Research Square

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Formulation and in-vitro Evaluation of Vildagliptin Microspheres Using Pectin and Xanthan Gum as Polymers

KRISHNAVENI MANUBOLU (krishnaveni.manubolu@gmail.com)
NARAYANA PHARMACY COLLLEGE, NELLORE, ANDHRA PRADESH, INDIA-524003
https://orcid.org/0000-0002-9401-1768

RAVEESHA PEERIGA
V.V. INSTITUTE OF PHARMACEUTICAL SCIENCES, KRISHNA, ANDHRA PRADESH, INDIA

KUDIPUDI HARINADHA BABA
NARAYANA PHARMACY COLLEGE, NELLORE

BINATHI BATTA
NARAYANA PHARMACY COLLEGE, NELLORE

Research Article

Keywords: vildagliptin, calcium chloride ion, sodium alginate, Pectin, and xanthan Gum, pH-sensitive bea

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Original Article

Nanoparticle Coating Obtained from Agaricus Bisporus On Elastic Ligatures: An *in vitro* Study

Meghana Pasala[1], Sujatha Sanneboina[2], Aparna Kadiveti[1], Gowri Sankar Singaraju*[1], Vivek Reddy Ganugapanta[1], Prasad Mandava[1]

[1]*Department of Orthodontics, Narayana Dental College, Nellore, Andhra Pradesh, India*
[2]*Department of Pharmaceuticals, Narayana Pharmacy College, Nellore, Andhra Pradesh, India*

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Keywords: *antimicrobial, durability, elastomeric, green synthesis, ligatures, nanoparticles, orthodontic, silver*

The presence of fixed orthodontic appliance favours the plaque accumulation and a compromise in oral hygiene. There are various methods in practice to minimize the white spot lesions (WSL) incidence, but which depend on the patients' compliance. It is prudent to introduce materials and methods which rely less on patient. The purpose of our study is to introduce a new silver nanoparticle (AgNPs) coating onto elastomeric ligatures and to assess its antimicrobial property and durability of the silver nanoparticles coating on the elastomeric ring. Out of a total sample of 69 clear elastomeric ligatures, 44 of them are equally allocated (n=22) to each of the two groups, Group A-test group (AgNPs coated) and Group-B-control (Non coated) for antimicrobial testing and rest for durability testing. The test group elastomeric modules coated with AgNPs were prepared from *Agaricus bisporus* extract and silver nitrate solution and tested for antimicrobial testing against *Streptococcus mutans*. Remaining test sample was utilised for determination of silver ion release(mg/L) when coated elastomeric rings are placed in artificial saliva and analyzed after T1 - 24 hours, T2 – 48 hours, T3 - 2 weeks, T4 – 4 weeks using atomic absorption spectrophotometer (AAS). The results showed a mean inhibition zone of 2.57 + 0.17 mm for antimicrobial activity for test group which is clinically significant compared to the control group which showed no inhibition zone. Friedman test was used to compare the silver release at 4 different time periods T1, T2, T3, and T4 and Wilcoxon rank test for pairwise comparison. The amount of silver ion accumulation into artificial saliva increased continuously as time elapsed and silver ion release is statistically significant between the measured time points ($p = 0.001$). The AgNPs coated elastomeric modules has definite antimicrobial activity compared non coated elastomeric modules. The durability of the coating was shorter.

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Introduction

The orthodontic treatment with fixed appliances is challenging for oral hygiene maintenance as it provides increased surface area for plaque adherence. The orthodontic appliances limit the self-cleansing capacity of saliva leading to high risk of incipient caries and white spot lesions (WSL) on dental surfaces [1]. Fejerskov and Kidd defined WSL as the "first sign of a caries lesion on enamel that is detectable with the naked eye"[2]. While the majority of WSL re-mineralize after the removal of appliances, but pre-treatment levels are never regained and can progress to cavitation [3].

The most important component in preventing WSL is good oral hygiene habits, although these depend totally on patient compliance. Therefore, orthodontic biomaterials that are inherently antibacterial or anti-cariogenic, such as adhesives, ligatures, brackets, etc., are of interest and have been tested [4].

The method of ligating archwires is a supplemental factor accounting to dental biofilm retention [5]. Elastomeric ligatures are synthetic elastics made of polyurethane, lie close to enamel and are changed regularly during orthodontic treatment [6,7]. They could serve as a vehicle for the localised distribution of antibiotics, reducing the need on patient cooperation and also improve enamel remineralisation of areas adjacent to the bracket base, that are difficult to clean [8].

One of the major advents in orthodontics is coating these elastomeric surfaces with Nano Particles to prevent microbial adhesion. Silver nanoparticles (AgNPs) are one of the commonly used nanoparticles (NPs) that can potentially combat the dental

* *Coresponding author*
E-mail address: *drgowrisankar@gmail.com* (Dr. Gowri Sankar Singaraju)

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Synthesis, Characterization of Quinalino Oxadiazoles and evaluation for their in Vitro Antitubercular Activity

J H Mruthyunjaya[1], Suchitra M[2], D K Ramesh[1], Manjunatha S. Katagi[1]

[1]Department of Pharmaceutical Chemistry, Bapuji Pharmacy College, Davangere 577 004, Karnataka, India and Rajiv Gandhi University of Health Sciences, Bangaluru

[2]Department of Pharmaceutical Chemistry, Narayana Pharmacy College, Nellore 524 003, Karnataka, India

ABSTRACT

Tuberculosis (TB) constitutes one of the most dangerous and serious health problems around the world. It is one of the lives threatening bacterial infectious disease caused by a gram positive, obligate, non-spore forming, non-motile, lipid rich cell wall containing mycolic acid belongs to genus mycobacterium which affects humans is mycobacterium tuberculosis. The development to resistance of multi drug therapy has become increasingly a serious problem, particularly, during last decades. Hence the critical importance is to develop and to design of a new agent which is active against resistant organism. So by keeping above facts, we planned to synthesize a new 2-quinolone derivatives linked substituted oxadiazole derivatives for possible anti-TB agents and to screened them for their high potency and selectivity to kill or inhibit the activity of mycobacterium tuberculosis. In search of new anti-TB agents, various 2-quinolone derivatives linked substituted oxadiazole derivatives were synthesized by different synthetic route. Synthesized compound were confirmed on the basis of physicochemical and spectral analysis, and further all the synthesized derivatives were evaluated for their in vitro antitubercular activity against Mycobacteria tuberculosis (Vaccine strain, H37 RV strain): ATCC No- 27294 by Alamar Blue Dye method. As resulted, Isoniazid, Ethambutol, Pyrazinamide, Rifampicin, Streptomycin showed potent antitubercular activity at concentration tested (0.8 µg/ml to 1.6 µg/ml). As can be clearly seen in the case of antitubercular activity, the worst inhibition was achieved for 2-quinolone linked oxadiazole derivatives (4a-4j). Despite continued efforts to discover improved antitubercular agents, there has been little success to discover 2-quinolone linked oxadiazole derivatives.

Keywords: 2-Quinolone, Oxadiazole, antitubercular, mycobacterium tuberculosis, Alamar Blue Dye.

INTRODUCTION

The knowledge in the synthesis of higher nitrogen containing heterocyclic system has evolved greater interest just because of their enormous usage in chemotherapy [1]. Although considerable advances have been achieved over recent decades in the field of research and development of novel structural prototypes as effective antimicrobials, current antimicrobial chemotherapy still suffers from two major limitations. The first is the lack of selectivity of conventional antimicrobial agents, which in turn brings about unwanted side effects. The second is acquisitions by the microorganism of multi drug resistance. The design of new agents, active against resistant organism is of critical importance.

Quinolones and their derivatives occur in numerous natural products, having interesting biological properties and comprise a relatively large growing and most interesting group in the field of chemotherapy as antibacterial. They also have wide range of applicability such as pharmaceuticals, agrochemicals and synthetic building blocks have been discovered [2]. Thus development of efficient methods for their synthesis is still attracting much interest for organic chemist, even though synthesis of quinolone have been known for more than a century [3,4].

Heterocyclic compounds containing nitrogen, is an indispensable structural unit for both the chemist and the biochemist. Among the antimicrobial agents discovered in recent years the various 2-quinolone as antimicrobial agent has stimulated remarkable interest in the synthesis of 2-quinolones bearing heterocycles [5]. Numerous biological activities of 2-quinolone have been described; antimicrobial [6], antioxidant and anti-inflammatory [7], antitumor [8], Fornesyl transferase inhibitor [9], antiangiogenic [10], acetylcholinesterase reactivators [11-14], and anti-tuberculosis [15-17]. In spite of such stimulating properties it was contemplated to synthesize some newer congeners of 2-quinolone linked oxadiazole with a need to explore their potency as better antitubercular activity. The 4-hydroxy-methyl/phenyl-2H-pyrano [3,2-c]quinoline-2,5(6H)-diones were synthesized according to literature proced

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An innovative hybrid biosorbent composed of nano ZnO and marine macro algae *Jania rubens* embedded in an alginate/PVA matrix: insights into Pb^{2+} removal in water†

Kadimpati Kishore Kumar,*[ac] Sanneboina Sujatha,[b] Wojciech Skarka [d] and Olivier Monfort *[e]

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Nanoparticles of zinc oxide (ZnO) combined with a *Jania rubens* (JR) biosorbent have been embedded in a sodium alginate (SA)–polyvinyl alcohol (PVA) matrix. This hybrid biosorbent was characterized by FTIR, and the presence of functional groups involved in the adsorption of Pb^{2+} was revealed. SEM/EDX analyses have shown that the hybrid biosorbent exhibited porous microstructures which are decorated with ZnO nanoparticles (hydrodynamic size of 68 ± 2 nm). The removal of Pb^{2+} from aqueous medium was thoroughly investigated. The adsorption capacity has been measured at q_e = 39.1 mg g^{-1} at pH = 5 and T = 303 K with the concentration of biosorbent and Pb^{2+} at 2.0 g L^{-1} and 100 mg L^{-1}, respectively. The Freundlich and Langmuir isotherms have been used to model the adsorption process, from which the maximum adsorption capacity (q_m) of the hybrid biosorbent was calculated to be 111 mg g^{-1}. The adsorption kinetics are represented by a pseudo-second order model. In addition, the hybrid biosordent was regenerated and reused for four cycles for the removal of Pb^{2+}.

1. Introduction

Non-biodegradable and hazardous heavy metal ions including lead (Pb^{2+}), cadmium (Cd^{2+}), chromium (Cr^{6+}), mercury (Hg^{2+}), and arsenic (As^{3+}) are still released into the natural environment *via* inefficiently treated wastewaters from various industries, thus being a serious threat to the ecosystem and human health.[1] Therefore, wastewater treatment should be improved by additional techniques like biological, chemical, or physical ones. In this work, particular attention is paid to removing Pb^{2+} using a physico-chemical method *i.e.* an adsorption process using an innovative hybrid biosorbent. Even in small concentrations, Pb^{2+} can cause carcinogenicity/genotoxicity, thus resulting in severe damage to brain, kidneys, and blood cells.[1] The World Health Organization has set the permissible limit of lead in potable water at 0.01 mg L^{-1}.[2] On the other hand, effective and eco-friendly approaches are required to remove such low concentrations of lead. Adsorption using a biomass-based sorbent (biosorption) is a technologically proven method for the sequestration of heavy metals, especially for biosorbents composed of algae,[3–7] fungi,[8] bacteria,[9] plants[10,11] and chitin.[12] In addition, hybrid biosorbents, *i.e.*, biosorbents combined with synthetic adsorbents, are even more promising regarding their stability, reproducibility, cost-effectiveness, thus their efficiency. In particular, the design of hybrid biosorbents by their entrapment with metal oxide nanoparticles in a polymeric matrix has appeared as an attractive technology since such nanoparticles can provide specific adsorption of heavy metal ions.[13] For example, a TiO_2-yeast nanocomposite exhibited a higher metal removal of Cr(VI) compared to conventional biosorbents.[14]

In addition, the immobilization of adsorbents into biological matrices appears promising for practical reasons like the ease of complete post-separation after treatment along with a limitation of nanoparticle release in the treated system. Therefore, natural polymers are excellent candidates because of their biodegradability and eco-friendly nature.[15] Among natural

[a] *Department of Pharmaceutical Bio-Technology, Mallareddy College of Pharmacy, Osmania University, 500 100 Secunderabad, Telangana, India. E-mail: kishore.kumar.kadimpati@polsl.pl; Tel: +48 729376412*
[b] *Department of Pharmaceutics, Narayana Pharmacy College, JNT University, Ananthapuramu, 524 002 Nellore, Andhra Pradesh, India*
[c] *Department of Environmental Biotechnology, Faculty of Power and Environmental Engineering, Akademicka 2, Silesian University of Technology, 44100 Gliwice, Poland*
[d] *Department of Fundamental of Machine Design, Faculty of Mechanical Engineering, Konarskiego 18A, Silesian University of Technology, 44100 Gliwice, Poland*
[e] *Department of Inorganic Chemistry, Faculty of Natural Sciences, Comenius University Bratislava, Ilkovicova 6, Mlynska Dolina, 84215 Bratislava, Slovakia. E-mail: monfort1@uniba.sk; Tel: +421 290142141*

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Original Article

Efficacy of Sacubitril/Valsartan versus Losartan in Heart Failure Patients with Respect to Improvements in Ejection Fraction and New York Heart Association Functional Class

Vamsi Krishna Sirimandla[1], Keerthana Kumar Chithirai[1], Venkata Lakshman Chakali[1], Sai Niharika Pydi[1], Afsar Shaik[2], K. Harinadha Baba[3], Jyothi Conjeevaram[4]

[1]PharmD, Narayana Pharmacy College, Departments of [2]Pharmacology and [3]Pharmaceutical Analysis, Narayana Pharmacy College, [4]Professor and HOD, Department of Community Medicine, Narayana Medical College and Hospital, Nellore, Andhra Pradesh, India

ABSTRACT

Background: Heart failure (HF) is a complicated clinical disease that develops when the Left ventricular becomes symptomatic due to anatomical or functional ventricular malfunction. The symptoms emerge from a cardiac output that is insufficient to meet the body's metabolic needs. Globally, HF has emerged as a major health issue, with an estimated prevalence of >37.7 million. While HF with reduced ejection fraction (HFrEF) is more frequently seen in Indian patients, HF with preserved EF seems to be more prevalent in the western population. **Objective:** This study was conducted to determine the efficacy of sacubitril/valsartan (S/V) versus losartan in patients with HF with respect to improvements in EF and New York Heart Association (NYHA) functional class symptoms. **Materials and Methods:** A prospective cohort study was conducted on 62 HF patients who are either on angiotensin receptor-neprilysin inhibitor or angiotensin receptor blocker therapy for a period of 6 months, i.e., November 2021 to April 2022, who attended the Inpatient Cardiology Department of Narayana Medical College and Hospital. By using a semi-structured questionnaire, the data was gathered. The 2013 edition of Microsoft Excel and SPSS version 20.0 software were used for data analysis. **Results:** Subjects in the S/V group showed a 56% reduction in subjects with HFrEF from the beginning to end of the follow-up, while subjects in the losartan group showed only 16% reduction. With respect to NYHA functional class, subjects in the S/V group showed greater reduction in subjects in NYHA class III and NYHA class IV by the end of follow-up when compared to the losartan group. **Conclusion:** S/V showed better efficacy in improving EF and NYHA functional class when compared to losartan.

KEYWORDS: *Ejection fraction, heart failure, losartan, New York heart association functional class, sacubitril/valsartan*

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INTRODUCTION

Heart failure with reduced ejection fraction (HFrEF) is a major worldwide health issue that, if untreated, can be deadly. Heart failure is linked to reduced life expectancy, increased hospitalization frequency, and poor quality of life, and it is a serious public health concern.[1] Evidence-based studies suggest that angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) as the first-line treatment for all grades of HFrEF. Aldosterone antagonists, beta-blockers, diuretics, digoxin, nitrates, and inotropic agents are also adjunctive therapies.[2]

In 2015, the Food and Drug Administration approved sacubitril/valsartan (S/V) for HFrEF treatment;

Address for correspondence: Mr. Vamsi Krishna Sirimandla, PharmD, Narayana Pharmacy College, Nellore, Andhra Pradesh, India.
E-mail: svamsikrishna1999@gmail.com

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Unlocking the Potential of Aquasomes: A Comprehensive Review on Innovative Nanocarriers in Drug Delivery and Beyond

Krishnaveni Manubolu[1], Pavan Kumar Balagani[2], Edward Raju Gope[3], Varalakshmi J[2], Raveesha Peeriga[4], Sridevi A.R.[2]*

[1]*Narayana Pharmacy College, Chinthareddypalem, Nellore-524002, Andhra Pradesh, India.*

[2]*Gokula Krishna College of Pharmacy, Sullurupeta-524121, Andhra Pradesh, India.*

[3]*Dr Samuel George Institute of Pharmaceutical Sciences, Markapur ANUCPS, Prakasam District, Andhra Pradesh, India.*

[4]*V. V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village, Gudlavalleru-521301, Krishna District, Andhra Pradesh, India.*

Abstract

Aquasomes are nanoparticles fabricated from ceramics developed to enhance proteins and peptides stability, providing an adequate residence time in circulation. It consists of ceramic core coated with poly hydroxyl oligomer, on which protein and peptide drug can be adsorbed. Aquasomes preparation, characterization, and application in protein and peptide drug delivery are discussed. Microneedles are promising transdermal approach; it involves creation of micron-sized pores in the skin for enhancing the drug delivery across the skin, as their length ranged between 150 and 1500µm. The delivery system has been successfully utilized for the delivery of insulin, hemoglobin, and various antigens. Oral delivery of enzymes like serratiopeptidase has also been achieved. This article discusses the problems faced in the delivery of clinically important peptides and presents aquasomes as a reliable approach to troubleshoot them.

Keywords: Aquasomes; Delivery; Microneedles; Peptides; Proteins

Full-length article **Corresponding Author*, e-mail: drprsha@gmail.com

1. Introduction

Aquasomes are one of the most recently developed delivery system for bioactive molecules like peptide, protein, hormones, antigens and genes to specific sites. Aquasomes are spherical in shape with 60–300 nm particles size. These are nanoparticulate carrier systems but instead of being simple nanoparticles these are three layered self assembled structures, comprised of a solid phase nanocrystalline core coated with oligomeric film to which biochemically active molecules are adsorbed with or without modification. These structures are self-assembled by noncovalent and ionic bonds. The solid core provides the structural stability, while the carbohydrate coating protects against dehydration and stabilizes the biochemically active molecules. The delivery system has been successfully utilized for the delivery of insulin, hemoglobin, and enzymes like serratiopeptidase etc. This reviews the principles of self assembly, the challenges of maintaining the conformational integrity and biochemical activity of immobilized surface pairs, the convergence of these principles into a single functional composition and its application in various fields of pharmacy.

Aquasomes are nanoparticulate carrier system but instead of being simple nanoparticle these are three layered self assembled structures, comprised of a solid phase nanocrystalline core coated with oligomeric film on which biochemically active molecules are adsorbed with or without modification. Aquasomes are like "bodies of water" and their water like properties protect and preserve fragile biological molecules, and this property of maintaining conformational integrity as well as high degree of surface exposure is exploited in targeting of bio-active molecules like peptide and protein hormones, enzymes, antigens and genes to specific sites. These three layered structures are self-assembled by non-covalent and ionic bonds. These carbohydrate stabilize nanoparticles of ceramic are known as "aquasomes". The pharmacologically active molecule incorporated by co-polymerization, diffusion or adsorption to carbohydrate surface of pre formed nanoparticles. Aquasomes discovery comprises a principle from microbiology, food chemistry, biophysics and many discoveries including solid phase synthesis, supramolecular chemistry, molecular shape change and self assembly [1].

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Educational Review

HDAC inhibitors: A novel approach to hyperglycaemia management and treatment

M. Suchitra [a], Kusuma Praveen Kumar [b], Manjunath.S. Katagi [c], Garla Venkateswarlu [d], P. Sree Mahalakshmi [e]

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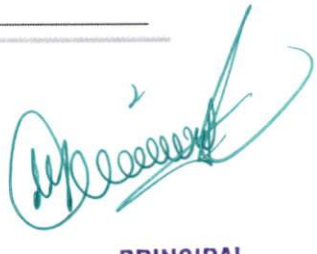

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Research Article

Captopril Niosomal Transdermal Films

Formulation and Evaluation of Captopril Loaded Niosomal Transdermal Films

Angilicam Avinash*[1, 2], P. Dwarakanadha Reddy[3] and S. V. Satyanarayana[4]

[1]*Research Scholar, Research & Development, JNTUA, Ananthapuramu, Andhra Pradesh, India-515002*

[2]*Department of Pharmaceutics, Narayana Pharmacy College, Nellore, Andhra Pradesh, India-524003*

[3]*Department of Pharmaceutics, Annamacharya College of Pharmacy, Rajampet, Andhra Pradesh, India-516126*

[4]*Principal, JNTUA College of Engineering, Kalikiri, Annamayya Dist, Andhra Pradesh, India– 517234.*

Abstract: Captopril was the first angiotensin-converting enzyme (ACE) inhibitor used for the management of hypertension. The aim of this study was to prepare and evaluate niosomal-loaded captopril transdermal films. Captopril has good solubility but has poor permeability and reduced bioavailability in the presence of food. The aim and objective are to improve bioavailability and permeability. The captopril-loaded niosomal formulations were prepared by thin film hydration technique, using materials like non-ionic surfactants such as Spans of different grades 20, 40, 60 and 80 and solvents like ethanol and chloroform. The FT-IR results revealed that there was no interaction between excipients and captopril. All the formulations showed better encapsulation efficiency. The dissolution studies showed prolonged drug release in comparison to pure captopril. On comprising all formulations, F3 showed sustained release of 98.44% up to 12hrs. The optimized niosomes of captopril were used to prepare transdermal films using methyl cellulose, HPMC E5, HPMC K4M and HPMC K15M as a film forming agents and dibutyl phthalate as a plasticizer. All the formulated captopril transdermal films were evaluated for drug content, folding endurance, weight variation and *in-vitro* drug permeation. The *in-vitro* drug permeation was found to be 99.58% over a period of 12 hrs. Based on the above results, administering niosomal-loaded captopril through the transdermal route is a better approach.

Keywords: Bioavailability, Captopril, Niosomes, Non-Ionic Surfactants, Permeability and Transdermal Films.

***Corresponding Author**

Angilicam Avinash , Research Scholar, Research & Development, JNTUA, Ananthapuramu, Andhra Pradesh, India-515002;Department of Pharmaceutics, Narayana Pharmacy College, Nellore, Andhra Pradesh, India-524003

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KNOWLEDGE ON BIRTH SPACING AMONG ANTENATAL MOTHERS-AN EXPERIMENTAL CROSS SECTIONAL STUDY

C. L. Sindhura[1]*, Chintham Venkata Vishnu Sai[2], Gangapatnam Pooja[3], Kamboji Umanjali[4] and Kona Vyshnavi[5]

[1]Department of Pharmacy Practice, Narayana Pharmacy College, Nellore, Andhra Pradesh.
[2-5]Department of Pharmacy Practice, Jagan's College of Pharmacy, Nellore, Andhra Pradesh.

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***Corresponding Author**
C. L. Sindhura
Department of Pharmacy Practice, Narayana Pharmacy College, Nellore, Andhra Pradesh.

ABSTRACT

In India contraceptive needs of young couples especially in the area of spacing pregnancies is mostly unmet. The unmet contraceptive method is directly found to be a reason for short birth Interval. The methods available for birth spacing and knowledge regarding the health benefits of birth spacing are largely unknown. The study aims to considered in the study is birth space awareness of antenatal mothers. The study has been conducted in the department of gynaecology in a tertiary care hospital. Study area The study has been conducted in department of gynaecology in a tertiary care hospital. The study Population was 160 patients. Descriptive survey research design was used to conduct the study among antenatal mother. Out of 200 women, 160 participants were recruited in to the study and 40 participants were not willing to participate in the study. Among them, 40 % were aware of the health benefits of spacing between two pregnancies and 56.25% were between 26-35, 25 % population were below 25 year and 18.75 % population were above 35 years of age were participated in the trial. Most of the study population were completed their secondary education and very few were completed graduation in the study participants Proper health education and awareness programmes would help to widespread practice of birth spacing contraceptive methods that would improve the maternal and infant health in long-term.

KEYWORDS: Contraceptive, birth spacing, health benefits, spacing pregnancies.

INTRODUCTION

Family welfare programme is also essential in the interest of the individual and family

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Review

The Effects of Vitamin D on Preventing Hyperglycemia and a Novel Approach to Its Treatment

Suchitra Monapati [1,*], Pavani Kaki [2], Mary Stella Gurajapu [2], Prathibha Guttal Subhas [3] and Harinadha Baba Kudipudi [4]

1 Department of Pharmaceutical Chemistry, Narayana Pharmacy College, Nellore 524004, India
2 Department of Pharm.D Narayana Pharmacy College, Nellore 524004, India; pandupavani2002@gmail.com (P.K.); stellagurajapu@gmail.com (M.S.G.)
3 Department of Pharmacognosy, Bapuji Pharmacy College, Davanagere 577004, India; prathibha625@gmail.com
4 Department of Pharmaceutical Analysis, Narayana Pharmacy College, Nellore 524004, India; principal.npc4q@gmail.com
* Correspondence: jajulasuchitra@gmail.com

Abstract: The dietary reference levels for vitamin D were established with an emphasis on its role in bone health; however, with the identification of vitamin D receptors in all body tissues novel associations with other metabolic disorders, such as diabetes, are being researched. Aside from its standard function as the main regulator of calcium absorption, vitamin D also controls the calcium pool, mediates the activity of beta cell calcium-dependent endopeptidases, encourages the conversion of proinsulin to insulin, increases insulin output, and raises insulin activity in peripheral insulin target tissues. Both immune cells and pancreatic beta cells include vitamin D receptors. A deficiency of vitamin D causes glucose intolerance and affects insulin secretion. Different pathogenic characteristics of the disease are linked to a number of vitamin D-related genes. It has been proven that vitamin D supplementation lowers the risk of type 1 and type 2 diabetes and its associated problems. In this article, we discussed a few prospective clinical trials on vitamin D that are necessary to clearly demonstrate the role of vitamin D in the prevention and management of diabetes.

Keywords: vitamin D; diabetes mellitus; insulin resistance; beta cell protection; cholecalciferol

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1. Introduction

Diabetes is a chronic metabolic disorder characterized by elevated levels of glucose in the blood. It occurs when the body either does not produce enough insulin or cannot effectively use the insulin it produces. Insulin is a hormone produced by the pancreas that regulates the absorption and utilization of glucose by cells for energy [1]. The word diabetes mellitus, however, was first used by the Greek doctor Aertaeus. Diabetes, which means "to pass through" in Greek, and mellitus, which denotes sweetness and is derived from the Latin word for honey, are two words that go together. Weight loss and polyuria are signs related to diabetes which were initially noted by the Egyptians. With roughly a single fatality every ten seconds, diabetes is a major contributor to long-term illness and early mortality. It also claims more lives each year than HIV/AIDS [2].

There are three main types of diabetes: type 1 which results from a lack of insulin due to an autoimmune attack, type 2 which is due to resistance to the effects of insulin, and the pancreas may not produce enough insulin to compensate, and Gestational diabetes which may develop during pregnancy [3]. According to the International Diabetes Federation (IDF), the number of people living with diabetes has been increasing significantly over the past few decades, primarily driven by the rise in type 2 diabetes. If current trends continue, it is expected that the number of individuals with diabetes will continue to grow in the coming years. Factors contributing to the increase in diabetes cases include aging

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Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
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Hepatoprotective activity of novel nutraceuticals of curculigo Orchioide root extract

Lalitha Chembeti[1,2*], N.Harikrishnan[3]

[1]Department of Pharmaceutical chemistry, Research scholor, faculty of pharmacy, DR.M.G.R Educational &research institute, Deemed to be university,Velappanchavadi,Chennai,Tamilnadu-600077, , India.

[2]Department of pharmaceutical chemistry, Narayana pharmacy college, chinthareddy palem,Nellore-524002.

[3]Department of pharmaceutical analysis, faculty of pharmacy, DR.M.G.R Educational &research institute, Deemed to be university,Velappanchavadi,Chennai,Tamilnadu-600077, , India

***Corresponding author:** Lalitha chembeti, dept of pharmaceutical chemistry, Narayana pharmacy college, Nellore, Email: lalithachembeti@gmail.com

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ABSTRACT

The aim of this study is to investigate hepatoprotective activity of hydroalcoholic extract of curculigo orchoide root in highly active antiretroviral administered rats. Animals were randomized and divided into five groups (I-V) of six animals in each group. Group I served as normal control and fed orally with normal saline 5ml/kg body weight daily for seven days. Group II rats as toxic control where as Group IV and V were treated with low dose and high doses with the Curculigo orchoide s respectively in controlled released formulation orally daily for seven days. Group III animals are treated with standard drug silymarin 25mg/kg(p.o) daily for seven days. On the seventh day, paracetamol suspension was given by oral route, in a dose of 750mg/kg body weight to all rats except the rats in group I .The biochemical parameters were estimated after an 18h fast following the last dose

Keywords: *Weight, Daily, Control, Activity*

INTRODUCTION

Liver is the largest organ in human body.it is a metabolically active organ responsible for many vital life functions.it also play a great role in carbohydrate, protein metabolism and fats also.it also play a surprising role in the maintenance ,performance and regulating homeostasis of the body. 15Nutraceuticals contain health-supporting ingredients or natural components that have an ability health benefit for the body. 1Curculigo orchioide is a small herb found in India in the sub tropical Himalayas from Kumaon eastwards and in the western ghats from Konkan southwards.it is commonly known as kalimusli in Hindi.it tuberous roots are used as alternative ,demulsecent, diuretic ,restorative and for the treatment of jaundice.it is also the components of several ayurvedic tonics.3

Evaluation Of Hepatoprotective Activity

Method used in the present study (Paracetamol induced hepatotoxicity)

Hepatoprotective activity of aqueous extract of the root of Curculigo .orchoides was studied using this method6

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RESEARCH ARTICLE
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Evolution of cytotoxicity of the phytopigments Isolated from Spirulina platen sis using MTT assay

Salma shaik[1,2*], N. Harikrishnan[3]

[1]Research Scholar, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India.

[2]Department of Pharmaceutical chemistry, narayana pharmacy college, chinthareddy palem, Nellore-524002

[3]Department of Pharmaceutical Analysis, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India.

***Corresponding author:** Salma shaik, Research Scholar, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India, Email: salma.mpharm@gmail.com

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ABSTRACT

Phytopigments of Spirulina platen sis extract has anticancer activity against various types of cancer cell cultures. However, study about effect of phytopigments on Monkey Kidney Epithelial Cells (Vero Line), Human breast cancer (MCF-7) and Human Colon Cancer-(HT-29)cell lines. This study aimed to reveal the anticancer activity of phytopigments from Spirulina platensis extract on Vero line, MCF-7 and HT-29 cells. The research was an in vitro experimental study, with the investigation on cytotoxicity as the anticancer parameters. cytotoxicity test was conducted through MTT assay to observe the visualization and inhibition of proliferation of different concentrations of phytopigments like Zeaxanthin, Phycocyanin, β-Carotene, Phycoerythrin, Chlorophyll-a, and Chlorophyll-b in several incubation times on the cancer cell line. The obtained data were then processed statistically with the Two-Way ANOVA test at a significance value of $p < 0.05$. Based on the results, it could be postulated that in all pigments the phycocyanin shows better activity compare with other at IC50on Vero at152.2 ± 0.20, MCF-7 at 22.60 ± 0.30, HT-29 at 23.30 ± 0.32 compare with standard doxorubicin.

Keywords: *Anticancer; Monkey Kidney Epithelial Cells; Human breast cancer; Human colon cancer; MTT assay*

INTRODUCTION

"More than 8.8 million people died from cancer in 2015, making it the second-leading cause of death globally and accounting for 1 in 6 fatalities worldwide"1 (Dewi et al.2018). "A normal cell can change into cells that express the malignant phenotype through a multistep process called carcinogenesis. As a result of the process, which involves frequent feedback loops as well as the full collapse or failure of controlled stages such cell differentiation, proliferation, and programmed cell death (apoptosis), cancer cells proliferate quickly and begin to metastasize"2 (Nazih & Bard et al.,2018).

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Insilico Assessment of Phytoconstituents in *Myxopyrum Smilacifolium* Blume against Arthritis

Raveesha Peeriga[1]*, S.A. Mohamed Shiek Arabath[2], Krishnaveni Manubolu[3], Bency Baby Thelappilly[4] and Lakshmi Chakradhar Yarlagadda[5]

[1]V. V. Institute of Pharmaceutical Sciences, Gudlavalleru Post, Krishna District, Andhra Pradesh, India.
[2]Arulmigu Kalasalingam College of Pharmacy, Krishnan Kovi, Virudhunagar District, Tamil Nadu, India.
[3]Narayana Pharmacy College, Chinthareddypalem, Nellore, Andhra Pradesh, India.
[4]Al Shifa College of Pharmacy, Perinthalmanna, Kerala, India.
[5]G.S.L. Medical College, Rajahmundry, Andhra Pradesh, India.
*Corresponding Author E-mail: gsrivastava@rmlau.ac.in

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Myxopyrum smilacifolium **Blume geographical occurrence is southern part of India and its usage for the treatment of various diseases has been marked in Traditional Medicine. The present study was aimed to examine the phytoconstituents in Myxopyrum smilacifolium Blume for antiarthritic activity by insilico approach. Antiarthritic activity of phytoconstituents in Myxopyrum smilacifolium Blume was performed by using software Autodock 4.0. For each phytoconstituents the pharmacokinetic parameters are also assessed by online tools. The study revealed that phytocompounds, Arenarioside, Verbascoside and Myxopyroside showed docking score of about -16.4 kcal/mol, -10.6kcal/mol and -6.5 kcal/mol comparatively high when compared with the docking score of standard Ibuprofen of about -6.2 kcal/mol. It had proven to posses the inhibition activity against inflammatory mediator as it shown a good binding affinity between ligand and the receptor site COX-2. The evaluated pharmacokinetic parameters of the only 3 phytoconstituents obeyed Lipinski's rule of 5. Arenarioside, Verbascoside and Myxopyroside are the phytoconstituents of Myxopyrum smilacifolium Blume shown high docking score and it can be explored further for SAR and simulation studies are needed to ensure the antiarthritic activity.**

Keywords: Arenarioside; Docking; In silico; Lipinski's; Myxopyrum.

A musculoskeletal condition results in excruciating long-term joint pain, edema, and movement restriction. A sizable portion of the population is affected by these diseases and their mortality rate has increased.[1] The most prevalent musculoskeletal disorder worldwide and a condition as old as mankind is arthritis. More than 100 different types of arthritis exist. Among these are autoimmune disorders such as osteoarthritis, rheumatoid arthritis, psoriatic arthritis, and others. The arthritis foundation estimates that two-thirds of people had arthritis in 2007, and the census indicates that by 2030, that number will rise to 40% of the population.[2-3] Although there are several therapies for different types of arthritis, each has its own disadvantages. Natural treatments of plant

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A Bibliometric Analysis of Investigations on Black Pepper Published from 1978 to 2023

Mohan Gandhi Bonthu[1], Raveesha Peeriga[1], Krishnaveni Manubolu[2], Bhaskara Raju Vatchavai[3], Nirmala Korukola[4], Edward Raju Gope[5]*

[1]*V. V. Institute of Pharmaceutical Sciences, Seshadri Rao Knowledge Village, Gudlavalleru-521301, Andhra Pradesh, India.*

[2]*Narayana Pharmacy College, Chinthareddypalem, Nellore-524002, Andhra Pradesh India.*

[3]*Sri Vasavi Institute of Pharmaceutical Sciences, Pedatadepalli, Tadepalligudem-534101, West Godavari District, Andra Pradesh, India.*

[4]*Department of Pharmacognosy, KGRL College of Pharmacy, Bhimavaram, Andhra Pradesh, India.*

[5]*Dr Samuel George Institute of Pharmaceutical Sciences, Markapur ANUCPS, Prakasam District, Andhra Pradesh, India.*

Abstract

Spices have played a crucial role in human history, shaping cultures, trade routes, and culinary traditions for millennia. The diverse and fascinating world of spices, examining their origins, cultural significance, economic impact, and the multifaceted roles they play in both traditional and modern societies. Black pepper (Piper nigrum) stands as one of the most globally recognized and widely used spices, with a history rooted in ancient trade routes and culinary traditions. The multifaceted aspects of black pepper, encompasses its botanical characteristics, historical significance, culinary applications, medicinal properties, and its current standing in the global spice market. Therefore, this study aims to map investigations on black pepper using the bibliometric method. A bibliometric investigation was adopted through metadata planning with the keywords "Investigation AND black AND pepper" from Scopus Database (1978-2023). Metadata is stored in CSV and BibTex types. Furthermore, CSV format of Scopus metadata for analysis using the counting method on VOS viewer. Mapping results showed that the number of publications related to the black pepper experienced a minimum investigation, most occurring from 2007 to 2023. Most articles relating to Black pepper were published in the Food and Chemical Toxicology. The most prolific studies were conducted by Elangovan Kannan, Gunasekaran Vetrichelvi, Niranjali Devaraj is the most cited. Studies on black pepper need to be explored and most of the keywords with a fairly high density included phenols, hplc, antivenom. Meanwhile, the rarely investigated themes include piperaceae.

Keywords: Bibliographic, Citations, Black pepper, Vos viewer

Full-length article **Corresponding Author*, e-mail: drprsha@gmail.com

1. Introduction

Spices are plant-based ingredients used to flavour, colour, or preserve food. They are usually extracted from the seeds, bark, roots, fruits, or other parts of plants [1]. For millennia, they have been an essential component of human culinary customs and conventional medical procedures [2]. In addition to adding flavour and perfume to food, spices play an important role in the cultural and historical identities of many different cuisines worldwide [3]. Professionals in the food business can also benefit from using spices as a beneficial reference [4-5]. One of the most extensively used and traded spices in the world is black pepper (Piper nigrum) [6]. It is well known for both its strong flavour and adaptability in cooking [7]. Black pepper is said to have come from India's Malabar Coast and has long been a highly valued item in the spice trade [8]. Black pepper has been acknowledged for possible health advantages in addition to its culinary usage [9]. Because black pepper (Piper nigrum) has such cultural, gastronomic, and maybe health-related significance, it has been the focus of several scientific studies. Scholars have investigated several facets of black pepper, encompassing its chemical constitution, growing methods, medical attributes, and its uses in multiple sectors. Scholars have carried out investigations to examine the molecular makeup of black pepper, pinpointing essential constituents accountable for its taste and fragrance. Gas chromatography-mass spectrometry (GC-MS) is one technology that is frequently used in these investigations to give extensive insights into the volatile chemicals present [10]. Black pepper production techniques have been optimised via research on soil needs, irrigation techniques, and insect management. The goal of these studies is to

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SOLUBILITY AND DISSOLUTION RATE ENHANCEMENT OF OLMESARTAN MEDOXOMIL BY HYDROTROPY AND DEVELOPMENT OF ORAL DISINTEGRATING TABLETS

Angilicam Avinash*, Avula Sushma, Koneti Lalasa, Siddabathina Prasanth Kumar, Thumati Gowthami, Dr. M. Sreenivasulu
Narayana Pharmacy College, Chinthareddypalem, Nellore, Andhra Pradesh, India-524003.

ABSTRACT
This research work was designed to enrich the solubility of olmesartan medoxomil by Hydrotropy technique and to develop the oral disintegrating tablets. Olmesartan medoxomil is an anti-hypertensive drug which belongs to BCS Class II having low solubility and therefore low oral bioavailability (26%). In the present study, HMs of olmesartan medoxomil with water soluble carriers like sodium acetate, sodium benzoate and urea were prepared by solvent evaporation method in different weight ratios and the optimized Hydrotropic mixture (HM) was used in the development of olmesartan medoxomil oral disintegrating tablets. HMs was evaluated for drug content and *in vitro* dissolution studies. The results revealed that the dissolution of olmesartan medoxomil HMs was improved greatly for F6 when compared with that of remaining formulations which shows 99.38% of drug release within 60 minutes. The above optimized HM was formulated as oral disintegrating tablets by direct compression using superdisintegrants like Croscarmellose sodium (CCS), (ODT1-ODT3), and sodium starch glycolate (SSG), (ODT4-ODT6). Olmesartan medoxomil oral disintegrating tablets were evaluated for pre-compression and post compression parameters. Amongst the formulations prepared (ODT1-ODT6), ODT6 was found to be effective formulation comprising of SSG which showed the drug release of 96.31% within 12 min.

Keywords: Bioavailability, croscarmellose sodium, Hydrotropy, Olmesartan medoxomil, Oral disintegrating tablets, Sodium starch glycolate, Solubility.

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Evolution of Antioxidant & Cytotoxicity of the Hydro Alcoholic Extract of Dried Root of Digera Muricata Using MTT Assay

Sk.Salma sultana[1,2], J. Banu rekha[3], B.S. Venkateswarlu[4], M. Kumar[5], L . Baskar[6]

[1]*Research Scholar, Faculty of Pharmacy, Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu- 636308, India.*

[2]*Department of Pharmacology,Narayana Pharmacy College, Chinthareddypalem, Nellore-524002.*

[3]*Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Vinayaka mission's research foundation,Deemed to be University,Salem, Tamilnadu- 636308, India.*

[4]*Department of Pharmaceutics, Faculty of Pharmacy, Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu- 636308, India.*

[5]*Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu- 636308, India.*

[6]*Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Grace College of pharmacy, kerala, tamilnadu.*

***Abstract*:-**Digera Muricata, a medicinal plant with a rich history in traditional medicine, has garnered attention due to its potential health benefits. This study investigates the antioxidant and cytotoxic properties of the hydro-alcoholic extract obtained from the dried root of Digera Muricata using the MTT assay. The dried roots of Digera Muricata were subjected to hydro-alcoholic extraction, and the resulting extract was tested for its antioxidant activity using standard assays, including DPPH and ABTS assays. The extract exhibited significant antioxidant potential, demonstrating its ability to scavenge free radicals. hydro-alcoholic extract of the dried root of Digera Muricata possesses notable antioxidant activity and demonstrates promising cytotoxicity against cancer cells. These findings highlight the therapeutic potential of Digera Muricata as a source of natural antioxidants and cytotoxic agents, which could have implications for the development of novel pharmaceuticals or complementary therapies in the field of cancer research and oxidative stress-related diseases.

Keywords: *Digeria Muricata , DPPH,ABTS,MTT, Antioxidant.*

1. Introduction

The study of natural compounds and their potential health benefits has been a focal point of scientific research for centuries. In recent decades, the exploration of phytochemicals from various plant sources has gained significant attention due to their potential therapeutic properties. Among these phytochemicals, antioxidants have been of particular interest because of their ability to neutralize harmful reactive oxygen species (ROS) and protect cells from oxidative damage[(1).] This research aims to investigate the antioxidant activity and cytotoxicity of the hydro-alcoholic extract of dried Digera muricata root using the MTT assay[(3)]. The MTT assay is a well-established and widely used method for evaluating the viability of cells and assessing cytotoxicity or cell proliferation. It measures the metabolic activity of cells, primarily through the reduction of MTT, a yellow tetrazolium salt, to purple formazan crystals by mitochondrial enzymes in living cells. This change in color can be quantified spectrophotometrically, allowing for the assessment of cell viability and cytotoxicity.[(2)]

Plant Profile

Digera muricata, commonly known as "rough-leaved turnsole," is a plant species found in various regions across the world, including Asia and Africa. This plant has been traditionally used in herbal medicine for its potential health-promoting properties[(4)]. The dried root of Digera muricata contains a variety of bioactive compounds,

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In Vitro Evaluation Of Antioxidant Potential Cytotoxicity Activity Of Hydro Alcoholic Extract Of Thunbergia Erecta Dried Leaves On Human Cancer Cell Lines

Sk. Salma Sultana[1,2]*, J. Banu Rekha[3], B.S. Venkateswarlu[4], M. Kumar[5]

[1].Department of Pharmaceutical Chemistry, Faculty of Pharmacy , Vinayaka mission's research foundation,Deemed to be University,Salem, Tamilnadu- 636308, India.

[2].Research Scholar, Faculty of Pharmacy , Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu-636308, India.

[3].Department of Pharmacology,Narayana Pharmacy College, Chinthareddypalem, Nellore-524002.

[4].Department of Pharmaceutics, Faculty of Pharmacy , Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu- 636308, India.

[5]Department of Pharmaceutical Chemistry, Faculty of Pharmacy , Vinayaka mission's research foundation, Deemed to be University,Salem, Tamilnadu- 636308, India.

Abstract

This study delves into the in vitro assessment of the antioxidant potential and cytotoxic activity of a hydro-alcoholic extract derived from Thunbergia erecta leaves against various human cancer cell lines. The antioxidant potential of the extract was evaluated through a series of in vitro assays, including the DPPH (2,2-diphenyl-1-picrylhydrazyl) and ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)) radical scavenging assays, ferric reducing antioxidant power (FRAP) assay, and quantification of total phenolic content. In the assessment of cytotoxicity, several human cancer cell lines, including breast cancer (MCF-7), were exposed to varying concentrations of the extract. Cell viability was ascertained using the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay.

Keywords: Tunbergia erecta, ABTS radial assay , FRAP ,cytotoxicity, antioxidant.

I. INTRODUCTION

Thunbergia erecta, commonly known as Bush Clock Vine or King's Mantle, is a plant traditionally acknowledged for its medicinal value in various cultures. In recent years, it has garnered attention from the scientific community due to its potential bioactive constituents. The leaves of Thunbergia erecta have been of particular interest, as they are believed to contain compounds with antioxidant and cytotoxic properties(1). Antioxidants play a vital role in neutralizing harmful free radicals and preventing oxidative stress, which is closely linked to the development of various chronic diseases, including cancer. On the other hand, cytotoxicity against cancer cells is a desirable trait in the search for new anti-cancer agents.(2)

II. PLANT PROFILE:

BOTANICAL NAME	:	**Thunbergia erecta**
Scientific name	:	**Thunbergia erecta (Benth.)**
Synonym	:	**Meyenia erecta Benth**
Common name	:	**Bush Clockwine, Upright Thunbergia, Blue bell**
Family	:	**Acanthaceae**
Vernacular names		

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Manuscript_54ae6a2a2f34a18a13d0c74cfa1ee2cf

Lawsone quantification in *Lawsonia inermis L.* by HPLC-MS: how does the temperature and pluviometry affect lawsone concentration?

Fatima-Zahra Alem [a,d], Samira Ananthabothla Gita [b], Lise Cougnaud [a], Cedric Affnar [a], Issmail Nounah [f], Bakri Youssef [d], Alessandra Lopes de Oliveira [e], Zoubida Charrouf [f], Boutayna Rhourri-Frih [a*]

[a] Chimie et Biologie des Membranes et Nanoobjets, University of Bordeaux, CNRS UMR 5248, 146, rue Léo Saignat, Bordeaux, 33076, France.
[b] Narayana Pharmacy College, Jawaharlal Nehru Technological University Anantapur, India
[d] Laboratory of Human Pathologies Biology, Department of Biology, Faculty of Sciences, University Mohammed V , Rabat, Morocco
[e] Universidade de São Paulo, FZEA, C.P. 23 - 13635-900 - Pirassununga, SP - Brazil
[f] Department of Chemistry, Faculty of Sciences, University Mohammed V, Rabat, Morocco

[*]Corresponding author:
Professor Boutayna Rhourri-Frih

Faculty of Pharmacy- University of Bordeaux
CGFB-CBMN - UMR 5248
146, rue Léo Saignat
33076 Bordeaux Cedex France
Phone : +33 5 57 57 56 21
Fax : +33 5 57 57 47 16
Email: boutayna.frih@u-bordeaux.fr

ORCID :
Boutayna Rhourri-Frih: https://orcid.org/0000-0001-8983-8974
Fatima-Zahra Alem: https://orcid.org/0000-0001-5716-4653

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ORIGINAL ARTICLE

Design and Evaluation of Captopril-loaded Niosomes

Angilicam Avinash[1,2], P. Dwarakanadha Reddy[3], S. V. Satyanarayana[4]

[1]Research Scholar, Research and Development, JNTUA, Ananthapuramu, Andhra Pradesh, India, [2]Department of Pharmaceutics, Narayana Pharmacy College, Nellore, Andhra Pradesh, India, [3]Department of Pharmaceutics, Annamacharya College of Pharmacy, Rajampet, Andhra Pradesh, India, [4]Department of Chemical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh, India

Abstract

Aim: The goal of this study is to design a niosomal carrier system for captopril for the treatment of hypertension that is capable of delivering the encapsulated drug over a prolonged period of time by overcoming the limitations of conventional dosage forms. Captopril is a water-soluble drug but has low permeability. The main objective is to improve bioavailability and permeability. **Materials and Methods:** The niosomes are prepared by thin film hydration method, using materials like non-ionic surfactants (Span 20, Span 40, Span 60, and Span 80) and solvents such as chloroform and ethanol. **Results and Discussion:** The FTIR results revealed that there is no interaction between captopril and excipients. All the formulations showed better encapsulation efficacy. SEM analysis revealed the size reduction of captopril-loaded niosomes. The dissolution studies showed prolonged drug release. **Conclusion:** On comprising all formulations, F3 showed sustained release of 98.44% up to 12 h. This may be due to the longest saturated alkyl chain and shows the highest entrapment.

Key words: Bioavailability, Captopril, Niosomes, Prolonged drug release

INTRODUCTION

Niosomes are known as non-ionic surfactant vesicles which are microscopic lamellar structures formed on admixture of a non-ionic surfactant, cholesterol, and dicetyl phosphate with subsequent hydration with aqueous media.[1] Niosomes are capable of entrapping a variety of drugs and found as an alternative to liposomes. The niosomes have similar physical properties when compared to liposomes and are comparatively inexpensive delivery systems.[2]

In current years, transferring the drug molecules to the desired site in the biological systems has become a very precise and sophisticated area of pharmaceutical research. The role of the drug delivery system is not only limited to a drug package just meant for administration and convenience but also to bring a required improvement in pharmacological efficacy and safety by carrying the drug molecules to the required site in the most convenient manner.[3] Drug delivery system using colloidal particulate carriers like niosomes has distinct merits over conventional dosage form as the colloidal particulate can act as drug reservoirs.[4] Among different nanovesicular carriers, niosomes are selected as a carrier of choice because of its dominance over others carrier with regard to stability and cost effectiveness.[5] Conventional drug delivery systems face some significant challenges, such as unfavorable pharmacokinetics and distribution, which can lead to undesirable side effects. Drug degradation in blood circulation by the reticuloendothelial system and insufficient drug uptake at the specific site can reduce drug efficacy. Nanocarriers have been extensively investigated in the past decades to overcome the challenges associated with conventional drug delivery systems, due to the advantages such as (i) facilitate targeted drug delivery to the diseased site; (ii) enhance absorption as surface area increases and hence increase bioavailability; (iii) improve pharmacokinetics and biodistribution of active agents; and (iv) increase retention in biological systems and extend the efficacy of drugs.[6]

Address for correspondence:
Angilicam Avinash, Research Scholar, Research and Development, JNTUA, Ananthapuramu - 515 002, Andhra Pradesh, India.
E-mail: avinash.angilicam3@gmail.com

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REVIEW ARTICLE

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Gold Nanoparticles: A Review

Sujatha S*[1], Rabbani Sk.[1], Sai Teja P[1], Kishore Kumar[2]

[1]Department of Pharmaceutics, Narayana Pharmacy College, Chinthareddy Palem, Nellore - 524003, Andhra Pradesh, India

[2]Silesian University of Technlology, ul. Akademicka 2A, 44-100 Gliwica, Poland

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Gold Nanoparticles, Photothermal Effect, Cancer Cells, Targeted Drug Therapy

ABSTRACT

Gold nanoparticles are small gold particles with a diameter of 1 to 100 nm. Their characteristic surface Plasmon resonance feature aid indistinctive absorption and optical properties which can be characterized and can be useful in many biomedical applications. Gold Nanoparticles can be used as delivery vectors due to their high surface loading capacity of drug, gene, Protein or vaccine. The surface of Gold Nanoparticles can be modified by molecules such as polymers, Ligands, surfactants by conjugation increases its ability to cross the membrane and also helps in reduction of cytotoxic effect due to attraction to targeted areas. So, it can be used in Targeted drug Therapy by conjugating cancer drug molecules to these particles. Gold Nanoparticles absorbs certain wavelength of incident light and converts into heat which is transferred to cancer cells and leads to destruction of cells due to photothermal effect.

*Corresponding Author

Name: Sujatha S
Phone:
Email: drsanneboina@gmail.com

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INTRODUCTION

The particles which exist in nanometer range (i.e., 1 to 100 nm) are generally called as Nano particles. These particles are strong enough to hold their electrons such that they can produce Quantum effects and also have unexpected visible properties [1]. The Nanoparticles are beneficial both in material sciences and Biology due to their characteristic physical properties such as conductance, Uniformity and optical properties [2].

Gold nano particles are small gold particles with a diameter of 1 to 100 nm. They contain free electrons which conducts electricity when voltage is applied. These electrons have a tendency to absorb certain wavelength of light which inturn resonate on surface of gold Nanoparticles [3]. This Phenomenon is called as Surface Plasma resonance. Gold nanoparticles have capability to turn certain wavelength of light into heat, i.e., they can be heated up by Radio Frequency which in turn heat up the cancer cells and can destroy them [4].

Generally Bulk gold is yellow in color and is inert in nature where as gold nanoparticles are wine red in color and have Antioxidant property. Gold nanoparticles exist in different sizes ranging from 1 nm to 8 μm [Figure 1]. The color of Gold Nanoparticles mainly depends on its size. If size of Particle is large it appears more red in color for example 20 nm gold nanoparticle has a distinct wine red color [5].

They also exist in different shapes such as Nanorods, Nanospheres, Nano stars, Nano shell, Nanocluster, Nanocube, sub octahedral, decahedral, Multiple twined, Tetrahedral, Nanotriangles, Nanoprisms etc. [6]. Gold Nanorods are solid cylinders of gold of diameter up to 10 nm range whereas Gold nanospheres consist of gold coating over a silica core [7]. If thickness of gold coating changes the wavelength of light absorbed by these particles also changes [Figure 2].

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Effect of Oral Sodium Bicarbonate in Maintaining Acid Base Balance and QoI in Chronic Kidney Disease and Long-Term Acidosis Patients

Singamsetty Lakshmi Priyanka [a#], Syed Kaifa Tara [a#], Vatam Sireesha [a#], Patan Maneesha Farahana [a#], Kudipudi Harinadha Baba [a†] and Kanamala Arun Chand Roby [b*‡]

[a] Narayana Pharmacy College, Andhra Pradesh, India.
[b] Department of Pharmacy Practice, Ratnam Institute of Pharmacy, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

AIM: Aim of the study is to determine the effect of oral sodium bicarbonate in maintaining acid base balance and quality of life in chronic kidney disease and long-term acidosis patients.
Study Design: A prospective observational study.
Study Population: Approximately 174 people who came to nephrology department, Selected based upon inclusion and exclusion criteria.
Study Criteria / Patient Enrollment: Patients are enrolled in study based on inclusion and exclusion criteria.
Inclusion Criteria: The patients who are diagnosed with CKD and receiving oral sodium bicarbonate as part of treatment
Exclusion Criteria: the patients who are having other comorbidities, hypertension, diabetes, and other cardiovascular problems who are not given with oral sodium bicarbonate.
Study Duration : 6 months (December 2021- May 2022).

[#] Pharm. D Intern,
[†] Principal
[‡] Associate Professor,
**Corresponding author: E-mail: arunchandroby@gmail.com;*

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Design and Evaluation of Telmisartan Loaded Niosomal Transdermal Films

Angilicam Avinash[1]*, P. Dwarakanadha Reddy[2], S. V. Satyanarayana[3]

Abstract

The motive of this study was to prepare Telmisartan loaded niosomal transdermal films. Telmisartan have good permeability but have low water solubility. The aim is to improve solubility and bioavailability. The Niosomal formulations were prepared by thin film hydration technique by using carriers like non-ionic surfactants (Span 20, 40, 60 and 80) and solvents like Ethanol and Chloroform. The FT-IR results showed that there was no interaction between excipients and telmisartan. All the formulations showed better encapsulation efficiency. SEM results revealed the reduction of crystalline nature of Telmisartan which enhances solubility. On comprising all formulations F3 showed sustained release of 99.08% up to 12hrs. The optimized niosomes of telmisartan was used to prepare transdermal films by using HPMC E5, HPMC K4M, PVP K30 and HPMC K15M as a film forming agents and propylene glycol as plasticizer. All the formulated transdermal films of Telmisartan were evaluated for folding endurance, drug content, weight variation and *in-vitro* drug permeation. The *in-vitro* drug release was found to be 99.48% over a period of 36 hours. Based on the above results it can be concluded that administration of niosomal loaded telmisartan through transdermal route is a superior approach.

Key words: Bioavailability, Crystallinity, Niosomes, Telmisartan, Transdermal films.

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INTRODUCTION

Targeting drugs by a carrier system has been a central matter of research in treatment of various diseases. Various approaches have been investigated to deliver drugs through topical route (Vemula Vaishnavi et al., 2019). In accordance to Biopharmaceutical Classification System class II drugs have no problem with the permeation through membranes but the problem for this class of medications is related with its low aqueous solubility, thus their preface into circulatory system is dissolution rate limited. Different systems have been approved for upgrading the dissolution rate of these practically insoluble medications like derivatisation of the medication, solid state manipulation, use of surfactants, increasing the surface area exposed for dissolution by preparing nano measured vesicles, solid dispersions, microencapsulation and spray drying. Perceptible effort have been done to microencapsulate these drugs in novel vesicular drug delivery systems (NVDDS) covering various routes of administration. These systems objective is to achieve controlled and targeted drug delivery. It is supposed that NVDDS can prolong the residence time of the drug in general circulation. Consequently, a variety of vesicular drug delivery systems such as niosomes, liposomes, transferosomes, sphingosomes and ethosomes were prepared and evaluated. The uses of liposomes as a drug carrier system has certain limitations because of physical instability of the phospholipids used in the formulation. The extensive interest in use of niosomes as drug carrier requires the necessity of pharmaceutically acceptable procedure for the formulation and characterization of niosome vesicles (Mahmoud Hasan Teaima et al., 2020).

Niosomes as a novel nano-vesicular drug delivery system can enhance the solubility and

***Corresponding Author:** Angilicam Avinash

Address:[1]*Research Scholar, Research & Development, JNTUA, Ananthapuramu, Andhra Pradesh, India-515002Contact No. +919704802079, Email: avinash.angilicam3@gmail.com

[1]*Department of Pharmaceutics, Narayana Pharmacy College, Nellore, Andhra Pradesh, India-524003

[2]Department of Pharmaceutics, Annamacharya College of Pharmacy, Rajampet, Andhra Pradesh, India-516126

[3]Principal, JNTUA College of Engineering, Kalikiri, Annamayya Dist, Andhra Pradesh, India– 517234.

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Original Article

Extraction. Isoaltion, Purification,Stability Studies And Cytotoxic Studies Of Phycocyanin From Spiruline Culture

Salma Shaik[1*, 2], N.Harikrishnan[3]

[1*]Research Scholar, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India.
[2]Department of Pharmaceutical chemistry, narayana pharmacy college, chintharedy palem, Nellore-524002
[3]Department of Pharmaceutical Analysis, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India.

***Corresponding Author: -** Salma Shaik

*Research Scholar, Faculty of Pharmacy, Dr.M.G.R. Educational and Research Institute, Deemed to be University, Chennai, Tamil Nadu-600 077, India, E-mail: salma.mpharm@gmail.com
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Abstract

The aim of work is focus on Extraction. Isoaltion, putification of phycocynin from spirulina culture. In this method extraction was done by centrifuge process by using the buffer and saturated amonium sulphate, form crude extract purification done by using the ammonium sulfate extract using DEAE-Cellulose was used for anion exchange chromatography. The spectral charrecterzation was done by using IR,NMR and Mass Spectroscopy. Phycocyanin concentration and purity were determined by spectrophotometry using absorbance at 620 nm and 652 nm the purity was foune to be between 08-4.3 for diffent extractions like Crude extract ,Ammonium sulphate precipitation with 25% saturation ,Ammonium sulphate precipitation with 50% saturation, DEAE-cellulose-52. The stabilty studies for phycocyanin was perfomed ar different temperature and pH: 4 °C, 25 °C, and − 20 °C and pH: 5, 6, and 7.the phycocyanin content decreased to 15% at 25 °C, 83% at 4 °C, and 51% at − 20 °C. The most appropriate storage condition was 4 °C at pH 5. It was found that the most appropriate storage temperature at pH 6 was − 20 °C for better preservation of phycocyanin. We found that the most appropriate pH was 7, at − 20 °C. the cytotoxicity studies were performed for crude extract and crude Phycocyanin, pure phycocyanin were evaluated by the MTT assay against the HT-29 (colon cancer), MCF-7 (breast cancer) and DU-145 (prostate cancer) cell lines. Of all the three components tested against HT-29 cell lines, the pure Phycocyanin shows 135± 2 than the standard Methotrexate. Of all the three components tested against MCF-7 cell lines, the pure Phycocyanin shows 155± 3 than the standard Methotrexate. Of all the three components tested against DU-145 cell lines, the pure Phycocyanin shows 174 ± 2 than the standard Methotrexate. Based on the above results it concludes that the pure Phycocyanin shoes better cytotoxicity against the HT-29 (colon cancer), MCF-7 (breast cancer) and DU-145 (prostate cancer) cell lines.

Key words: *Spirulina,* phycocyanin, stability studies, cytotoxicity, MTT assay, Cell lines

INTRODCUTION

Spirulina is gaining attention due to its high nutritional value and extensive pharmaceutical applications. The correct identification of a certain species is a fundamental requisite for research study and/or developmental applications. The genus *Spirulina* has been incorrectly used to describe two different genera, *Spirulina* and *Arthrospira*. However, Stizenberger (1854) and Gomont (1892–1893) classified the forms with visible septa within the genus *Arthrospira*Stizenberger 1852; while coiled filaments with invisible septa were classified as belonging to the genus *Spirulina* Turpin 1829[1] The view of *Arthrospira*and *Spirulina* as two separate genera has been officially accepted by Bergey's Manual of Systematic Bacteriology [2-3]The separation between these two genera has been repeatedly affirmed on the basis of many other characteristics such as cell wall structure, helicity, trichome size, motility, gas vesicles, thylakoid pattern, GC analysis and phylogenetically using 16S rRNA. *Spirulina* is a photosynthetic autotrophic organism containing the blue pigment phycocyanin as the main photosynthetic pigment in addition to the green pigment chlorophyll *a,* which results in the blue-green color of the cells. *Spirulina* is one of multicellular unbranched non-heterocystous filamentous microalgae which are recognizable by the unique open left-handed helix along the entire length of the filament. the biochemical composition of *Spirulina* is highly dependent on growth conditions and the methods used for harvest and drying. In general, Capelli and Cysewski (2010)[4] reported that the amount of calcium in *Spirulina* is 1.8 times higher than that in whole milk, total protein is 6.7 times that of tofu, iron is 51 times greater than that of spinach and β-carotene is 31 times more abundant than in carrots. Therefore, *Spirulina* was given the label of 'super food' by The World Health Organization (WHO).

Based on the literature revire the present was focused on the extraction and isoaltion and purification of the phycocynin perform the charecterzation using IR,NMR ,Mass spectrosopy. And perform the purity content in extract using

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Research Article

Bioinformatics for health care

Design and Optimization of Floating Microspheres Using *Abelmoschus esculentus* Natural Polymer

Krishnaveni Manubolu[1], Sreenivasulu Munna[2] and Chandrasekhar Kothapalli Bonnoth[3]

[1]*Department Of Pharmaceutical Sciences, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu-515002, Andhra Pradesh, India.*

[2] *Professor, Department Of Pharmaceutical Chemistry, Santhiram College Of Pharmacy, Nandyal, Kurnool- 518501, Andhra Pradesh, India.*

[3] *Professor, Department of chemistry, Krishna University, Machilipatnam,Krishna- 521001, Andhra Pradesh, India.*

Abstract: The main objective of the present research study was to fabricate Vildagliptin floating microspheres by ionotropic gelation using natural polymer, Abelmoschus esculentus obtained from the fruits of Abelmoschus esculentus in combination with sodium alginate. Microspheres were prepared and optimized using central composite rotatable design model using design expert software version 12 .The study is focussed on the interaction effects of the three independent variables, natural polymer concentration, sodium alginate concentration and crosslinker concentration, optimization of formulations response surface methodology was used . drug –excipient compatibility studies were carried out by infrared spectroscopic studies. Infrared spectroscopic studies clearly shown that drug and excipients were compatible. Totally 15 formulations were generated taking 8 factorial points, 6 axial points and 1 centre point. Response surface methodology was used to optimize the formulations. To investigate the responses %cumulative drug release, floating time and floating lag time Response surface methodology was used. Polynomial equations and model plots of 3 dimensional model surface plots were generated. Vildagliptin optimized microspheres were formulated and a second order, model quadratic model was used to study influence of formulation factors on response variables. Experimental data of Statistical analysis exhibited good coefficient of regression for cumulative in vitro drug release. Regression F –ratios for the experimental variables were significant. The experimental values and predicted values are agreed. All fifteen formulations exhibited % yield of 94.35-99.99%, particle size of 124-441µm, %swelling index 64.52-89.65%, floating time of 10.16 to 13.16 and floating lag time of 30.31 to 46.98 sec. F4 formulation is optimized based on cumulative % in-vitro drug release at 2nd hour, 12th hour, floating lag time and floating time values. Predicted and observed results are in agreement of 95% confidence intervals. Based on investigation, RSM is the good tool for optimization of formulations.

Key words: Vildagliptin, floating microspheres, Abelmoschus esculentus, natural polymer, optimization, Response surface methodology

***Corresponding Author**

Krishnaveni Manubolu , Department of Pharmaceutical Sciences, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu-515002, Andhra Pradesh, India.

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ARTHROSPIRA-FRIEND OF THE FUTURE-REVIEW

SALMA SHAIK*[1], N.HARIKRISHNAN[2]

[1]Research scholar, Dept of pharmaceutical chemistry, Ratnam institute of pharmacy, Pidthapolur, Muthukur, Nellore-524346 , India.

[2] Dept of pharmaceutical analysis, Faculty of pharmacy, Dr.M.G.R.Educational and research institute, deemed to be university, velappanchavadi, Chennai, Tamilnadu-600077, India

Corresponding author

ABSTRACT

The investigation for natural items that have health advantages in general and that have the ability to treat human disease has piqued the curiosity of people all over the world. In this paper, we examine the most recent information available on Cyanobacteria, which are aquatic and photosynthetic organisms that are well-known for their pigment-rich colours. Because of their high protein content, they are widely used as dietary supplements in a variety of applications. A high concentration of proteins, lipo polysaccharides, and gamma-linolenic acid may be found in the algae. AP extracts, phycocyanin compounds, and the polysaccharide calcium spirulina (Ca-SP) have all been tested in a variety of animal models to determine their efficacy. In addition to the synthesis of phycocyanobilin and allophycocyanin, spirulina (Arthrospira) also exhibits antioxidant and antimicrobial (antibacterial, antifungal, and antiviral) properties through the creation of additional important chemicals. Additional anti-cancer efficacy was shown in oral cancer, melanoma and UV-induced non melanoma skin cancer models, as well as in human patients. This article is an attempt to compile all of the nutritional and therapeutic uses of Arthrospira in one convenient location.

Keywords: blue-green algae, arthospira, spirulina, Cyanobacteria

I.INTRODUCTION

Cyanobacteria are photosynthetic organisms that have existed for millions of years and may be found in a variety of aquatic settings. Their photosynthetic pigments give them a variety of hues, although they are typically considered to be blue-green in appearance [1]. To refer to them as algae, on the other hand, is a misnomer because they are true prokaryotes that exhibit many of the features of eubacteria. Cyanobacteria can be found as colonies or as single cells in the environment. They can also develop structures such as coccid or filamentous structures. The filamentous colonies have demonstrated the capacity to differentiate into three distinct cell types [2].

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ORIGINAL ARTICLE

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Acute toxicity studies of an novel natural polymer *vigna mungo* in swiss albino rats

Krishnaveni Manubolu*[1], Sreenivasulu Munna[2], Chandrasekhar Kothapalli Bonnoth[3]

[1]Research Scholar, Department of Pharmaceutical Sciences, Jawaharlal Nehru technological university anantapur, Ananthapuramu-515002, Andhra Pradesh, India

[2]Department Of Pharmaceutical Chemistry, Santhiram College Of Pharmacy, Nandyal, Kurnool-518501, Andhra Pradesh, India

[3]Department of chemistry, Krishna University, Machilipatnam, Krishna- 521001, Andhra Pradesh, India

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ABSTRACT

The aim of the present research is to investigate acute toxicity profiling of isolated Vigna mungo new natural polymer. Safety administration is the primitive criterion for any drug substance. To explore the safety and toxicity profiling of the novel polymer, this study was carried out. Vigna mungo novel polymer was isolated from the pulverised seeds of Vigna mungo which is part and parcel of our diet. This polymer is obtained using a non-solvent extraction method using acetone. Acute toxicity studies were performed according to the OECD guidelines 420. In this, the selected animal model is Swiss albino rats, grouped into control and test containing each three animals. 2000 mg/kg of Vigna mungo polymer was administered to a test group and did not produced any abnormalities and behavioural changes. Furthermore, histopathological studies, body weight, haematological parameters did not presented abnormal values. The observations found 2000mg/kg of a dose of the polymer did not cause lethality and death of any animal till 14 days of a period. It was concluded that Vigna mungo novel polymer is safe to administer up to 2000mg/kg dose. Hence, the novel *Vigna mungo* polymer is safer for therapeutic use in pharmaceutical formulations.

*Corresponding Author

Name: Krishnaveni Manubolu
Phone:
Email: krishnaveni.manubolu@gmail.com

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INTRODUCTION

Polymers are the backbone of drug delivery systems. These are the carriers of inert nature. Polymers alter the pharmacokinetics, pharmacodynamics properties of the dosage forms. Polymers are natural, synthetic and semisynthetic based on the source of origin. Many natural source origin polymers, especially proteins, polysaccharides used as carriers in the tissue engineering, targeting, and in bio response stimuli drug delivery systems (Gil and Hudson, 2004). These are used as binders, film formers, artificial organs linings, immunological testing, and as substrates for cell growth. Smart polymers are materials of choice in the dosage forms which undergo physical or chemical change in response to external stimuli. Hydrogels are the hydrophilic polymeric networks capable of taking a large amount of water or biological fluids (Qiu and Park, 2001).

Natural polymers are gaining popularity in the modern era due to biocompatibility, biodegradability,

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A Study on Extraction and Characterization of *Vigna mungo* Polymer

Krishnaveni Manubolu*[1], Sreenivasulu Munna[2], Chandrasekhar Kothapalli Bonnoth[3]

[1]Department of Pharmaceutical Sciences, Jawaharlal Nehru Technological University, Anantapur, Ananthapuramu-515002, Andhra Pradesh, India

[2]Department of Pharmaceutical Chemistry, Santhiram College of Pharmacy, Nandyal, Kurnool-518501, Andhra Pradesh, India

[3]Department of Chemistry, Krishna University, Machilipatnam, Krishna- 521001, Andhra Pradesh, India

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Natural Polymer,
Vigna Mungo,
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Acetone,
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ABSTRACT

The aim of work is to extract and characterize the *Vigna mungo* polymer solvent using acetone and ethanol. Natural polymers contribution towards formulation of dosage forms is appreciable as they are biocompatible, biodegradable and safe. So extraction and characterization of Vigna mungo polymer helps in the interaction studies of preformulation. In this present study, various physicochemical characters like phytochemical screening, viscosity, particle size analysis, and flow characteristics were determined. Further characterization performed using FTIR and XRD. Vigna mungo polymer obtained using acetone was taken into further studies of evaluation because of more product yield and less particle size. FTIR results revealed existence of carbohydrate nature. X-ray diffractogram presented degree of crystallinity 26.4%. And phytochemical screening of the extracted polymer indicated presence of mucilage and carbohydrates using ruthenium red and molisch's test. Statistical analysis of data was performed using two way ANOVA using Graphpad prism 5 software was used to compare Vigna mungo polymer extracted using acetone and ethanol. Physicochemical parameters experimental data found to be statistical significance two way ANOVA ($P < 0.05$).

*Corresponding Author

Name: Krishnaveni Manubolu
Phone:
Email: krishnaveni.manubolu@gmail.com

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INTRODUCTION

Polymer is a macromolecule. It is comprised by rehashing the primary units associated by covalent substance bonds. Polymers are separated into engineered and regular polymers. Characteristic polymers are alluring atoms with more drug applications (Vishakha *et al.*, 2012). Plant inferred polymers have explicit applications in drug details including assembling of strong solid grid frameworks, inserts, films, dabs, miniature particles, and nanoparticles, inhalable and injectable frameworks. Natural polymers are biodegradable (Satturwar *et al.*, 2003). They are biocompatible, non-ionic, economic, safe, without results and effectively accessible (Jani *et al.*, 2009).

Spatiotemporal arrival of medication in the definitions is made conceivable in current medication conveyance frameworks. Different hydrogels and other polymer based transporters gives, safe saturation through physiological areas. In this way, polymers are formed with medicaments to change transport or course half-life characteristics for targeting (Liechty *et al.*, 2010). This research outlines

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Research Article

ANTIFERTILITY ACTIVITY OF *DECASCHISTIA CROTONIFOLIA* LEAF EXTRACT ON MALE RATS

AFSAR SHAIK[1,2]*, PRASANNA RAJU YALAVARTHI[3], CHANDRASEKHAR KOTHAPALLI BONNOTH[4]

[1]Faculty of Pharmaceutical Sciences, JNTUA, Ananthapuramu, Andhra Pradesh, India. [2]Department of Pharmacology, Narayana Pharmacy College, Nellore, Andhra Pradesh, India. [3]Department of Pharmaceutics, Sri Padmavathi School of Pharmacy, Tirupati, Andhra Pradesh, India. [4]Department of Chemistry, Oil Technological and Pharmaceutical Research Institute, JNTUA, Ananthapuramu, Andhra Pradesh, India. Email: afsarsk_14@yahoo.com

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ABSTRACT

Objective: The objective was to investigate the male antifertility effect of *Decaschistia crotonifolia* leaf extract on male Wistar rats.

Methods: The animals were divided into three groups of five animals each. The first group (I) served as control and received normal saline, and remaining Groups II and III were treated with plant extract at a dose of 200 and 400 mg/kg p.o., respectively, for 21 days.

Results: Dose-dependent significant decrease in the weight of testes and epididymis was observed. Furthermore, a dose-related reduction in sperm count and motility was observed. A significant decrease in testosterone levels leading to infertility was also observed.

Conclusion: The 70% methanolic leaf extract of *D. crotonifolia* has produced dose-dependent antifertility effect on male rats.

Keywords: Male antifertility, *Decaschistia crotonifolia* leaf extract, Testosterone levels, Testes and epididymis.

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INTRODUCTION

Fertilization and control of overpopulation is a major quest in the modern era. Majority of people are facing problems such as infertility due to unremarkable reasons, and on the other hand, control of fertilization is also one of the targets of scientific community. Although a number of oral antifertility agents [1] are available in market, their usage is questionable due to their synthetic nature and a wide variety of side effects. Hence, a large number of population are migrating in a search for safe means of contraception. One of the most attracting and safest ways is using herbal medicine which is having a promising output with less or no side effects from the ancient times [2].

In the recent past, a majority of scientific and systemic investigations on herbal plants for their physicochemical and phytopharmacological properties including their antifertility activities are undertaken by researchers worldwide. As a part of contribution to the society, the present paper is focused on the research activity of *Decaschistia crotonifolia* for its antifertility activity.

D. crotonifolia is a widely grown plant in forests of Andhra Pradesh, Karnataka, Tamil Nadu, and Kerala. It belongs to the family Malvaceae, which is a shrub, growing at an height of 2 m [3]. A large source of wild plants possess a wide range of pharmacological uses, and hence, there is a need to explore uses of such plants to treat many diseases. An attempt was made to investigate antifertility potentials of *D. crotonifolia* as the investigations on this particular plant were very much limited.

MATERIALS AND METHODS

Plant material

D. crotonifolia leaves were collected from Talakona Forest, Tirupathi, and authenticated by botanist. The collected leaves were washed thoroughly in water and air-dried for 2 weeks at 35–40°C. Extraction was carried out in 500 ml of 70% methanol by soxhlation for 18 h using Soxhlet apparatus. The extract was concentrated under reduced pressure, dried, and stored in a desiccator.

Animals used

Healthy adult Wistar male rats (150–200 g) with proven fertility were marked and housed in polypropylene cages under a 12 h light and 12 h dark cycle. The experimental protocol was approved by the institutional animal ethical committee.

Experimental design

Animals were divided into three treatment groups containing five in each.

Group I - Animals in this group were treated as control and given distilled water alone for 3 weeks (21 days).

Group II - Animals in this group were treated as test I and given *D. crotonifolia* leaf extract at the dose of 200 mg/kg body weight p.o.

Group III - Animals in this group were treated as test II and given *D. crotonifolia* leaf extract at a dose of 400 mg/kg body weight p.o.

A suspension of extract was prepared in distilled water before administration. The required dose was administered orally with a syringe fitted with a feeding needle.

Sacrifice schedule

After their last dose at 21st day, the rats were weighed and sacrificed under light ether anesthesia.

Parameters monitored

Body and organ weights

The animals were weighed before and after the treatment schedule to note the initial and final body weights. The testes and epididymides were dissected out, freed from tissues and blood, and weighed.

Sperm count and motility

About 100 mg of each cauda epididymal tissue was minced in 1 ml of physiological saline. For sperm motility, one drop of evenly mixed

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Evaluation of Anti-fertility activity of *Decaschistia crotonifolia* leaves on female wistar rats

Afsar Shaik*[1,2], Prasanna Raju Yalavarthi[3], Chadrasekhar Kothapalli Bonnoth[4]

[1]Faculty of Pharmaceutical Sciences, JNTUA, Ananthapuramu-515002, Andhra pradesh, India
[2]Department of Pharmacology, Narayana Pharmacy College, Chinthareddypalem, SPSR , Nellore-524003, Andhra pradesh, India
[3]Department of Pharmaceutics, Sri Padmavathi School of Pharmacy, Tirchanoor, Tirupathi-517503, Andhra pradesh, India
[4]Department of Chemistry, Director Foreign Affairs and Alumini Matters, JNTUA, Ananthapuramu-515002, Andhra pradesh, India

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ABSTRACT

Medicinal Plants were used from the ancient to the modern era and has proved in treating and preventing many different types of diseases which are not treatable with other means of treatment. The present study was aimed to prove the anti-fertility activity of *Decaschistia crotonifolia* leaves on female wistar rats. The extracts were mainly estimated for their anti-implantation activity by taking mainly 2 dose levels: 200 & 400 mg/kg, respectively. The extracts were also tested for their hormonal alteration effects on female wistar rats. The reports obtained in this study strongly prove the anti-fertility potential of leaves extracts of *Decaschistia crotonifolia*, as the extracts has shown a potential decline in the formation of implants (100%), and also the increase in uterine weight projects its estrogenic effect in Ovariectomised rats. Hence by considering the above-mentioned results, it may be proved that the leaves extracts of *D. Crotonifolia* poccess strong anti-fertility activity.

*Corresponding Author

Name: Afsar Shaik
Phone: +919885398761
Email: afsarsk_14@yahoo.com

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INTRODUCTION

The explosion of the population has brought up the requirement for new, safe and pharmacologically effective contraceptive method. The Indian population is rapidly multiplying and has crossed more than one billion. Fertility control now, therefore, became a major threat for the economy of developing countries. Anti-fertility agents are those which are capable of terminating the pregnancy. Moreover, the synthetic anti-fertility methods available in the market have significant side effects and morbidity rates (Sharma *et al.*, 1983).

Hence it's an alarming time for mankind to think about the natural sources, which has been neglected from the past few decades for their safe and effective means of medical needs. A lot of recent past studies in the field the herbal research has promising results in treating many ailments (Hiremath and Rao, 1990).

D. Crotonifolia is a widely grown plant belonging to the family Malvaceae found in forests of Andhra Pradesh, Karnataka, Tamilnadu and Kerala. Which is a shrub, grows at the height of 2m (Prasad *et al.*, 1986). A large source of wild plants possess a wide range of pharmacological uses, hence there is a need to explore uses such plants to treat many diseases. The present was an attempt made to investigate the

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