diabetes. The unique mechanism of tirzepatide requires careful safety monitoring. LLMs can automatically analyse real-world data from electronic health records, social media, and regulatory reports to identify safety signals. Key parts of this process include extracting adverse events from clinical narratives, detecting signals using natural language processing, and contextualizing risks with clinical factors.

A case study on tirzepatide shows how LLMs can improve pharmacovigilance by identifying gastrointestinal events and signals of pancreatitis. LLMs improve the sensitivity of signal detection and help with proactive risk management. Their use in workflows can lead to better safety detection, faster regulatory reporting, and more tailored safety profiles. However, challenges exist, such as data quality, bias, and the complexity of interpreting safety data. LLMs have the potential to change pharmacovigilance, allowing for quicker, data-driven monitoring of drug safety across therapeutic areas and supporting better safety profiles and informed regulatory decisions in global healthcare.

RECENT ADVANCES IN HERBAL AGENTS AS ANTI-CANCER

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ABSTRACT

Natural products have long been vital sources of anticancer agents due to their efficacy and diverse bioactive compounds. This review highlights the rise of herbal agents in cancer mitigation through combinatorial therapies, novel formulations, and molecular mechanisms of action. Plants provide therapeutic benefits in forms such as teas and extracts, containing compounds like terpenes, alkaloids, flavonoids, and gums. Many anticancer drugs, including paclitaxel, vincristine, etoposide, and irinotecan, originate from natural sources. Historically, herbal knowledge was deeply rooted in mythology and early Greek medicine, where practitioners used plant-based mixtures guided by detailed understanding of herbs and anatomy. Early herbal anti-cancer drugs include vinblastine and vincristine from the Madagascar periwinkle, used since the 1960s. Today, compounds like curcumin, resveratrol, and EGCG are studied for their cancer-fighting effects. New technologies like nanoparticles help these herbal medicines work better in the body. Numerous plant compounds have shown promising anticancer properties based on various mechanisms, such as inhibit cell proliferation and cell cycle, interfere with microtubule formation, targeting topoisomerases, inhibit angiogenesis, modulating signaling pathways, improving the tumor microenvironment, reverse drug resistance and activate immune cells, metastasis, inducing apoptosis. Their benefits include selective toxicity, reducing side effects, enhancing chemotherapy tolerance, and synergizing with conventional treatments. Phytomedicine has been used for centuries in disease treatment but faces limitations such as low bioavailability, poor absorption, weak solubility, large molecular size, instability, and the need for high doses, which reduce efficacy and increase toxicity, especially orally. Nanotechnology-based delivery systems like polymeric, lipid, and inorganic nanocarriers improve stability and cellular uptake, enhancing efficacy, reducing dosing frequency, and boosting patient compliance. Future directions for natural products in cancer therapy include advanced screening, AI-driven discovery, microbiota-immune interactions, and combination strategies to maximize therapeutic effects.

Keywords: Nanotechnology, anti-cancer, herbal, drug resistance.

CARRIER MEDIATED TOPICAL DRUG DELIVERY FOR FUNGAL INFECTIONS

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ABSTRACT

Topical drug delivery is a method of administering medication that produces a localized effect to treat skin problems by allowing the topical formulation to be administered over the skin upon application. Fungi are the cause of an illness called fungal infection, or mycosis. Systemic, subcutaneous, and superficial are the three categories used to historically separate different types based on the bodily part impacted. Carrier-mediated drug delivery occurs when a transporter transfers a drug across a membrane. The goal of the present study was to design and evaluate carrier loaded gel for topical delivery of water insoluble broad spectrum BCS Class II antifungal agent which is useful in the treatment of fungal infections, with an aim to increase its penetration through skin for enhanced therapeutic effect. Drug characterization studies such as FTIR and DSC analysis, pre-formulation studies such a solubility and analytical studies were also performed. Total eight solid dispersion batches were prepared by complexing it with a polymer such as Beta Cyclodextrin, Hydroxy Propyl Beta-Cyclodextrin and Poloxamer-407 in varied ratios which were prepared by solvent evaporation technique and hot melt method. These complexes were evaluated for drug content and in vitro release profile. Batch No. 5 was optimized as it showed a maximum drug release of 13.16% after 5 hours. Anti-fungal assay declared that the drug with concentration of 200 ppm showed maximum zone of inhibition of 25 mm. The future prospects of the research is to load the optimized carrier into gelling agents. This carrier loaded drug delivery approach can be a novel modality for the management of fungal infections. Further detailed investigation and elaborative clinical studies need to be carried out to confirm our proof of concept.

Keyword- Topical drug delivery , Carrier- loaded gel , Antifungal Agent , Solid dispersion .

NUTRANOURISH CRUNCHIES: A HERBAL AND DIABETES FRIENDLY DIETARY SUPPLEMENT

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ABSTRACT

Diabetes mellitus is a chronic and rapidly growing disease condition affecting individuals worldwide. Despite having several treatments, maintenance of blood glucose levels is still a major concern. Often, cookies consumed during breakfast or snack time to temporarily overcome hunger, consist of refined flour, artificial sweeteners, flavours and preservatives. However, consumption of such cookies by a diabetic patient may lead to elevated blood glucose levels. This research work focuses on the development of a herbal nutraceutical dietary supplement for the management of diabetes that comprises of Herbal Constituent-I and Herbal Constituent-II as a traditionally used supplements obtained from natural sources and helps in maintaining the blood glucose levels. Pre-formulative analysis like Fourier Transform Infrared Spectroscopy (FTIR) and Thin Layer Chromatography (TLC) were performed individually for both the active herbal constituents. This dietary supplement was prepared in a form of cookie by using other nutritional excipients such as Ragi flour, flaxseed powder, novel natural sweetener, and healthy fats taking into consideration certain critical process parameters such are amount of binder (Ghee) added and temperature for baking. Powder blend was evaluated for its flow properties and four batches were formulated based on these evaluations studies one batch was optimized. Batch-04 was considered as the optimized batch. This optimized batch was subjected to a sensory evaluation/survey with 20 volunteers of different age groups. This innovation highlights the importance and need of nutraceutical supplement as a compatible and user friendly approach for the management of diabetes mellitus.

Keywords : Diabetes mellitus, Nutraceutical, Herbal, Dietary supplement

PHARMACOGNOSY AND TRADITIONAL KNOWLEDGE IN MODERN DRUG DEVELOPMENT

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ABSTRACT

Synergizing pharmacognosy traditional knowledge, and advanced extraction for modern drug discovery pharmacognosy serves as a vital bridge in modern drug development by systematically validating and harnessing the therapeutic potential embedded in centuries of Traditional Knowledge (TK) regarding medicinal plants. This poster presents an overview of how TK guides the selection of natural sources and how different extraction techniques are strategically employed to isolate bioactive lead compounds for pharmaceutical innovation. TK systems (e.g., Ayurveda, Traditional Chinese Medicine) offer an invaluable, pre-screened library of remedies used to treat specific human ailments. This ethnopharmacological evidence significantly reduces the time and cost associated with identifying promising plant candidates. The successful transition from traditional remedy to modern drug hinges on efficient and targeted extraction. We highlight the role of both conventional and advanced techniques: Conventional Techniques (Maceration, Percolation, Soxhlet): Provide simple, large-scale extraction, though often at the risk of thermal degradation or high solvent usage. Advanced techniques (Supercritical Fluid Extraction (SFE), Microwave-Assisted Extraction (MAE), Ultrasound-Assisted Extraction (UAE): These modern, "green" technologies are crucial for contemporary drug discovery. They offer reduced extraction time, lower solvent consumption, and enhanced selectivity for heat-sensitive or low-concentration compounds, ensuring the integrity of the original bioactive molecules suggested by TK. SFE, using non-toxic is particularly valuable for isolating lipophilic compounds without residual solvent. The integration of TK with sophisticated pharmacognosy methods and selective modern extraction techniques is essential for developing standardized, safe, and effective new drugs. This synergistic approach maximizes the efficiency of the drug discovery pipeline and honors the cultural wisdom of indigenous practices by transforming age-old remedies into validated therapeutics for global health needs.

Keywords: Pharmacognosy, Traditional Knowledge, Advanced Extraction, Medicinal Plant

A HERBAL NOVEL FORMULATION FOR TOOTH CARE MANAGEMENT

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ABSTRACT

Oral bacterial infections are a major cause of dental problems worldwide. This research works focuses on formulation and evaluation of a Novel Herbal toothpaste containing extracts of Herbal constituent -1 and Herbal constituent- 2. Both the herbal constituents were extracted by suitable extraction process and phytochemical evaluation tests was performed to confirm the presence of constituents. The extracts were further analyzed by thin layer chromatographic technique to confirm the presence of active herbal constituents. Both offer complementary antibacterial and anti-inflammatory properties, the fixed combination showed enhanced effectiveness against oral pathogens such as Streptococcus aureus and Escherichia coli. Total five batches were formulated and then subjected to various evaluation parameters such as spreadability , pH , abrasiveness, extrudability and foaming test. Further, the optimized batch was also analyzed by thin layer chromatography technique followed by its anti-bacterial assay showcasing effective zone of inhibition. The developed innovation serves as a natural alternative to conventional toothpastes, the developed formulation represents a promising approach to oral hygiene, especially for communities with limited access to professional dental care. These research findings highlight the potential for further clinical investigations and product development to improve community oral health using accessible plant-based materials.

Keywords: Novel herbal Toothpaste, Active Constituents, Oral infections.

SMART DELIVERY, PRECISE THERAPY: SHAPING THE FUTURE OF MEDICINE

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ABSTRACT

The demand for more efficient, focused, and patient-friendly treatment solutions has led to revolutionary advancements in the field of drug delivery during the past few decades. Conventional drug delivery techniques, such oral tablets and injections, frequently have drawbacks such as low bioavailability, non-specific targeting, systemic adverse effects, and frequent dose requirements. Researchers have created a variety of cutting-edge drug delivery methods to improve patient compliance and optimize treatment results in order to solve these issues. The drug delivery systems based on nanotechnology, such as liposomes, polymeric nanoparticles, dendrimers, and solid lipid nanoparticles, are important advancements because they improve medication solubility, stability, and targeted administration to particular tissues or cells. These systems have demonstrated special promise in the treatment of neurological illnesses, infectious diseases, and cancer. Site-specific action is made possible by targeted drug delivery with ligands, antibodies, or aptamers, which lowers toxicity and increases efficacy. Another important development is "smart" or stimuli-responsive medication delivery devices. These systems provide precise and regulated drug release at the intended site of action by reacting to particular physiological triggers like pH, temperature, enzymes, or redox conditions. Furthermore, patient comfort and adherence are being enhanced by non-invasive delivery techniques such transdermal patches, implantable devices, microneedle arrays, and inhalable particles. Real-time, individualized treatment is also being made possible by the integration of digital health technology, such as feedback-controlled systems and wearable drug delivery devices. Moreover, 3D printing techniques are being investigated to produce personalized dosage forms with specific release characteristics. With the rise of interdisciplinary collaboration, advancements in drug delivery are anticipated to profoundly influence the future of healthcare by providing more efficient, safer, and patient-focused treatment alternatives. So collectively, innovations in drug delivery systems are crucial for enhancing therapeutic efficacy, minimizing side effects, and improving patient compliance. By enabling targeted delivery, controlled release, and protection of sensitive drug molecules, these systems ensure that medications act precisely where and when needed. They also overcome biological barriers, support personalized medicine, and make previously unusable drugs viable. Ultimately, advanced delivery methods expand treatment possibilities and contribute to more effective, safer, and cost-efficient healthcare.

Keywords: Stimuli-responsive systems, Personalized medicine, 3D printing in pharmaceuticals, Interdisciplinary collaboration in drug delivery

CONTROL STRATEGY AND RISK ASSESSMENT STUDIES IN DEVELOPMENT OF NOVEL DISPERSIBLE TABLET FOR DRY MOUTH SYNDROME

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ABSTRACT

Individuals with dry mouth syndrome are at a greater risk of developing caries and mucosal lesions. If left unattended, dry mouth syndrome can induce rapid deterioration in oral health. The treatment is mostly palliative and done with the use of oral moisturizers and lubricants. Recent NDDS employed for improving patient compliance included extended-release systems, chewable tablets and dispersible tablets, etc. The objective of present study was to develop water dispersible tablets of hydrating polymer with moisturizing and lubricating effect by comparing with known polymers. The polymer has good binding property but shows problems with respect to flowability and compression on large scale. It has also shown drastic increase in in vitro disintegration time. Therefore, the objective of the study was also to optimize the composition of water dispersible tablets for uniform and clear dispersion in water, patient compliance and adequate scalability. For the study, we have adopted control strategy with risk assessment done at every step during trial. The optimized formulation gave satisfactory results when evaluated using standard tablet evaluation parameters. The work also includes a sustainable procedure. Thus, the developed and optimized product can be a promising non medicated substitute to the other NDDS being created for treatment of dry mouth syndrome.

BIOMATRIX NOVAPIGMENT: A POLYMER–LIPID BIOMIMETIC SYSTEM FOR SUSTAINABLE HAIR AND SCALP CARE

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ABSTRACT

Conventional hair care products often contain p-phenylenediamine, ammonia, and peroxides, which are linked to scalp irritation, allergic reactions, and follicular toxicity. To address these limitations, BioMatrix NovaPigment is developed as a biomimetic delivery system composed of over 90% naturally derived ingredients. The formulation incorporates an advanced porous polymer matrix along with a lipid-based carrier system prepared using plant-derived sterols for improved penetration, controlled release, and enhanced biocompatibility compared with conventional products. The formulation was evaluated through SEM (surface morphology, particle size), zeta potential (dispersion stability), FTIR analysis, Franz diffusion studies on cut human hair, keratin restoration testing, heat protection assays, and antifungal activity. These studies demonstrated comparative advantages in keratin restoration, smoothening, heat resistance, grey coverage, and antifungal effect over marketed formulations. Based on feedback, a serum-based variant was developed to deliver these benefits without the colouring function. Patch testing showed good tolerance with no observable irritation. By integrating botanical bioactives within a lipid–polymer biomimetic framework, this work highlights the potential of functional biomaterials to provide safe, sustainable, and healthcare-relevant solutions in trichology.

Keywords: biomimetic system, follicular targeting, keratin restoration, sustainable trichology

HERBAL NUTRACHEWS: INNOVATIVE DEVELOPMENT AND EVALUATION

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ABSTRACT

The present study aims to develop and evaluate sugar-free anti-diabetic gummies formulated using Momordica charantia (bitter melon) extract as the primary phytopharmacological agent. Bitter melon is widely recognized for its hypoglycemic and insulin-mimetic properties, yet its inherent bitterness often limits patient acceptability and long-term compliance. To overcome this limitation, gummies were prepared using pectin and gelatin as biocompatible gelling agents, while stevia and isomalt were incorporated as non-glycemic sweeteners suitable for diabetic individuals. The prepared formulations were systematically assessed for organoleptic properties, weight variation, pH, moisture content, mechanical strength, syneresis, and in vitro drug release using simulated gastrointestinal conditions. Among the various trials, the optimized batch exhibited uniform consistency, desirable chewability, and enhanced palatability, effectively masking the bitterness of the extract. Furthermore, the formulation demonstrated controlled release kinetics, ensuring sustained availability of active constituents, which is advantageous for glycemic control. Stability studies conducted under accelerated storage conditions confirmed acceptable physicochemical integrity. Overall, the findings suggest that bitter melon-loaded nutraceutical gummies serve as a promising novel drug delivery system (NDDS) offering patient-friendly, non-invasive, and compliant supplementation for diabetes management. This approach highlights the potential of functional confectionery-based therapeutics in enhancing adherence to phytomedicine-based interventions.

Keywords-Momordica charantia, Anti-diabetic Gummies, Nutraceutical Delivery System

BIOMIMETICS: A NEW ERA FOR HEALTH AND BEAUTY SCIENCES

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ABSTRACT

Biomimetics, the science of imitating nature's mechanisms and processes, offers innovative strategies for developing neutraceuticals and cosmaecuticals derived from Greek words bios (life) and mimesis

Biomimetics, (imitation), is the science of studying and emulating nature's strategies to solve human challenges. In recent years, this field has revolutionized healthcare and cosmetic sciences, offering innovative, safe, and eco-friendly solutions aligned with principles of green chemistry and sustainability.

Biomimetic nutraceuticals are nature-inspired functional foods or supplements that replicate biological pathways, structures, or defense mechanisms to improve human health. Examples include mimicking cell membranes for better nutrient encapsulation and absorption, designing bioinspired antioxidants based on natural enzymes and peptides and developing biomimetic nanocarriers that deliver vitamins, minerals, or bioactives efficiently. Examples include, Hydrogel beads inspired by alginate shells to encapsulate probiotics for gut health, Phytosome formulations that mimic plant cell membranes to improve absorption of herbal actives like curcumin or silymarin Nanoemulsions inspired by milk fat globules for delivering fat-soluble vitamins. Biomimetic omega-3 delivery systems replicating marine microalgae lipid structures for enhanced brain and heart health.

In the beauty and cosmetic industry, biomimetics has inspired formulations that replicate the skin's natural structure and functions. Biomimetic peptides such as Matrixyl and Argireline promote collagen synthesis and reduce wrinkles, while ceramide-based lamellar emulsions restore the skin barrier and improve hydration.

Nature-inspired ingredients like lotus leaf, jellyfish collagen, and butterfly-wing nanostructures have also enabled the development of sustainable and non-toxic beauty products.

Beyond performance, biomimetics fosters sustainability through bioinspired materials and processes that minimize waste and energy use. Looking ahead, emerging fields such as personalized biomimetic skincare, smart adaptive materials, and regenerative cosmetics will redefine the intersection of biology, technology, and beauty.

In essence, biomimetics bridges nature and innovation—paving the way for a new era of health and beauty solutions that are effective, safe, and environmentally harmonious.

Keywords: mimic natural processes, bioinspired, nanocarriers, bioactivates, Phytosome, Nanoemulsions, Matrixyl, Argireline, cosmaecuticals, neutraceuticals.

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