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Genotoxic effect of manganese and nickel doped zinc ferrite (Mn0.3Ni0.3Zn0.4Fe2O4) nanoparticle in Swiss albino mouse Mus musculus (/handle/123456789/55844)	*D'Costa, Avelyno H. (/browse?type=author&value=D%E2%80%99Costa%2C+Avelyno+H.); Shyama, Soorambail K. (/browse?type=author&value=Shyama%2C+Soorambail+K.); Kumar, Praveen MK (/browse?type=author&value=Kumar%2C+Praveen+MK); Verenkar, Vidhyadatta S. (/browse?type=author&value=Verenkar%2C+Vidhyadatta+S.); Tangsali, Rudraji B. (/browse?type=author&value=Tangsali%2C+Rudraji+B.)*	*IJEB Vol.59(01) [January 2021]*	*25-32*
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Polyphenol rich extract from Sesbania grandiflora (L.) Pers. bark reduces rheumatism by mediating the expression of NF kappa B in rats (/handle/123456789/55842)	*Arora, Sumit (/browse?type=author&value=Arora%2C+Sumit); Itankar, Prakash (/browse?type=author&value=Itankar%2C+Prakash)*	*IJEB Vol.59(01) [January 2021]*	*44-53*

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Indian Journal of Experimental Biology
Vol. 59, January 2021, pp. 44-53

Polyphenol rich extract from *Sesbania grandiflora* (L.) Pers. bark reduces rheumatism by mediating the expression of NF kappa B in rats

Sumit Arora[1]* & Prakash Itankar[2]

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Sesbania grandiflora (L.) Pers. (Fabaceae) commonly called Agati or Vegetable Hummingbird, is autochthonal from Malaysia to North Australia; plant is cultivated in several parts of India. Root and bark paste is applied externally to relive pain and inflammation associated with arthritis. It has long been used as a traditional medicine for rheumatism. Keeping this in cognizance, the study was designed to explore the antirheumatic potential of *S. grandiflora*. The bark extracts were prepared and studied for their phytochemical study, *in vitro* antioxidant potential using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and nitric oxide (NO) radicals and antiarthritic activity against Complete Freund Adjuvant (CFA) induced arthritis. To probe into the causal mechanism of action, NFκB suppressing activity in paraventricular nucleus (PVN) of hypothalamus using potent extract was also studied. Polyphenol rich extract supplementation significantly normalizes the altered blood parameters and reverses the increase in paw thickness, a sign of arthritis in rats. Further, immunohistochemical analysis revealed significant reduction in the NFκB immunoreactive cells in 50% methanolic extract treated (14 days) arthritic rats (57%; $p<0.001$) as compared to control. These results consolidate the observation, that inhibition of NFκB may be a beneficial approach in the treatment of arthritis. This study corroborates the traditional use of *S. grandiflora* plant in rheumatism.

Keywords: Agati, Antioxidant, Antirheumatic, Immunohistochemistry, NFκB, Vegetable Hummingbird

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease affecting approximately 1% of the people worldwide irrespective of race. It is often accompanied by an array of articular and extra-articular manifestations[1]. Proinflammatory cytokines, notably interleukin one (IL-1) and tumor necrosis factor-α (TNF-α) plays a vital role in initiating and perpetuating inflammatory and harmful processes within the arthritic joint. Additionally, several evidences indicated an important role of nuclear factor kappa B (NFκB) within the etiology of RA. In patients with RA, activation of the NFκB in synovial cells ends up in the transactivation of an oversized variety of responsive genes that contribute to the inflammatory phenotype, together with TNF-α, chemokines and cytokines that conscript immune cells to the inflamed pannus[2]. Importantly, the genes coding TNF-α and plenty of the other factors mentioned on top are currently better known to be under the regulation of NFκB transcription factors[3] suggesting that NFκB could be one of the master regulators of inflammatory cytokine production in RA.

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The increasing interest in characterizing NFκB involvement in mediating inflammatory pain stems from the large number of genes and cellular processes that it regulates. This transcription factor contributes to controlling developmental processes, neuronal plasticity, synaptic transmission, death and cellular defense[4]. Some of the genes whose expression NFκB modulates are nitric oxide synthase, cyclooxygenase (COX), cytokines, adhesion molecules, acute-phase proteins and dinorphine[5]. Regarding inflammatory pain, it was shown that intrathecal treatment with NFκB inhibitors reduces thermal and mechanical hyperalgesia after peripheral inflammation induced by complete freund adjuvant (CFA) in rats[6]. Thus, inhibition of NFκB could reduce the expression of inflammatory genes and is a mechanism by which anti-inflammatory agents might elicit their antiinflammatory effects. Taking into account these evidences, in the present study, we investigated whether activation of NFκB is involved in the rheumatoid arthritis and subsequently reductions in their expressions alleviate the inflammation following the administration of CFA.

Sesbania grandiflora (L.) Pers. (Fabaceae), commonly called Agati or Vegetable Hummingbird,

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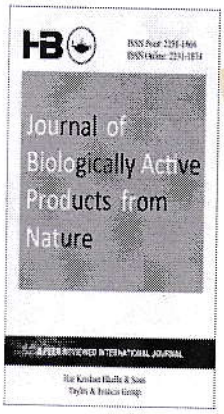

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Article

Antioxidant and Cognitive Enhancing Activities of *Sargassum ilicifolium* and *Padina tetrastromatica* in Scopolamine Treated Mice

Subhash R. Yende [1]*, Sumit K. Arora [2] and Abhay M. Ittadwar [2]

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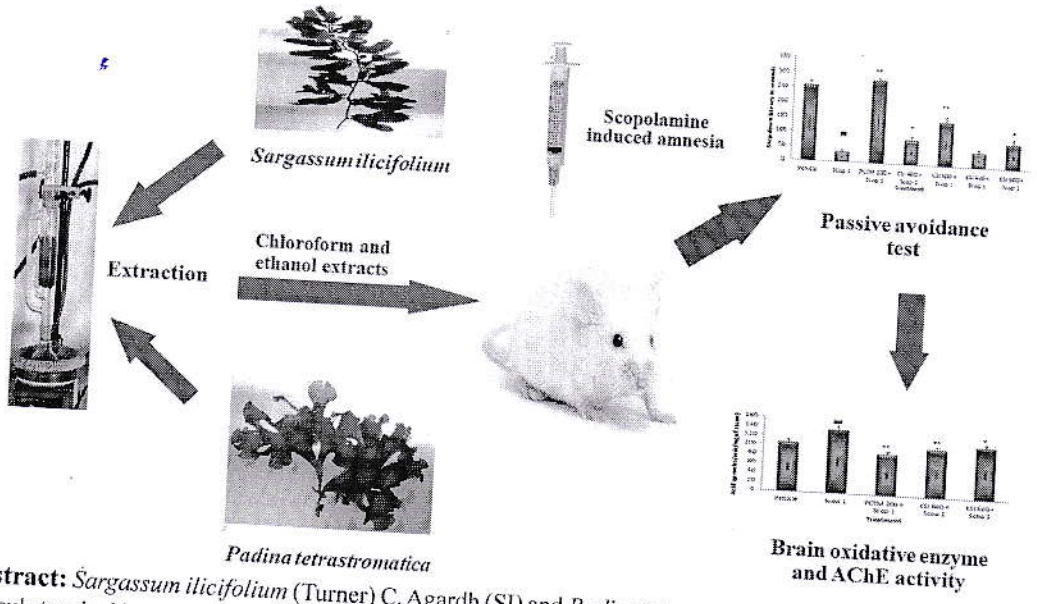

Abstract: *Sargassum ilicifolium* (Turner) C. Agardh (SI) and *Padina tetrastromatica* (Hauck) (PT) are tropical and sub-tropical brown algae, found in the coastal region of India. In the present study, the cognitive enhancing activity of chloroform and ethanol extract of SI and PT (CSI, ESI & CPT, EPT) was investigated in scopolamine-induced amnesic mice using the Passive avoidance (PA) test. In addition, the effect on brain oxidative enzymes and acetylcholinesterase (AChE) was also evaluated using a spectrophotometer. The results of this study indicated that CSI (600 mg/kg), ESI (600 mg/kg), as well as CPT (600 mg/kg), significantly increased Step-Down Latency compared to scopolamine treated group, indicated that, CSI, ESI and CPT significantly ($p < 0.01$)

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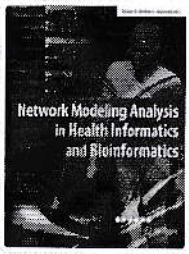

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ORIGINAL ARTICLE

Exploring the active constituents of *Oroxylum indicum* in intervention of novel coronavirus (COVID-19) based on molecular docking method

Sapan Shah[1] · Dinesh Chaple[1] · Sumit Arora[2] · Subhash Yende[3] · Keshav Moharir[4] · Govind Lohiya[4]

Received: 28 August 2020 / Revised: 24 November 2020 / Accepted: 15 December 2020

Abstract

The severe acute respiratory syndrome COVID-19 declared a global pandemic by WHO has become the present wellbeing worry to the whole world. There is an emergent need to search for possible medications. We report in this study a molecular docking study of eighteen *Oroxylum indicum* molecules with the main protease (M^{pro}) responsible for the replication of SARS-CoV-2 virus. The outcome of their molecular simulation and ADMET properties reveal four potential inhibitors of the enzyme (Baicalein-7-*O*-diglucoside, Chrysin-7-*O*-glucuronide, Oroxindin and Scutellarein) with preference of ligand Chrysin-7-*O*-glucuronide that has the second highest binding energy (−8.6 kcal/mol) and fully obeys the Lipinski's rule of five.

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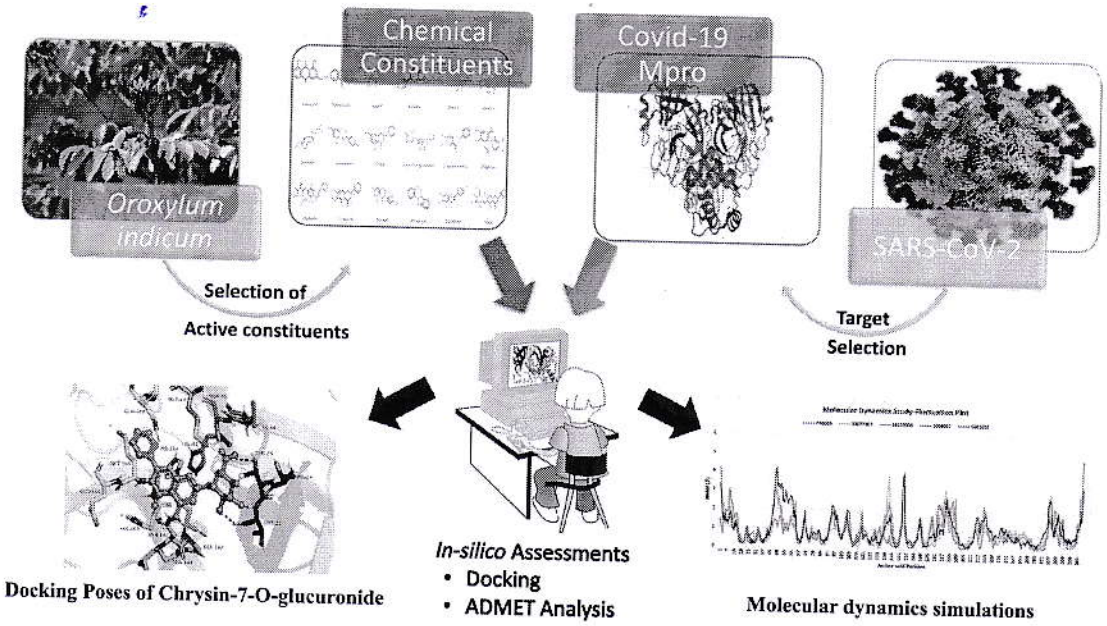

Keywords COVID-19 · *Oroxylum indicum* · Molecular docking · Molecular dynamics · ADMET study

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s13721-020-00279-y.

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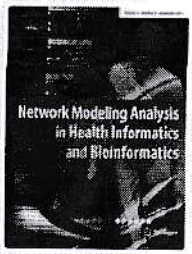

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Evaluation of pancreatic regeneration activity of *Tephrosia purpurea* leaves in rats with streptozotocin-induced diabetes

Sumit K. Arora [a, *], Prashant R. Verma [b], Prakash R. Itankar [c], Satyendra K. Prasad [c], Kartik T. Nakhate [d]

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ABSTRACT

Background and aim: Flavonoid rich plant *Tephrosia purpurea* (*T. purpurea*), commonly known as Sarpunkha has been used in traditional systems of medicine to treat diabetes mellitus. However, its effectiveness in promoting regeneration of pancreas in diabetes has not been investigated. Therefore, the present study was undertaken to evaluate pancreatic β-cells regeneration, antioxidant and antihyperlipidemic potentials of *T. purpurea* leaves extract, its fractions and main constituent Rutin in diabetic rats.

Experimental procedure: The leaves extract and its fractions were first screened for acute and sub-chronic antidiabetic activity in a dose range of 250–500 mg/kg orally. Further, fractions with potent antidiabetic activity were screened for pancreatic β-cells regeneration activity using histopathological studies and morphometric analysis, which was followed by estimation of biochemical parameters.

Results and conclusion: The most significant antidiabetic, pancreatic regeneration and antihyperlipidemic activity was exhibited by *n*-butanol soluble fraction of ethanol extract at the dose level of 500 mg/kg. Histopathology revealed that treatment with this fraction improved the β-cell granulation of islets and prevented the β-cells damage which was further confirmed by morphometric analysis. Thus, the present study validated the traditional use of *T. purpurea* plant in the treatment of diabetes, which might be attributed to pancreatic β-cells regeneration potential of its active constituent Rutin.

Taxonomy (classification by EVISE): Traditional Medicine; Metabolic Disorder; Experimental Design; Cell Regeneration and Histopathology.

1. Introduction

Diabetes mellitus (DM) is a multifactorial chronic disorder of carbohydrate, protein and lipid metabolisms. It is characterized by persistent hyperglycemia, hypercholesterolemia and hypertriglyceridemia. Chronic hyperglycemia results in micro-vascular complications to the organs like eyes and kidneys, lower-limb amputations, and increased risk of cardiovascular diseases such as hypertension and atherosclerosis, which contribute to diabetes-associated morbidity and mortality.[1–3] Defects in insulin gene expression in the islets of β cell and consequent decrease in insulin secretion are the major causes of glucose toxicity. Decreased levels of insulin gene transcription stimulatory proteins such as pancreas homeobox protein 1 (PDX-1) and musculoaponeurotic fibrosarcoma oncogene homolog A (MafA) are responsible for declined insulin gene expression.[4] The hyperglycemia is controlled by multiple injections of insulin in type I diabetic patients, while type II diabetes is controlled by administration of oral hypoglycemic agents. Currently available treatments are expensive and have serious adverse effects.[5] Likewise, commonly prescribed

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A 23 FACTORIAL DESIGN FOR FORMULATION AND DEVELOPMENT OF DOXYCYCLINE HYDROCHLORIDE IN SITU GEL FORMING SOLUTION FOR WOUND HEALING APPLICATION

N. VISHAL GUPTA, S. SHANMUGANATHAN, SANDEEP KANNA, K. TRIDEVA SASTRI

221-232

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FABRICATION OF MICROEMULSION LOADED SUBLINGUAL FILM FOR RAPID ABSORPTION OF FENTANYL CITRATE IN TRANSIENT BREAKTHROUGH PAIN

D. MUNDHEY, N. SAPKAL, A. DAUD

233-238

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VIRTUAL TARGET CONSTRUCTION FOR STRUCTURE-BASED SCREENING IN THE DISCOVERY OF HISTAMINE H2 RECEPTOR LIGANDS

GERRY NUGRAHA, ENADE PERDANA ISTYASTONO

239-241

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RAPID AND SIMPLE DETERMINATION OF IBUPROFEN AND CAFFEINE IN FIXED-DOSE COMBINATION FORMULATIONS: APPLICATION TO DISSOLUTION STUDIES

JOSE RAUL MEDINA-LOPEZ, JOAQUIN ALEXANDRO SOTO-JUHA, JUAN MANUEL CONTRERAS-JIMÉNEZ

242-246

International Journal of Applied Pharmaceutics

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Original Article

FABRICATION OF MICROEMULSION LOADED SUBLINGUAL FILM FOR RAPID ABSORPTION OF FENTANYL CITRATE IN TRANSIENT BREAKTHROUGH PAIN

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ABSTRACT

Objective: The present research work aims to develop a microemulsion loaded sublingual film for rapid absorption of fentanyl citrate in transient breakthrough pain.

Methods: The Fentanyl citrate microemulsion loaded sublingual film was prepared using Capmul MCM C8 (oil), tween 20 (surfactant) and propylene glycol (co-surfactant) with different grades of film-forming polymer (HPMC) using a film casting machine. The films were evaluated for *in vitro* disintegration study, tensile strength, folding endurance, content uniformity, drug content, *in vitro* dissolution, pH, thickness and weight variation, scanning electron microscopy, ex vivo permeation study, droplet size, polydispersity index, zeta potential, % moisture content and stability study were evaluated.

Results: The optimized film formulation showed desired mechanical properties (tensile strength of 0.291 kg/cm^2) and a minimum disintegration time of 20 s. The optimized sublingual film formulation exhibited 43.16 % of FC microemulsion loading. Morphological study showed the absence of drug crystals on the polymeric surface. Permeation studies through goat sublingual mucosa indicated 89% fentanyl citrate release through fentanyl citrate microemulsion loaded sublingual film, whereas only 40% fentanyl citrate release was obtained when it was directly added to film without microemulsion strategy.

Conclusion: The present study indicated that extend of permeation of fentanyl citrate when added to the sublingual film in microemulsion form was around 2.225 folds higher than when added directly to film without microemulsion. The present microemulsion embedded film technology could be a promising alternative to conventional drug delivery systems and traditional routes of administration for breakthrough pain management.

Keywords: Fentanyl citrate, Microemulsion, Sublingual film

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INTRODUCTION

Fentanyl citrate (FC) is a small and potent μ-receptor agonist that is given in low doses (100-1000 μg), and lacks the bitter taste associated with some other opioids [1, 2]. FC is known to be effective in the treatment of breakthrough pain which is estimated in more than half of cancer patients [3]. Breakthrough pain in cancer patients ranges from 40% to 93%, and these patients suffer an average of 4 episodes of breakthrough pain per day [4, 5]. For the successful treatment of transient breakthrough pain, the analgesic used must be fast-acting and provide immediate pain relief. The low oral bioavailability of FC limits its therapeutic utility due to metabolism by the enzyme CYP3A4 in the gastrointestinal tract as well as first passes hepatic clearance [6-8].

Fentanyl is a highly lipophilic compound (octanol-water partition coefficient at pH 7.4 is 816:1) having peak analgesic effects within a few minutes of IV administration and a duration of action, after small to moderate doses, of 30 to 60 min [9]. But parenteral administration of fentanyl is usually unsuitable or inconvenient for the patient for the self-management of breakthrough pain, especially in the home environment. Fentanyl has therefore been formulated for administration by a number of alternative routes including transdermal [10], pulmonary [11, 12], oral [13-15], oral transmucosal [16-19] and intranasal [20-22]. Sublingual administration is noninvasive, and the transmucosal absorption of lipophilic drugs is rapid [23-25]. Sublingual fentanyl appears to be clinically useful, safe and well tolerated by the patients [26] and causes minimal mucosal irritation [19]. Whereas the sublingual route offers good bioavailability (57%) and which further can be increased by proposed strategy.

Thus currently there is a need for a sublingual film dosage form that provides the desired absorption level of fentanyl. Hence, the objective of the current research work was to develop a fast-dissolving microemulsion (ME) loaded sublingual film of fentanyl citrate for transient breakthrough pain. To achieve this objective, fentanyl citrate in microemulsion form is incorporated into the sublingual film for better sublingual bioavailability.

MATERIALS AND METHODS

Materials

Fentanyl citrate USP was purchased from Rusan Pharma Ltd. Works, Ankleshwar, Gujrat. Propylene Glycol was purchased from Shell Chemicals, Singapore. Capmul® MCM C8 (Mono/diglycerides of caprylic acid) was obtained as a gift sample from ABITEC Corporation, Columbus, USA. Monebat®-20 (Polyoxyethylene 20 sorbitan monolaurate) was obtained as a gift sample from Mohini Organics Pvt. Ltd. Malad (West), Mumbai.

Methods

Preparation of fentanyl citrate microemulsion loaded sublingual films

Polymeric ME drug-loaded sublingual film was prepared using film casting machine at 1.5 V and wet thickness of 0.50 mm and dimensions of film was set at 20 × 22.5 mm and dried immediately. Preparation of FC microemulsion and polymeric solutions used to make are as follows. Weigh each ingredient accurately as described in table 1 to prepare formulations F1 to F3. Initially, FC microemulsion was prepared using Capmul MCM C8 (oil), tween 20 (surfactant) and propylene glycol (co-surfactant) using water titration method [27, 28]. In C2 optimized microemulsion, Smix ratio was 1:1 (table 1). This resulted into the formation of a clear microemulsion and to it calculated quantity of FC was added and sonicated for 30 min. Then alpha-tocopherol acetate and BHA (as an antioxidant), sucralose (sweetener), sunset yellow (color) and orange flavor were added and further sonicated for 20 min to obtain

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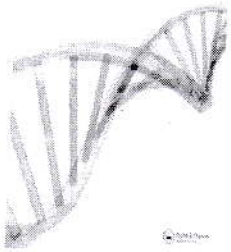

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Prospecting for *Cressa cretica* to treat COVID-19 via *in silico* molecular docking models of the SARS-CoV-2

Sapan Shah[a], Dinesh Chaple[a], Sumit Arora[b], Subhash Yende[c], Chetan Mehta[d] and Usha Nayak[d]

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ABSTRACT

The severe acute respiratory syndrome COVID-19 declared as a global pandemic by the World Health Organization has become the present wellbeing worry to the whole world. There is an emergent need to search for possible medications. *Cressa cretica* is reported to show antitubercular, antibacterial and expectorant property. In this research, we aim to prospect the COVID-19 main protease crystal structure (M^{pro}; PDB ID: 6LU7) and the active chemical constituents from *Cressa cretica* in order to understand the structural basis of their interactions. We examined the binding potential of active constituents of *Cressa cretica* plant to immensely conserved protein M^{pro} of SARS-CoV-2 followed by exploration of the vast conformational space of protein–ligand complexes by molecular dynamics (MD) simulations. The results suggest the effectiveness of 3,5-Dicaffeoylquinic acid and Quercetin against standard drug Remdesivir. The active chemical constituents exhibited good docking scores, and interacts with binding site residues of M^{pro} by forming hydrogen bond and hydrophobic interactions. 3,5-Dicaffeoylquinic acid showed the best affinity towards M^{pro} receptor which is one of the target enzymes required by SARS CoV-2 virus for replication suggesting it to be a novel research molecule. The potential of the active chemical constituents from *Cressa cretica* against the SARS-CoV-2 virus has best been highlighted through this study. Therefore, these chemical entities can be further scrutinized and provides direction for further consideration for *in-vivo* and *in-vitro* validations for the treatment of covid-19.

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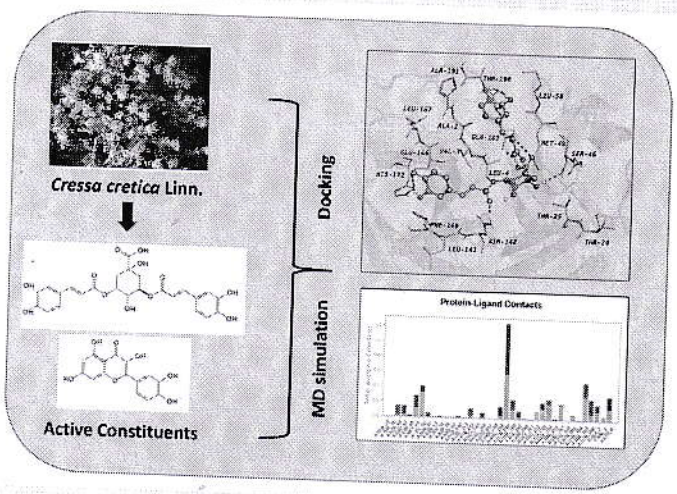
Cressa cretica; SARS-CoV-2 M^{pro}; *in silico*; molecular docking; molecular dynamics

GRAPHICAL ABSTRACT



Abbreviations: MD: Molecular dynamics; ORF: Open reading frames; HIV: Human Immunodeficiency virus; RNA: Ribonucleic acid; OPLS: Optimized potentials for liquid simulations; NCDCV: Neonatal calf diarrhoea coronavirus; OC43: Orthocornavirinae family; RdRps: RNA-dependent RNA polymerase; MW: Molecular weight; PSA: Polar surface area; HBD: Hydrogen bond donor; RMSD: Root mean square deviation; RMSF: Root Mean Square Fluctuation; CAESAR: Computer assisted evaluation of industrial

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3	**Article: Organic Agri-Practices and Pharmacognostic Evaluation of Off- Seasoned Cultivated Madhulika: A Wonder Herb** Author: *Lalit Raj Singh and Karan Singh* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P19-23* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	19-23	11	8
4	**Article: Effect of Curing Time on Bond Failurerct Based on Two Light Cure Units used in Bonding Orthodontic Brackets** Author: *B. Nivethigaa and Aravind Kumar.S* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P24-28* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	24-28	3	6
5	**Article: Protective Role of *Tridax Procumbens* against Adjuvant Induced Arthritis in a Murine Model** Author: *K. Gopal Rao, Y.R.K Tirupathi Rao and A .Satishchandra* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P29-34* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	29-34	3	5
6	**Article: A Current Review on Polymeric Hydrogel Based Approach for Skin Tissue Regeneration.** Author: *J. Subin Kiruba, Uppuluri Varuna Naga Venkata Arjun, Shanmugarajan T.S.* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P35-42* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	35-42	14	3
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8	**Article: Synergistic and Safe Antidiabetic Effect of Polyherbal Formulation: Comprehensive Overview** Author: *Vipinchandra Bhaskarrao Pande, Saket Singh Chandel and Vishal Soni* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P51-57* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	51-57	8	3
9	**Article: Putative Role of Chloroquine In Amelioration of DSS Induced Ulcerative Colitis in Mice** Author: *AvikDas ,Srikanta Chandra, Lucky Mukherjee, Tathagata Roy and Preeta Bose* DOI:*http://dx.doi.org/10.22376/ijpbs/lpr.2021.11.2.P58-67* [View] [Downloads PDF] [Abstract] [XML] [Full HTML]	58-67	24	6
10	**Article: Partial Purification and Biochemical Characterization of Horse Gram**	68-78	11	7

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Review Article

Pharmacology for drug discovery

Synergistic and Safe Antidiabetic Effect of Polyherbal Formulation: Comprehensive Overview

Vipinchandra Bhaskarrao Pande[1], Saket Singh Chandel[2]* and Vishal Soni[3]

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Abstract: Diabetes is a metabolic disorder and enhances the glucose level in the blood. The synthetic antidiabetic agents are limited to the management of diabetes due to its adverse effects. The herbal medicines are the alternative and better option for the management of diabetes. Mostly Ayurvedic formulations are polyherbal formulation and impart chief role for the treatment of diabetes. The polyherbal formulation illustrates the combination of two or more herbs in formulation. The herbal components in the polyherbal formulation interacts leading to synergistic antidiabetic effect compared to the individual herb. Frequent available reports show evidence of synergistic effect of polyherbal drugs and their mechanism of action. But due to scanty availability of these reports in electronic libraries the researcher has to search the hard copies which leads to wastage of effort and time. To overcome these lacuna, this article was undertaken to scientifically review the *in vitro* and *in vivo* research studies on antidiabetic polyherbal formulations Further, the data presented in this review exploration of synergistic mechanisms of the antidiabetic polyherbal formulation will not only assist researchers to discover new phytomedicines or drug combinations but also support to avoid the possible negative synergy. Additionally, it would assist in clinical research for carrying out clinical trials to assess the efficacy of these herbal combinations and guide in understanding their synergistic mechanisms.

Keywords: Antidiabetes, Polyherbal formulation, Synergistic, Clinical study, Herbal, herb-herb combination

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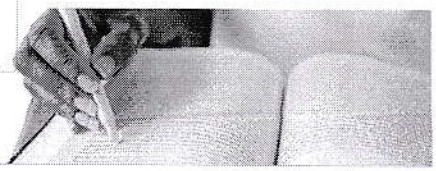

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USE OF RICE WATER (Oryza Sativa) & HIBISCUS (Hibiscus Rosa- sinensis)

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GAURAV RAJENDRA PARMAL
KAUSTUBH SHYAM JOSHI, MITALI. M. BODHANKAR

Abstract

: Healthy looking hair is a sign of good health & beauty which moulds one's personality. Human hair follicle cycle consist of 4 main phases anagen, catagen, telogen and exogen. Hair get its pigment from Melanin stored in hair follicle cells. Follicle can lose their ability to produce melanin with age which result in growth of grey or white hair. Damage follicle can also stop producing hair which can lead to certain condition such as alopecia which can cause follicle to stop producing hair altogether. Hair nutrition is therefore a vital part of any treatment regime. An effective approach must be taken when formulating a hair nutrition supplement for hair. The main objective of this study is to comprehend the hair nutrition and hair growth activity of rice water and hibiscus.

Key Words

Human hair, Growth cycle, Hair nutrition, Hair strength, rice water, hibiscus

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USE OF RICE WATER (Oryza sativa) & HIBISCUS (Hibiscus rosa-sinensis) FOR HAIR NUTRITION AND HAIR GROWTH

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Abstract:

Healthy looking hair is a sign of good health, beauty and hair care practices which moulds one's personality. Human hair follicle cycle consist of 4 main phases anagen, catagen, telogen and exogen. Hair get its pigment from Melanin stored in hair follicle cells. Follicle can lose their ability to produce melanin as age which result in growth of grey or white hair damage follicle can also stop producing hair which can lead to certain condition such as alopecia which can cause follicle to stop producing hair altogether. The main objective of this study is to comprehend the hair nutrition and hair growth activity of rice water and hibiscus.

When rice water is created the water becomes loaded in vitamins, amino acids and other trace minerals (Zn, Mg, Vit. B and C etc.) which helps to strengthen and improve the condition of the hair cuticle, nourish the hair follicles and repair damaged cells whereas hibiscus helps to control hair fall due to calcium, riboflavin, phosphorus and vitamin C. Use of hibiscus can help strengthen and improve the condition of hair cuticle and boost shine.

Keyword: Human hair, growth cycle, hair nutrition, hair strength, rice water, hibiscus.

I. INTRODUCTION

1.1 HUMAN HAIR

Human hair has about 65-95% of its weight in proteins, more 32% of water, lipid pigments and other components. Chemically, about 80% of human hair is formed by a protein known as keratin, with a high grade of sulfur. Keratin is a laminated complex formed by different structures, which gives the hair strength, flexibility, durability, and functionality (1) . The physicochemical properties and shape of the hair is the direct result of the organization of its various structural elements, proteins being the most significant. Hair shape is defined in the hair follicle: large hair follicles produce "terminal" hairs (scalp), small follicles produce fine "vellus" hairs (body hair), curved follicles produce curly hair in all ethnicities (2).

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USES OF ONION (Allium cepa L.) & ALOE VERA (Aloe barbadensis Miller) POST HAIR DYE TREATMENT

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Lakshya H. Udasi
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Abstract

Human hair is composed of proteins, lipids, water, melanin and it presents three principal components i.e., cuticle, cortex and medulla. The different stages of hair growth are anagen, catagen and telogen phases. Hair growth can be affected by the use of certain hair dyes and may cause hair damage too. In present work, we have studied the hair protecting effect of Onion and Aloe vera which can possibly be used to prevent the hair from getting damaged by various hair dyes. This article highlights the human hair and its growth cycle and brief information about the chemical constituents and properties related to the hair protectants.

Key Words

Human Hair, Hair dye, Hair Care, Keratin, Onion, Aloe vera, Disulphide Bond, Oxidising agent.

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USES OF ONION (*Allium cepa L.*) & ALOE VERA (*Aloe barbadensis Miller*) POST HAIR DYE TREATMENT

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***Abstract*:** Human hair is composed of proteins, lipids, water, melanin and it presents three principal components i.e., cuticle, cortex and medulla. The different stages of hair growth are anagen, catagen and telogen phases. Hair growth can be affected by the use of certain hair dyes and may cause hair damage too. In present work, we have studied the hair protecting effect of Onion and Aloe vera which can possibly be used to prevent the hair from getting damaged by various hair dyes. This article highlights the human hair and its growth cycle and brief information about the chemical constituents and properties related to the hair protectants.

***IndexTerms*:** Human Hair, Hair dye, Hair Care, Keratin, Onion, Aloe vera, Disulphide Bond, Oxidising agent.

I. INTRODUCTION

1.1 HUMAN HAIR

The human hair is composed of protein, lipid, water, melanin and trace elements. The main constituents of hair are of α-keratin, a group of proteins which account for 65%-95% of hair weight. It is responsible for conferring mechanical properties such as elasticity, shape, strength and functionality (1).

The human hair presents three principal components: cuticle, cortex and medulla which are respectively from outside to inside. The cuticle is composed of protein material and amorphous, and it is located in the outer portion of the hair fibre and consists of enucleate cells, translucent and flattened. Morphologically, the cuticle is composed of 6 to 8 cell layers overlapped in the longitudinal direction of the fibre. The overlapping cell adherence provides the physical properties of hair with reflection light and reduces the friction between the fibres being responsible for the properties of gloss and combing, respectively. Cosmetic treatments, such as conditioners, hair sprays, mousses and gels, alter the properties mentioned above because they are deposited on the cuticle layer. However, dyes and straightening products due to the alkaline pH of the cuticle open up the layers for the active principles or dyes penetrate and act in the cortex, reducing the size or altering the colour of hair. The cortex is a major constituent of the hair fibre (75%). Cortical cells are subdivided into macrofibrils formed per material interfilamentar amorphous rich sulphur and microfibrils arranged in α-helix, consisting of four protofibrils, and these two protofilaments, dimers possessing two α-keratin subunits. The α-keratin presented in the microfibrils determines the mechanical properties of fibre, such as strength and elasticity. In the same way as the cuticle, it has cells filled by cross links of cystine and others cells separated by the cell membrane complex (CMC). The medulla is a thin cylindrical layer at the centre of the hair thread may or may not be present; it is presented only in terminal hair and its role is not clearly defined (1) (2) (3).

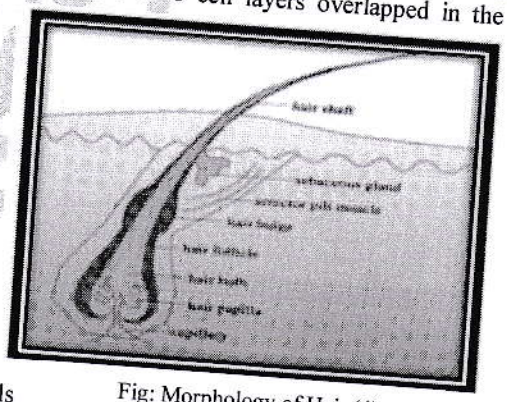

Fig: Morphology of Hair (4)

Hair is an annex of the epidermis and covers the external tissues of most mammal. It is also considered an adornment. It works as a thermal regulator and protects the head and the skin from the sun due to the presence of melanin (4). Humans have between 90 and 150 thousand of hair fibres on the scalp that grow 1 cm/month (0.37 mm/day), and the normal amount of hair lost is between 50 and 100 fibres per day. The hair diameter varies from 15 to 110 µm, depending on the race (5). Caucasian hair is usually thin and fine, may have waves, and is circular under the cross-section view (ellipticity of 1.25). The African hair type (wavy to curly) has a larger diameter, with a slightly oval cross-section (ellipticity of 1.75). Lastly, Mongolian hair also has a larger diameter but varies from flat to wavy with a cross-section similar to Caucasian hair (ellipticity of 1.35) (6) (7).

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Article Detail

Synthesis and Investigation of Antibacterial, Antimycobacterial Activity and Cytotoxicity Study of Sparfloxacin Derivatives

Author: GULSHAN GURUNANI, KAPIL AGRAWAL, SHEELPRIYA WALDE, ABHAY ITTADWAR

Abstract: Based on earlier pieces of evidence of N-piperazinyl fluoroquinolone, and in search of new bioactive molecules from the fluoroquinolone class, the derivates of N-substituted piperazinyl quinolones were synthesized. A series of 2-((amino-1,3,4-thiadiazol-2yl)thio)-1-(4-subst.) (3a–j) were used for diazotization of amines in concentrated hydrochloric acid in the presence of Cu-powder, resulting into 2-((5-chloro-1, 3, 4-thiadiazol- 2yl)thio)-1-(4-subst.)ethanone (4a-j). The reaction of (4a-j) with piperazinyl quinolone in dimethylformamide resulted (5a-j). The structure of synthesized compounds was confirmed by their spectral analysis. The compounds are screened against Staphylococcus aureus, Bacillus subtilis(Gram positive)and Escherichia coli, Pseudomonas aeruginosa,(Gram negative) and mycobacterium tuberculosis. The findings revealed moderate activity against Gram-positiveand poorly active against Gram-negative bacteria. Results indicated that halogenated analogs with nitro substitution (5b, 5e, and 5j) derivatives revealed antibacterial and antimycobacterial activity. The results advocate the need for further exploration of such derivatives, coupled with their preclinical and clinical investigation.

Keyword: 2-amino-benzoylthio-1, 3, 4-thiadiazole, Fluoroquinolone, N-piperazinyl quinolone, Sparfloxacin, synthesis, antibacterial activity

DOI: https://doi.org/10.31838/ijpr/2021.13.02.492

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A Review of Murraya koenigii (Curry Tree) which act as a Multiskilled Medicinal Plant with Various Medicinal Properties

Rashmi Zade Nasare, Sheelpriya Walde, Suhas Padmane

Abstract

Medicinal plants are used in herbalism. They form the easily available source of healthcare purposes in rural and tribal areas. World's about 80% population relies upon herbal products because they have been considered safe, effective, and economical. This review article describes the medicinal importance of the medicinal plant Murraya koenigii. It should be used to cure the symptoms of variety of diseases.

Keywords

Chemical constituents, curry tree, medicinal plant, medicinal property, pharmacological activity

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NATURAL PRODUCTS IN ANTICANCER THERAPY

Mr.Chandrashekhar Bhojraj Badwaik, Gurunanak College of pharmacy Nagpur,MAHARASHTRA

Dr.Suhas padmane,Dr.Sheelpriya Walde, Mr.Sharad Manapure. Gurunanak college of pharmacy Nagpur, Maharashtra

Submitted: 15-04-2021 Revised: 28-04-2021 Accepted: 30-04-2021

ABSTRACT: An attempt has been made to review some medicinal plants used for the prevention and treatment of cancer. Plant derived compounds have played an important role in the development of several clinically useful anticancer agents. Cancer is a major health problem in both developed and developing countries. Cancer is the second leading cause of death after cardiovascular disease. Due to high death rate associated with cancer and serious side effects of chemotherapy and radiation therapy, many cancer patients seek alternative and/or complementary methods of treatment. India, which are being used traditionally for the prevention and treatment of cancer.

Keywords: Medicinal plants, Cancer, Chemotherapeutic, MAO,Phytochemicals.

I. CANCER

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body.(1)

Anticancer Drug

The Drug that are used in inhabiting the abnormal cell growth or killing the cancer cells.
It is also called as Antineoplastic Drug.(2)

MODE OF ACTION OF NATURAL ANTICANCER DRUGS

Block nucleic acid (DNA, RNA) Biosynthesis.

⇩

Directly Destroy DNA and RNA and inhabit the reproduction.

⇩

Interfere transcription and block DNA Synthesis.

⇩

Interfere protein synthesis and function.

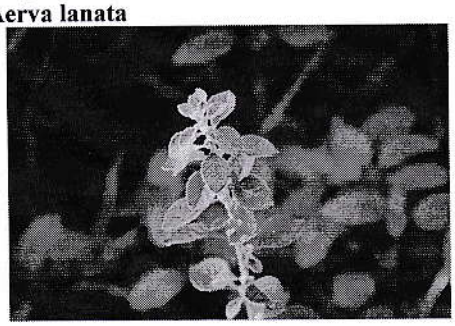
⇩

Influence harmone homeostatis.(3)

Recent Advance Of Natural Anticancer Agents

1. Natural agents have low toxicology.
2. The MOA of recent natural agents are.
Acts on DNA bases
Intercalation of DNA
Induction of Apoptosis
3. Many new species are investigated to find out new agents for treatment of cancer
4. produce good therapeutic agents with low toxicity.

1. Aerva lanata



B.source : Aerva lanata L.
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Cellulose Microcrystalline Beads As An Exfoliating Agent

Adiba Khan[1], Sudipa Bose[1], Urja Chopkar[1], Pritam Wath[1], Ahtesham Khan[1], Dr. Mitali Bodhankar[1]

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Corresponding Author: Adiba Khan

Date Of Submission: 05-06-2021 Date Of Acceptance: 20-06-2021

ABSTRACT: Powder exfoliants are incredibly gentle. When mixed with water, these finely-milled powders transform into a luxurious paste or lather that removes impurities and smooths skin - without scratching its surface. In addition to physical exfoliants like oat and rice flour, many also include naturally-derived Alpha hydoxy acids and Beta hydroxy acids.

Apricot and fruit kernels Scrub, has been used for decades by those hoping to reduce breakouts, slough off dead skin or to just get that after-scrub glow. But as consumers have become better educated about their skin, there has been increasing awareness of the risks of using products that contain such ingredients. Apricot Scrub caused harm to consumer's skin through over-abrasion while encouraging the onset of acne, wrinkles, inflammation and loss of moisture.

The present invention relates to cellulose particles with measurable exfoliation properties in a cosmetic composition, and uses thereof in the cosmetic field (1).

To overcome the onset of acne, wrinkles, inflammation and loss of moisture because of Apricot and fruit kernels we can use cellulose microcrystalline beads.

It also contains advantages like to exfoliate during cleansing of the skin or scalp of the body and to exfoliate part of body skin or scalp without rinsing out.

KEYWORDS: Cosmetics, Exfoliation, Inflammation, Microcrystalline

I. INTRODUCTION

Pharmaceutical Powders are intimate mixtures of dry, finely divided drugs and/or chemicals that may be intended for internal (Oral Powders) or external (topical or dusting powder) use. (2)

Powders represent one of the oldest dosage forms. It is a preparation in which a drug is blended with other powdered substances and used for internal or external purpose.

A good Powder formulation has a uniform particle size distribution.

Exfoliation is a cosmetic technique aimed at improving skin appearance by removing dead skin cells from the surface of the skin (3).

The skin of the human body self-renews continuously by eliminating the upper, external, layers and generating new internal layers from the basal layer. Desquamation normally occurs invisibly with shedding of dead cells resulting from desquamation. During natural desquamation process, the skin can shed spontaneously 30,000 to 40,000 dead cells per minute. However, disturbances in this process result in the accumulation on the skin surface of only partially detached cells with or without a concomitant thickening of the stratum corneum. Such cells and debris accumulation on the skin surface is generally combined with a feeling of roughness and dryness of the skin surface and may lead to flaky skin, less soft and smooth, non-uniform skin colour, etc.

Exfoliation of dead cells and debris from the epidermis is a well-known cosmetic process that generates abrasive tensions on skin surface, thereby removing dead cells and promoting regeneration of the epidermal tissue. Additional potential benefits to exfoliation are improved skin cleansing by helping to mechanically remove dirt and oil from the skin, reduction in bacteria on the skin and increased blood flow to the skin due to the mechanical stimulation. Exfoliation can be accomplished by the use of natural sponge or rag, or exfoliating compositions.

Exfoliating seems like a relatively self-explanatory process—you grab your scrub and facial brush and get to work (4).

Cellulose particles can be used as exfoliating agents. We can use this ingredient and can also sell this product in market. Because of its remarkable benefits, it can be great product in market.

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E marketing in pharmaceutical sector

Dipti Masram , Pratiksha Bramhe, Shivam Bhelau, Roshni Bhalekar
Mrs.Bindu Jacob., Dr. Mitali bodhankar
Student, rashtrasant tukdoji maharaj Nagpur university.
(associate professor Gurunanak college of pharmacy Nagpur)

Date Of Submission: 05-06-2021 Date Of Acceptance: 20-06-2021

ABSTRACT-. the objective of the study is to examine and analyse present scenario of online pharmacies and govt. role in this perspective. Digital has already transformed the pharma and healthcare industry in many ways such as greater levels of transparency, patient communication and drug development. In addition due to its unrivalled cost effectiveness, digital marketing strategies offer a variety of meaningful ways to connect and treat *prospective clients and customers*

Keywords- digital marketing, pharmaceutical marketing, social media, digital marketing stratergies, e pharma, online pharmacy.

I. INTRODUCTION –

what is e marketing-?

E-marketing is a process of planning and executing the conception, distribution, promotion, and pricing of products and services in a computerized, networked environment, such as the Internet and the World Wide Web, to facilitate exchanges and satisfy customer demands.

Digital marketing is the component of marketing that utilizes internet and online based digital technologies such as desktop computers,

DIGITAL MARKETING IN INDIAN PHARMACEUTICAL INDUSTRY

Digital marketing is the developmental stage in Indian pharmaceutical industry. Pharmaceutical companies are using technology-based services, helping patients learn more about their conditions and helping them monitor their health. It may also be useful to give the physicians an insight into the health of the patient, any side effects for any particular product. These digital services also make it easier for doctors to communicate their message to patients with ease on certain health conditions. Digital marketing has clearly simplified advertising, awareness campaign organization, and mass reach at low cost and efficient methodologies. The use of medical pharmaceuticals is worldwide dependent. Cardiovascular disorders and hypertension are at a peak in the developed nations. Although, infectious diseases such as tuberculosis typhoid, and some other diseases are prevalent in developing countries. Pharmaceutical-based companies are

working hard to keep up with developments that digital technology has brought in. In recent years, the use of digital marketing in this field has

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Use of D- Limonene as an Alternative to Acetone in Nail Polish Remover

Kanchan Kuralkar[1], Kalyani Thakre[1], Harshali Chonde[1], Divya Atram[1], Pratiksha Deulkar[1], Dr. Mitali Bodhankar[1]
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Corresponding Author: Kanchan Kuralkar

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ABSTRACT
Nail polish remover are organic solvents that break down and dissolve the polish ,thus removes it from nail plate. Nail polish remover generally contain acetone which is very harmful to skin, such as drying out nails, leaving white residues on nails, it strips off nails, their oil and dries them out, nails become brittle and prone to peeling and splitting, therefore the development of alternative to acetone in nail polish remover is necessary.
D-limonene is a chemical found in the rind of citrus [illegible]

several hours (3).Consumption of chemical such as acetone and GBL may lead to a worrisome clinical presentation initially, with vomiting, coma, and Cardiorespiratory demise (1, 4).

D-Limonene has been produced since 1995 and has been used as a flavor and fragrance additive in cleaning and cosmetic products, food, beverages, and pharmaceuticals. It is also increasingly used as a solvent (5). The dextrorotatory isomer(+)-limonene (or d-limonene) [illegible]

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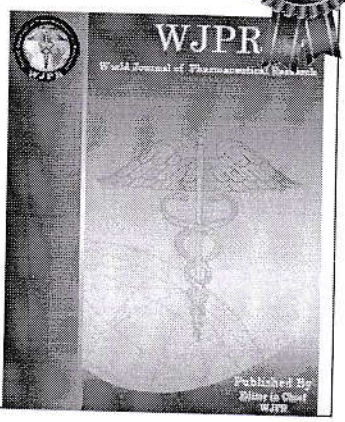

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REVIEW ARTICLE: SLS AND PARABEN FREE HAIR CLEANSER

Gaikwad Renuka*, Harode Prajakta, Bhajikhaye Pratiksha, Dubey Yash, Wankhede Yogita and Dr. Mitali Bodhankar

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ABSTRACT

Sulfate free shampoos are the cosmetic preparations that with the use of Traditional ayurvedic herbs are meant for Cleansing the hair and scalp just like the Regular shampoo. They are used for removal of oils, dandruff, dirt, environmental pollution etc. Shampoo occupies a prominent and very important place among the Products available today. Due to the increasing awareness and importance of Cleanliness and healthiness of hair, the use of "sulphate free shampoo" is increasing Every day. Earlier the Use of herbal shampoo was confined to the upper and upper Middle classes of urban society, but with increasing awareness the Use of herbal shampoos has become well established in even rural households. Sulphate free Shampoos can keep the hair clean, nurtured and meet the need of stronger, softer And shinier hair. They are also Perceived as helping to maintain the colour of dyed Hair. We offer an array of sulphate alternatives to meet the increasing Consumer Demand for sulphate-free option.[8]

INTRODUCTION

The hair care sector is probably one of the largest sales units amongst the cosmetics. Shampoos are used to cleanse the hair and the scalp. Today the cosmetic market has become

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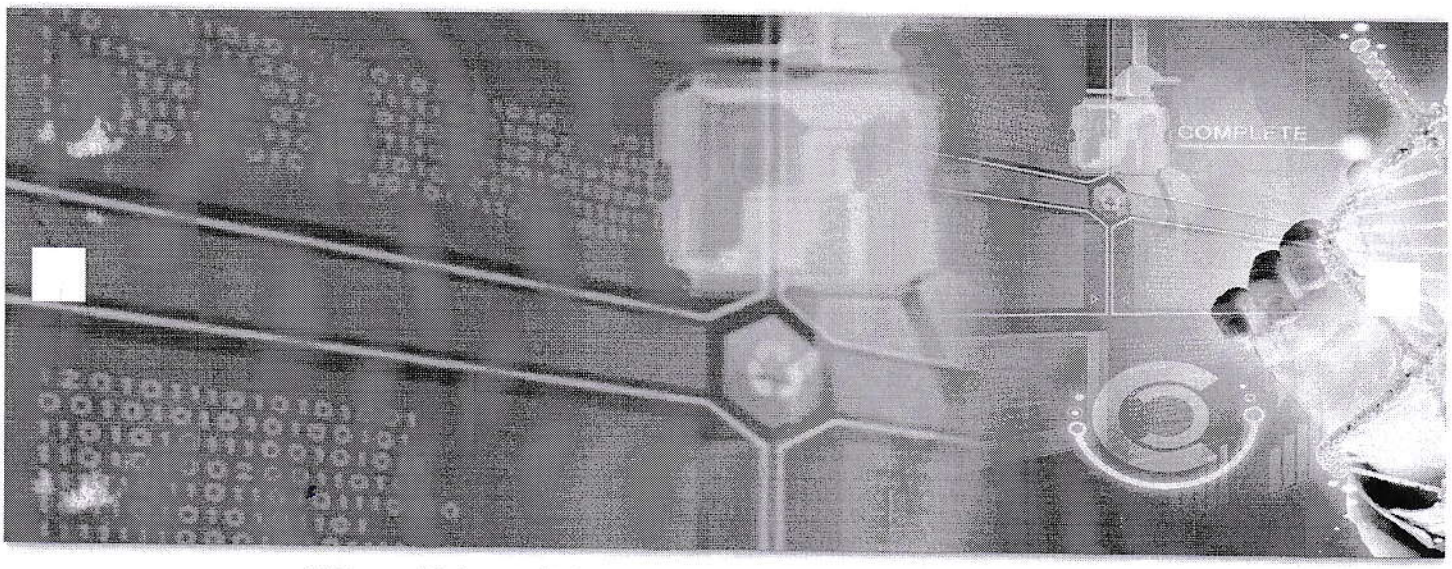

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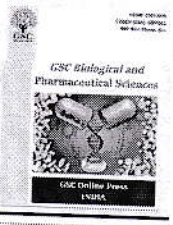

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Dried serum powder and sheet mask for anti-aging purposes

Sumbul Fatma Hasan Khan *, Shrutika Sanjay Bawankar, Sana Parveen Moin Shaikh, Gaurav Suryanarayan Sharma, Gaurav Chhotelal Jaiswal and Mitali Milind Bodhankar

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Abstract

Wrinkles are one of the most common skin problems which are a natural part of the aging process. A lot of claims are made about how to make wrinkles go away. Some methods can be painful or even dangerous. To overcome these problems we can use anti-aging sheet mask which is the latest and easiest method to get rid from wrinkles.

Sheet masks are face-shaped sheet fabrics soaked in nutrition-packed solution called serum. The sheet is made up of variety of materials including papers, fibers or gel types. It is observed that sheet masks are super simple and hassle-free.

There are several disadvantages of conventional sheet mask like there shelf life is less and some of them may prone to oxidative decay. To overcome this problem powdered form serum is suggested. By using ingredients in powdered serum, the shelf life of the product can be increased. In serum powder, packaging products can be stored again once the packaging has been opened, with the help of a re-closable container; products remain as fresh as ever.

By using the dried serum Powder with compressed sheet mask tablet instead of conventional serum sheet mask for Anti-aging purpose we can increase the shelf life of product and there will be little or no need of preservatives. Dried serum powder can be given in a re-closable container by which the product can be reused so there will be no wastage of serum.

Keywords: Dried serum powder; Serum sheet mask; compressed sheet mask; Anti-aging sheet mask

1. Introduction

The skin is one of the largest organs and constitutes 16% of the human body weight. It weighs around 5 kgs and covers an area of about 2 square meters. It is one of the tissues in our body that duplicates the most and the fastest. The skin has three main functions: protection, regulation and sensation [1]. There is hundreds of skin condition that affects you. Skin disorders vary greatly in symptoms and severity. They can be temporary and permanent and may be painless and painful. Some have situational causes, whiles others may be genetics. Some skin conditions are minors and others can be life threatening [2]. Over time, skin begins to wrinkle. Things in the environment, like ultraviolet (UV) light from the sun; can make the skin less elastic. Gravity can cause skin to sag and wrinkle. Certain habits, like smoking, also can wrinkle the skin.

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RESEARCH ARTICLE JPAR 2021

Solid Lipid Nanoparticle: A Novel Lipid Based System of Coenzyme Q10 for Skin Enrichment

Pallavi K. Urade*, Mitali M. Bodhankar

Department of Pharmaceutics, Gurunanak College of Pharmacy, Nagpur – 440026, Maharashtra, India.

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ABSTRACT: Background: Coenzyme Q10 is a fat soluble vitamin-like substance. It has antioxidant properties. The antioxidant role of CoQ10 as a free radical scavenger was widely studied. **Aim:** The study was aimed to develop Solid Lipid Nanoparticle (SLNs), a novel lipid based system of coenzyme Q10 for skin enrichment. **Method:** Coenzyme Q10 SLNs were prepared from solvent evaporation method containing Glyceryl monostearate as lipid carrier, Span 80 as surfactant, Tween 80 as co-surfactant and acetone, chloroform and dichloromethane as organic solvents. The drug and excipient compatibility was confirmed by FTIR study. The developed SLN formulations were evaluated for particle size, zeta potential, DSC, total drug content, entrapment efficiency, *in vitro* dissolution and stability studies. **Result:** SLN formulation batch F5 was considered as the overall best formulation as it showed highest *in vitro* drug release and also shows good anti-wrinkle property. Short term stability studies revealed that the optimized formulation was stable as there was no significant change occurring in drug content. **Conclusion:** Solid lipid nanoparticle F5 containing the drug and carrier in the ratio of 1:5, is the best optimized formulation as it possesses maximum encapsulation efficiency and shows good anti-aging property as compared to other formulations.

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Keywords: Solid Lipid Nanoparticle, Coenzyme Q10, Lipid based system, Nanostructured Lipid Carrier, Active Pharmaceutical Ingredient, Drug Delivery System.

INTRODUCTION:

Coenzyme Q10, a vitamin-like substance with a yellow-coloured crystalline powder form and the melting point of 49 °C, is widely biosynthesized in living organisms such as plants and animals [1]. It has been found in virtually all cells of the human body, including the heart, liver and skeletal muscles [2]. Initially, it became a popular supplement due to participation in two major physiological activities: as a mitochondrial electron-transporter in the high-energy metabolic pathways of liver cells and other cells of the body and as an antioxidant against free radicals and lipid peroxidation [3-4]. Recently, Co Q10, as a cutaneous antioxidant and

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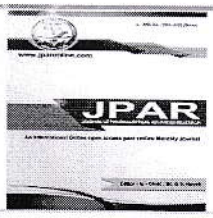

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Identification of Potential Flavonoid Inhibitors of the SARS-CoV-2 Main Protease 6YNQ: A Molecular Docking Study

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Identification of Potential Flavonoid Inhibitors of the SARS-CoV-2 Main Protease 6YNQ: A Molecular Docking Study

SUMIT Arora[a*], GOVIND Lohiya[b], KESHAV Moharir[b], SAPAN Shah[c], SUBHASH Yende[d]

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Flavonoids

*Corresponding author: SUMIT Arora, Assistant Professor. Research direction: natural product research and computational studies.
E-mail: sumitkishanarora@gmail.com.
Peer review under the responsibility of Hunan University of Chinese Medicine.

ABSTRACT

Objective Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent for coronavirus disease 2019 (COVID-19), is responsible for the recent global pandemic. As there are no effective drugs or vaccines available for SARS-CoV-2, we investigated the potential of flavonoids against SARS-CoV-2 main protease 6YNQ.

Methods *In silico* molecular simulation study against SARS-CoV-2 main protease 6YNQ.

Results Among the 21 selected flavonoids, rutin demonstrated the highest binding energy (– 8.7 kcal/mol) and displayed perfect binding with the catalytic sites.

Conclusions Our study demonstrates the inhibitory potential of flavonoids against SARS-CoV-2 main protease 6YNQ. These computational simulation studies support the hypothesis that flavonoids might be helpful for the treatment of COVID-19.

DOI: 10.1016/j.dcmed.2020.12.003
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1 Introduction

The unprecedented coronavirus disease 2019 (COVID-19) outbreak has had a critical impact on countries across the globe and on people from every world has recorded 1 111 998 deaths due to COVID-19 and more than 39 944 882 confirmed cases [1]. The causative agent of COVID-19, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), belongs to the β-coronavirus group. Antiviral drugs can target diverse phases of viral infection. In the case of SARS-CoV-2, both structural and nonstructural proteins

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SYNTHESIS AND EVALUATION OF TASTE-MASKED IONIC LIQUID SALTS OF LORATADINE

PRADNYA GONDANE, NIDHI P. SAPKAL, NIDHI JAISWAL

71-79

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A MASS COMPATIBLE UPLC METHOD FOR THE QUANTIFICATION OF IMPURITIES IN FLUTICASONE PROPIONATE NASAL SPRAY

MUGADA RAVI PRASADA RAO, RAMA KRISHNA THOTA, MAHIBALAN SENTHI, PAUL MOGADATI, SRINIVAS ARUTLA

80-87

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10.22159/ijpps.2020v12i11.38750

A CROSS-SECTIONAL OBSERVATIONAL STUDY ON MISCONCEPTIONS ABOUT DIABETES AND RISK OF HYPOGLYCEMIA WITH CONCURRENT USE OF NATURAL HERBS/HERBAL PRODUCTS

A. SRINIVASAN, JITTA MARY JOSE, MEGHA K. BAIJU, SMRITI SURESH GEORGE

88-93

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10.22159/ijpps.2020v12i11.36221

DEVELOPMENT AND VALIDATION OF STABILITY INDICATING RP-UPLC METHOD FOR THE QUANTIFICATION OF BALOXAVIR MARBOXIL IN TABLET FORMULATION

T. VENKATA RAVEENDRANATH, R. T. SARAVANAKUMAR, C. H. K. V. L. S. N. ANJANA

94-99

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FORTIFIED DADIH (FERMENTED BUFFALO MILK) WITH VITAMIN D3 IMPROVES INTERLEUKIN-6 AND CAECUM SHORT CHAIN FATTY ACIDS ON DIET-INDUCED OBESE RAT

SARI BEMA RAMDIKA, ENDANG MAHATI, ANANG MOHAMAD LEGOWO, MUFLIHATUL MUNIROH, YORA NINDITA, DIANA NUR AFIFAH

100-105

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Original Article

SYNTHESIS AND EVALUATION OF TASTE-MASKED IONIC LIQUID SALTS OF LORATADINE

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ABSTRACT

Objective: To synthesize and evaluate taste-masked ionic liquid (IL) salts of loratadine.

Methods: In the present work, pharmaceutically active IL salts of loratadine using selected counter-ions were synthesized. The synthesized IL salts were characterized using melting point, Ultraviolet (UV) spectroscopy, Fourier Transform Infra-Red (FTIR) spectroscopy, Differential Scanning Calorimetry (DSC), and X-ray Diffraction (XRD). These salts were also evaluated for solubility, dissolution, and palatability studies.

Results: All synthesized IL salts of loratadine exhibited melting points below 100 °C. UV spectral data and FTIR data confirmed the formation of new salt forms with selected counter-ions. The absence of sharp melting point peaks during DSC studies revealed the amorphous nature of new salt forms. During XRD studies, loratadine-indomethacin IL salt yields completely amorphous compound while the intensity of characteristic peaks of loratadine was found to be reduced with other counter-ions. Solubility studies revealed that the solubility of loratadine is reduced from 35.85 mg/ml to 3.63 mg/ml, 15.39 mg/ml, 5.31 mg/ml, and 3.71 mg/ml in case of IL-1, IL-2, IL-3, and IL-4, respectively. Dissolution studies further confirmed this finding. Except for oleate, all the IL salts were found to be palatable by subjects with the score ranging from 2.5 to 2.8, which is the standard range for palatability.

Conclusion: Results obtained in the present work indicated that IL salts of loratadine can be synthesized successfully using selected counter-ions. This approach can be used to mask the bitter taste of pure loratadine and thus can be used for the development of drug products intended for children.

Keywords: IL salts, Loratadine, Counter-ions, Taste masking

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INTRODUCTION

Ionic liquid (IL) salts are a new class of purely ionic, salts of compounds that have very low melting points. Many times they exist in the liquid state at room temperature. By the official definition, "Ionic liquids (IL) are ionic compounds that are liquid below 100 °C". At room temperature, such compounds appear either like liquids or fused or soft solids [1-3]. Although ionic in nature but the properties of IL salts differ from typical inorganic salts. In the IL salts, the charges are not confined/localized to one particular area in the molecule; rather, they are distributed over a large volume. Due to this, the intensity of charge in a localized area reduces and crystal packing becomes loose. This is the reason for the low melting points of IL salts. Typical inorganic salts, on the other hand, have symmetrical packing in their crystal structure and charges are well localized [4]. These IL salts have additional properties like non-flammable [1], thermally, mechanically, and electrochemically stable [5, 6], etc. Due to such unique properties of IL salts, these are used as solvents in synthesis and separation of organic compounds [1, 7-9], as thermal fluids [10], lubricants [10], electrolytes [10], electro-elastic materials [11], etc.

In pharmaceutical sciences also, ILs are used to facilitate synthesis and analysis of active pharmaceutical ingredients (APIs). Some researchers have used the concept of IL for synthesizing novel ionic salts of existing medicinal compounds to overcome the difficulties associated with them [12]. When combined with suitable counter-active/inactive ions, the IL salts of APIs may yield compounds with improved solubility, stability, bioavailability, palatability, and therapeutic activity [13]. When IL salts are prepared using two APIs, it has dual therapeutic activity and thus forms a very useful alternative for fixed-dose combination drugs [14].

Loratadine is Ethyl-4-(8-chloro-5, 6-dihydrobenzo [1, 2] cyclohepta [2,4-b] pyridine-11-ylidene) piperidine-1-carboxylate, second-generation antihistaminic drug. It is widely prescribed to patients of all age groups for the treatment of symptoms of rhinitis and other allergies. It is prescribed alone or in combination with nasal decongestants, analgesics or anti-inflammatory agents [15]. It is available in the form of tablets, chewable tablets, orally disintegrating tablets, oral solutions [16], and oral suspensions [17]. Being very bitter in nature, patient acceptability of its dispersible, orally disintegrating, and liquid dosage forms is very poor [18, 19].

In the present work, an attempt has been made to synthesize taste-masked IL salts of Loratadine to improve its palatability issues. Both inactive and active counter-ions were used to synthesize IL salts. The IL salts were characterized using melting points, Ultra Violet (UV) spectroscopy, Infra-Red (IR) spectroscopy, X-ray diffractometry (XRD) and differential scanning calorimetry (DSC). The IL salts were also evaluated for their dissolution profile and palatability and compared with the existing Loratadine hydrochloride salt.

MATERIALS AND METHODS

Material

Loratadine, oleic acid, salicylic acid, indomethacin, and diclofenac sodium were gifted generously by Zim Laboratories Ltd., Kalmeshwar, Nagpur. All other reagents and solvents used were of analytical grade.

Preparation of IL salts

Loratadine and selected counter-ion were mixed in the ratio mentioned in table 1 by continuous stirring in ethanol in a water bath for 10 min at 70-80 °C [20]. The resultant IL salt was collected by evaporating solvent at room temperature in airtight vials and stored at ambient condition till further characterization and evaluation. For convenience, all IL salts were given a code mentioned in table 1.

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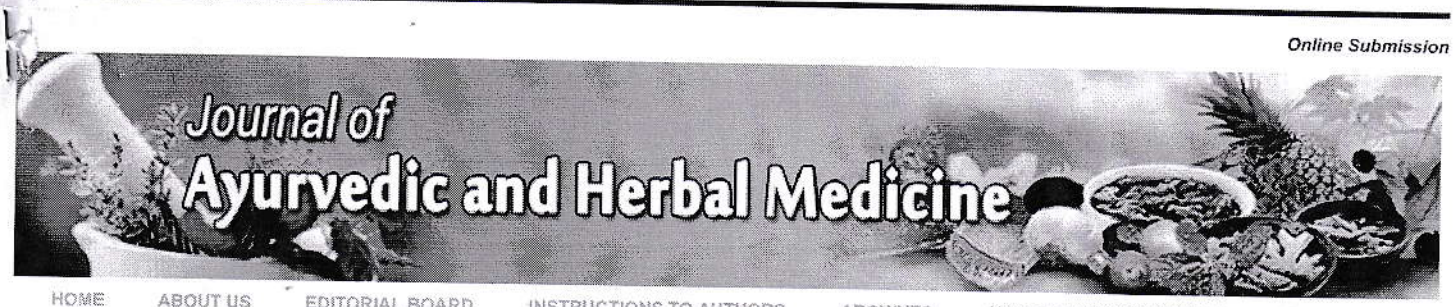

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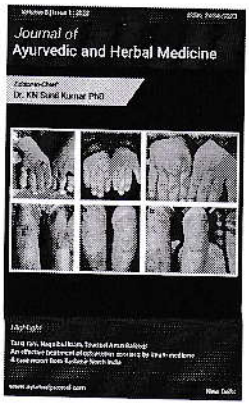

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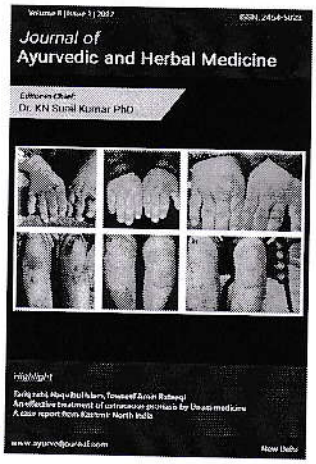

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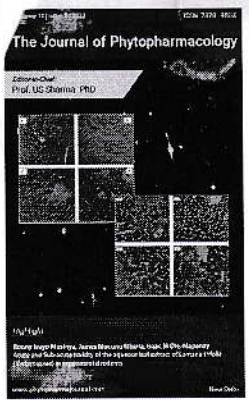

RESEARCH ARTICLE

11 **Screening of Punica granatum extract for antimicrobial activity against oral microorganisms**
Meera Avadhani, Meena Anand Kukkamalla, Kishore.G Bhatt
J. Ayu. Herb. Med., 2020;6(2):73-77 **DOI:** 10.31254/jahm.2020.6211
[Abstract] [HTML Full text] [PDF 364 KB]

12 **Pharmaceutical and Analytical Standardization of Medopachak Vati**
Sayali Joglekar- Joshi, Sarang Deshpande
J. Ayu. Herb. Med., 2020;6(2):78-80 **DOI:** 10.31254/jahm.2020.6212
[Abstract] [HTML Full text] [PDF 274 KB]

REVIEW ARTICLE

13 ***Bauhinia purpurea*: An Updated Pharmacological Profile**
Sumit K. Arora, Maviya Hussain, Subhash R. Yende, Keshav Moharir, Vipinchandra pande, Abhay Ittadwar
J. Ayu. Herb. Med., 2020;6(2):81-85 **DOI:** 10.31254/jahm.2020.6213
[Abstract] [HTML Full text] [PDF 345 KB]

14 **Conceptual study of Vishnukranti Kalka in the management of Parinama shula**
H G S P Hewageegana
J. Ayu. Herb. Med., 2020;6(2):86-89 **DOI:** 10.31254/jahm.2020.6214
[Abstract] [HTML Full text] [PDF 296 KB]

15 **Ayurveda and its Medicinal Plants: Halting the Surge of COVID-19**
Rohit Singh, Shreshtha Kaushik, Robin Badal, Smrutimayee Sahoo
J. Ayu. Herb. Med., 2020;6(2):90-99 **DOI:** 10.31254/jahm.2020.6215
[Abstract] [HTML Full text] [PDF 472 KB]

16 **Potentiality and possibility of Medicinal Plants on Ayurvedic Principle in prevention and treatment of COVID-19**
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J. Ayu. Herb. Med., 2020;6(2):100-107 **DOI:** 10.31254/jahm.2020.6216
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Bauhinia purpurea: An Updated Pharmacological Profile

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ABSTRACT

Bauhinia purpurea (B. purpurea) (family: Fabaceae) commonly called as butter fly tree has vast medicinal uses and remarkable pharmacological potential. Various phytoconstituents, extracts and parts of this plant were possess significant pharmacological activities such as cardiac activity, antifungal, wound healing, antidiabetic, antiulcer, antioxidant, antinociceptive, hepatoprotective, nephroprotective, antidiarrhoeal, anti-inflammatory, antipyretic, analgesic, antimalarial, gastro protective and cytoprotective activity. The present study emphasizes the overview of recent studies and/or updates on pharmacological potential of *B. purpurea*.

Keywords: *Bauhinia purpurea*, Taxonomy, Pharmacological.

INTRODUCTION

Medicinal plants are very beneficial and important aspect of indigenous healthcare system in India. In recent years, ayurvedic systems of medicine with special emphasis on bioactive compounds are of global importance. A large population depends on Herbal medicine to meet their primary health requirements which in turn enhances the research on medicinal plants. Although modern medicines are available but plant products are preferred over them due to lesser side effects As stated in various reports, large number of people relies on traditional medicinal system [1]. Amongst them is Bauhinia purpurea (*B. Purpurea)* which is a well known plant with versatile therapeutic potential. It belongs to family Caesalpiniaceae. Bauhinia is a genus having greater than 200 species, and about 15 species were occurring in India. Some of them are shrubs or trees, while a few are climbers. Familiar name are Butterfly tree in English, purple orchid shrub, purple *Bauhinia*, Kaniar in Hindi, Devakanchan in Kannada, Raktachandan in Marathi [2].

PLANT DESCRIPTION

B. purpurea is a small tropical evergreen tree or erect shrub grows up to 17 feet tall. The leaves are bilobed at the base and apex, alternate, broad, rounded and 10 to 20 cm long. The flowers are pink and fragnant, with five petals (Fig. 1). The fruits are a pod 30 cm long, containing 12 to 16 seeds and appear in the month of December [3]. *B. Purpurea* is native to China and found throughout India. It is Indigenous to Southern Asia, South-Eastern Asia and widely distributed throughout the world and common in Himalayan, Sub-Himalayan and western track of India [4]. The whole plant or part of plant has wide medicinal uses. Flowers and Flower buds are edible, cooked and used as vegetable. The flowers are laxative, mixture of flower buds and flowers, fried in purified butter are beneficial to treat dysentery. Also, Pushpa Gulakanda (flower jam) is valuable in constipation [5]. Bark is useful in dyeing, tanning industry, to obtain fibers and as a source of tannins. Stem bark are useful in respiratory disorder and menstruation trouble [6]. Roots are used in haemorrhoids, goitre and as carminative [7]. This plant is useful in treatment of various diseases like diarrhea, dysentery, amoebic dysentery, ano-rectal, piles, lymph nodes swelling, lymph node enlargement, inflammatory swelling and hemorrhage-bleeding, cold and cough, disorders related to urinary system and skin disease. Also, Plant essence contains astringent, cooling and pungent properties [8].

B. purpurea reported for the presence of various phytochemical constituents. It contain glycosides, saponin, phenolic compounds, tannins, flavonoids, [illegible], fixed oils, fats, proteins, flavones glycoside, fatty acid.

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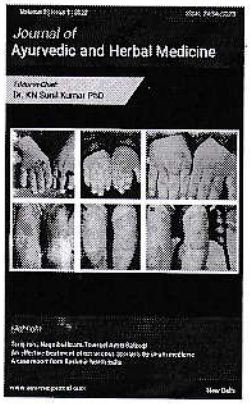

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Short Communication

Histological study, phytochemical screening and TLC studies of *Sesbania grandiflora*

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Abstract

Sesbania grandiflora (S. grandiflora), folklore medicinal plant is used in various parts of world. Leaves were used as alexeteric, for epilepsy, nyctalopia, gout, anthelmintic, itch, leprosy and ophthalmia. The plant possesses various therapeutic properties such as antiphlogistic, mildly laxative, anthelmintic, odontalgic properties and antirheumatic. The flowers were used as aperitif and refrigerant, for bronchitis, biliousness (abhorrence), gout, nyctalopia (night blindness), ozoena and quartan fever. Roots and barks were used in inflammation and as astringent respectively. In the present investigation phytochemical screening, histological examination and thin layer chromatographic identification of bark and extracts has been studied extensively and provided diagnostic key to spot adulterant. It is concluded that our research data helps to isolate and characterize the different phytochemicals responsible for medicinal potential of the S. grandiflora as anticancer, antiinflammatory, antibacterial, anxiolytic and anticonvulsant.

Keywords: *Sesbania grandiflora*; Morphology; Microscopy; Physiochemical; Phytochemical; TLC.

Introduction

Sesbania grandiflora (*S. grandiflora*) commonly called as Agati (in Hindi) belonging to Fabaceae family. It is native to many Asian countries and grows well in settled areas at low and medium altitude.*S. grandiflora* possesses many medicinal properties as anticancer, chemo preventive and hepatoprotective. It is also reported to have anxiolytic, anticonvulsive[1], antioxidant, antiurolithiatic[2] and hypolipidemic properties[3]. In addition, it is reported as a strong antidote for tobacco and smoking-related disorders[4]. Different phytoconstituents such as steroids, terpenoids [5], flavonoids and isoflavonoids as isovestitol; medicarpin and sativan were isolated and reported previously[6]. In this study the attempt was made to establish the phytochemical screening, histological examination and TLC identification of bark and its extracts respectively.

Material and methods

Identification and authentication of plant: The bark of *S. grandiflora* was collected locally from Nagpur. The plants were collected locally and taxonomic authentication was done by the Botany Department, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. The above plant materials were dried under the shade. The herbarium sheets of plant specimen was prepared and deposited for future reference (Herbarium voucher specimen number 9580).

Morphological and microscopical evaluation: The bark of *S. grandiflora* were procured and examined for various organoleptic properties. These studies include parameters such as taste, odour, shape, margin, venation, size, surface and apex. The microscopical study of *S. grandiflora* was done with the help of Motic Image plus 2.0 microscope. The air-dried plant material was then, pulverized into a coarse powder and used for research work.

Determination of Physicochemical constants: Physicochemical constants of *S. grandiflora* barks were determined to elicit water soluble ash, total ash, acid insoluble ash, alcohol soluble extractive value and water soluble extractive value as per the method described in Pharmacopoeias and reported previously[7].

Preparation of extract: Bark was dried and milled to a coarse powder. One kg of fresh plant material was grounded and defatted with petroleum ether. It was extracted subsequently with chloroform, ethyl acetate, acetone and methanol in a Soxhlet apparatus followed by maceration with 50% methanol (hydroalcoholic) for 7 days.

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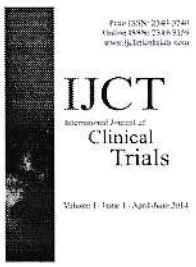

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Abbreviation

The correct abbreviation for abstracting and indexing purposes is Int J Clin Trials.

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Clinical efficacy of different dosage forms containing vitamin D: design and study outcomes of a randomized, comparative clinical trial

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176-187

Nidhi Sapkal, Gaurav Chhaya, Milan Satya, Dhara Shah

DOI: 10.18203/2349-3259.ijct20203104 (https://dx.doi.org/10.18203/2349-3259.ijct20203104)

Comparison of the effectiveness between epidural methylprednisolone injection and intranasal calcitonin in reduction of back pain due to osteoporosis in postmenopausal patients: a randomized controlled trial

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188-193

Kanti Rajkumari, Akoijam Joy Singh, Longjam Nilachandra Singh

DOI: 10.18203/2349-3259.ijct20203105 (https://dx.doi.org/10.18203/2349-3259.ijct20203105)

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194-199

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200-211

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Clinical efficacy of different dosage forms containing vitamin D: design and study outcomes of a randomized, comparative clinical trial

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ABSTRACT

Background: Different dosage forms of vitamin D like tablets, soft gelatin capsules, oral granules, powders, solutions and thin films are available. The objective of the present study was to evaluate and compare the clinical efficacy of three different dosage forms of vitamin D3 namely, orally disintegrating strips, oral granules and oral solution.

Methods: An open label, single centre, prospective, randomized, parallel group, comparative study was conducted for a period of 4 months. The study participants were divided into three groups (A, B, C) and received the respective treatments (orally disintegrating strips, n=20; granules, n=20; oral nano solution, n=10) for the study period. The estimation of blood levels of 25-hydroxy vitamin D [25(OH)D_3] in all the subjects at day 0, 60 and 120 was carried out.

Results: The normalization level of 25(OH)D_3 achieved by the subjects in group A, group B and group C was 100%, 83.3% and 90% respectively after 90 days. Comparison of 25(OH)D_3 level in all three groups showed significant increase at day 60. The levels were maintained at day 90 and 120 even after drastic reduction in dosage in Group A and group C. On day 120, the dose reduction was in the order of group A>group C>group B.

Conclusions: All the three formulations showed increase in the level of 25(OH)D_3. It can be concluded that oral disintegrating strips of 25(OH)D_3 are clinically more efficient than other conventional dosage forms.

Keywords: Vitamin D, Orally disintegrating strips, 25-hydroxy Vitamin D, Ergocalciferol, Cholecalciferol, 25(OH)D_3

INTRODUCTION

Vitamin D includes a group of fat-soluble secosteroids considering mainly two molecules, vitamin D_2 and vitamin D_3. liver converts vitamin D to the prohormone calcidiol, or 25-hydroxy vitamin D [25(OH)D].[1-3] Measurement of 25(OH)D in the circulation is the best diagnostic test for [illegible]

levels of the 25(OH)D, are linearly related with bone mineral density and bone fractures, increased risks of vascular and non-vascular mortality.[5,6] The vitamin D deficiency is also linked to many diseases, including several deadly cancers, several autoimmune diseases including type 1 diabetes, type 2 diabetes, multiple sclerosis, rheumatoid arthritis, Crohn's disease,

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A Study of Quality Control Test & Evaluation Parameter for Ayurvedic Formulation in Liquid, Semi-Solid & Solid Dosage Forms

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Abstract: - The use of ayurvedic drug as medicine is the ancients form of health care known to delicacy & it is used in all culture through history. the identification of purely active moiety is an important requirement for quality control & dose determination of plant related drugs. standardization of ayurvedic drug means conformation of its identify, quality & purity. the present overview covers the evaluation parameter with their standard value of the same ayurvedic dosage form. the process of good quality control & assurance. evaluation of ayurvedic dosage form at different stages were also discussed.

Keyword: - Ayurvedic Drug, Quality Control, Evaluation, Dosage Form.

I. INTRODUCTION

Quality control & evaluation of ayurvedic formulations is essential in order to assess of quality drug. based on the concentration of their active principle, physical, chemical, physiochemical quality evaluation & in-vitro, in-vivo parameters. Natural products have been our single most successful source of medicine dosage forms are the means by which drug molecules or plant parts are delivered to site of action within a body. The routes for which herbal dosage form may be administered include topical, oral, parenteral etc.

II. DEFINITION OF AYURVEDIC FORMULATION

Ayurvedic medicine are all the medicine intended for internal or external for in the diagnosis treatment, migration, or prevention of disease or disorder in human being or animal.

Ayurveda has been defined as the "Knowledge of living" or "science of longevity"

III. CLASSIFICATION OF AYURVEDIC DOSAGE FORMS

They are classified into four groups as below-

A. Solid dosage form: - Pills, Ghutika, Vatika
B. Semi-solid dosage form: - Avaleha, Pak, Lapa, Ghrita
C. Liquid dosage form: - Asava, Arista, Ark, Tails, Drava Ka
D. Powder dosage form: - Basma, Sattva, Pisti, Marduna, Lavana, Kshara, Churn

IV. NEED OF QUALITY CONTROL FOR AYURVEDIC FORMULATIONS

- When traditional medicine was developed technology & concept of quality control was quite different.
- During past thousand-year dynamic process of evaluation may have changed the identify of plant material.
- Due to commercialization, supply of genuine raw material has become a changed.
- Properties of botanicals may have undergone change due to time & environmental factor.
- It is cardinal responsibility authorities to ensure that consumer get the medication, which guarantee, purity, safety, potency & efficacy.

V. WHO GUIDELINE STANDARDIZATION OF AYURVEDIC FORMULATION

Standardization & quality control parameter for ayurvedic dosage form are based on following fundamental parameters:-

- Quality control of crude drug material, plant preparation & finished products.
- Stability assessment & shelf life.
- Safety assessment, documentation of safety based on experience or toxicological studies.
- Assessment of efficacy by ethnomedical information & biological activity evaluation.

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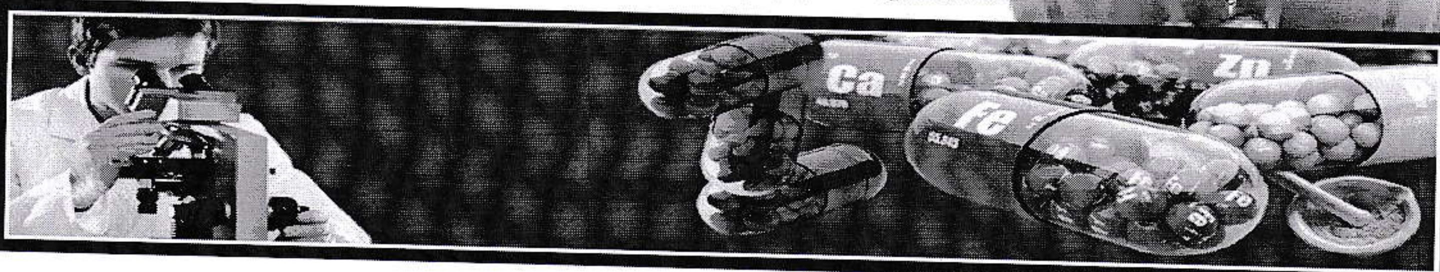

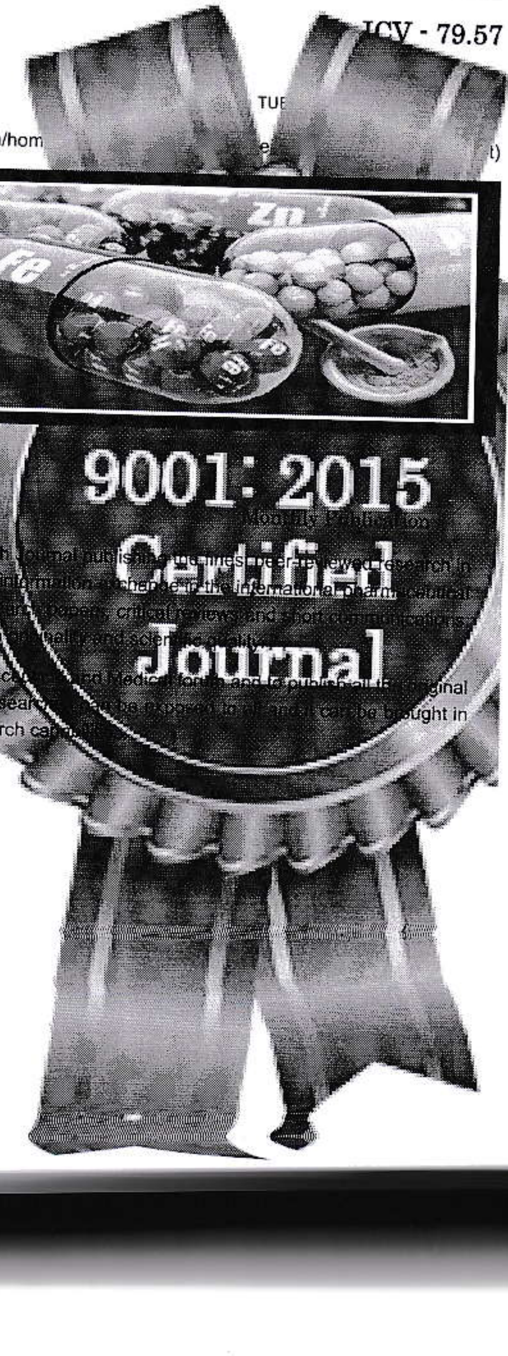

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Review Article
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OVERVIEW ON OVER-THE-COUNTER DRUGS: COMPARISION BETWEEN GENERIC AND BRANDED DRUGS IN INDIA

Priyanka Narendra Warambhe[1]*, Dr. Suhas Padmane[2] and Dr. Sheelpriya Walde[2]

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ABSTRACT
In recent years there has been an increasing trend in self-medication with non- prescription drugs, sometimes referred to as over- the- counter (OTC) medicines available in pharmacies and retail outlets. Self medication also has advantages for healthcare systems as it facilitates better use of clinical skills of pharmacists, increases access to medication and may contribute to reducing prescribed drug costs associated with publicly funded health programmes. The present study was conducted to compare the quality and price of generic drug product to their expansive popular brands (branded) product manufactured by the same pharmaceutical company in India.

KEYWORDS: Over the counter medicines, generics, brands, prescription.

1. INTRODUCTION

Medicines are the vital components of therapeutics which are manufactured, distributed and sold to the patients under various regulations like Drugs and Cosmetics Act and Drug Price Control, 1945 and the market in India in on the rise.[1] Over the counter drug are the drugs that are purchased without prescription. There are currently more than 300000 different OTC drugs available. The Indian OTC market ranks 11 th in terms of market size globally. The Indian OTC market is extremely competitive at present.[2] In India, though the phrase has no legal recognition; all the drugs that are not included in the list of 'Prescription Drug' are considered as non-prescription (OTC) drug. In India, the import, manufacture, distribution and sale of drugs and cosmetics are regulated the Drugs and Cosmetics Act. Pharmacist and pharmacist attendants play an important role in fostering self-medication among the people.

In India, it is possible to buy prescribed and non-prescribed drugs with or without prescription from a wide variety of sources. OTC medicine provide consumers safe and effective treatment for commonly occurring conditions saving them time and money that might otherwise be invested in other, more expansive health service. Generic drug provide the opportunity for major saving in healthcare expanditure since they are lowering in cost than branded. The present study was conducted to compare the quality and price of generic drug product to their expansive popular brands (branded) product manufactured by the same pharmaceutical company in India. Almost all medicine in India are sold under a brand (trade) name and generic. The study was undertaken to evaluate the dispensing pattern of OTC drugs in retail pharmacies in, Nagpur. Pharmacists have to be trained and educated regarding rationale dispensing of drugs.[3]

As the general rule OTC drugs have to be primarily used to treat a condition that does not require the direct supervision of a doctor and must be proven to be reasonably safe and well tolerated. OTC medicine can help you feel better by helping to treat or prevent health problem, such as allergies, constipation, cold, flu and nausea. However sometimes OTC medicine can cause unpleasant effect. These adverse effect include side effects, drug-drug interaction, food-drug interaction, and allergic reactions. This trends is increasing and is expected to reach 9th position within next 5 years.[4] Since Indian patients have huge tendency of self treatment. The Indian market is characterized by a huge demand for OTC drugs. In India, through the OTC phrase has no legal recognition, all the drugs that are not included in the list of prescription are considered as non-prescription drugs.[5] Prescription drugs are those that fall under two schedule of the drug and cosmetics rules 1945: schedule H and schedule X. Schedule H and X are drugs which can be sold only on the prescription of a registered medical practitioner.[6] This legal requirement is made to prevent self medication of medication with OTC analgesics such as paracetamol among children and adolescents is increasing. OTC medication offers advantages like easy access to medicines, self management of minor ailments with the involvement of pharmacists, and utilization of available resources. In India, OTC related adverse effects, abuse, and

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INSULIN THERAPY AND IT'S NEW APPROACHES

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ABSTRACT

Diabetes mellitus is a serious pathologic condition which is responsible for major healthcare problems worldwide Insulin replacement therapy has been used in the clinical Management of diabetes mellitus for more than 84 years. Insulin has remained indispensable in dispensable in management of diabetes mellitus since its discovery in 1921. Comparatively, a large percentage of world population is affected by diabetes mellitus, out of which approximately 5-10% with type 1 diabetes while the remaining 90% with type 2. The present mode of insulin administration is by the subcutaneous route through which insulin introduced into the body in a non-physiological manner having many challenges. Hence novel approaches for insulin delivery are being explored. Challenges that have adverse effect on oral route of insulin administration mainly includes rapid enzymatic degradation in the stomach, inactivation and digestion by proteolytic enzymes in the intestinal lumen and poor permeability across intestinal epithelium because of its high molecular weight and its lipophilicity. Approaches such as liposomes, micro emulsions, nano cubicle, insulin chewing gum and so forth have been prepared to ensure the oral delivery of insulin. Attempts have been made to achieve oral insulin delivery using various systems. Scientists have been able to protect the insulin delivery systems from acidic environment of the stomach and target it to the intestine. Limitations to the delivery of insulin have not resulted in fruitful results to date.

KEYWORDS: Diabetes mellitus, Liposome, Micro emulsions, Nano cubicle, Oral insulin delivery systems.

INTRODUCTION

Insulin could be a hormone with intensive effects on metabolism and and a number of other body systems (e.g. vascular compliance); Insulin causes most of the body's cells to require glucose from the blood(including liver, muscle and fat tissue cells), storing it as glycogen within the liver and muscle and stops use of fat as an energy source. When insulin is absent or low), glucose isn't preoccupied by most body cells and the body begins to use fat as an energy source (i.e. transfer of lipids from fat to the liver for metabolism as an energy source). As its level could be a central metabolic control mechanism, its status also used as a way signal to other body systems (such as organic compound uptake by body cells). it's several other anabolic effects throughout the body. When control of insulin levels fails, DM results.

Diabetes mellitus can be a standard disease and its complications are chargeable for excess morbidity and mortality, loss of independence, and reduced quality of life. DM can be a significant pathologic condition that's chargeable for major healthcare problems worldwide and costing billions of dollars annually. Diabetes develops thanks to a diminished production of insulin (in type 1) or resistance t effects (in type 2 and gestational).). Both lead to hyperglycaemia, which largely energy causes the acute signs of diabetes: excessive urine production, leading to compensatory thirst and increased fluid intake, blurred vision, unexplained weight loss, lethargy, and changes in energy metabolism. Monogenic e.g. MODY, constitute 1-5 you cause you to take care of all cases. Through more convenient drug delivery methods, pharmaceutical companies, regulatory bodies, and other government institutions can introduce better diabetes care and reduce costs related to diabetic complications caused by poor compliance." At this point, several methods of non-lar.

Types of Diabetes

Diabetes Type 1

Overview

Diabetes type 1, also called insulin-dependent diabetes, is additionally a chronic condition within which the pancreas produces little or no insulin. Insulin also a hormone needed to permit sugar (glucose) to enter cells to supply energy. Various factors, including genetics and some viruses, may contribute to type 1 diabetes. Although type 1 diabetes usually appears during childhood or adolescence, it can develop in adults. Despite active research, type 1 diabetes has no

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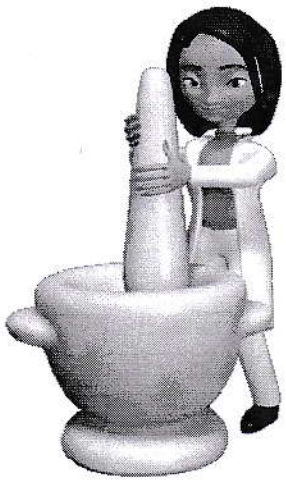

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Research Article

Optimization, Characterization and *In Vitro* Evaluation of Buprenorphine Microemulsion

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ABSTRACT

The aim of the present study was to develop an o/w microemulsion for poorly solubilized potent semi-synthetic opiate analgesic drug buprenorphine for sublingual administration. The oil phase, surfactant and co-surfactant were selected on the basis of their drug solubility and their efficiency to form ME. Pseudo-ternary phase diagrams were constructed and on the basis of ME existence ranges various formulations of BU were developed. The influence of surfactant and co-surfactant mass ratio (S_{mix}) on the ME formation and in vitro permeation of ME through cellophane membrane was studied respectively. The optimized formulations (ME A2 & ME C2) consisting of 0.2.44% & 2.75% (w/w) BU, 5.67% & 5.60% (w/w) Capmul® MCM C8 and 23.82% (w/w) S_{mix} (1:1) & 23.86 % (w/w) S_{mix} (2:1) respectively, has shown a globule size of 59.7 ± 0.5 nm & 12.0 ± 0.8 , a polydispersity index of 0.242 ± 0.01 & 0.328 ± 0.004 , pH 4.93 ± 0.005 & 5.15 ± 0.005, viscosity 15.4 ± 0.10 cPs & 20.4 ± 0.20 cPs, a zeta potential of -0.2 ± 0.1 & 1.4 ± 0.1 and conductance of 105.1 ± 0.50 µS & 131.7 ± 0.42 µS respectively for ME A2 & ME C2 formulation. ME A2 & ME C2 exhibited a steady state flux of about 705.226 ± 0.99 & 445.993 ± 0.47 respectively thus exhibiting higher drug permeation through ME formulations. Besides this, the formulation was also evaluated for drug content, centrifugation and stability study. Stability analysis of the microemulsion indicated that they were stable upon storage for at least 3 months. The results indicate that, the investigated ME may be used as a promising alternative for BU therapy.

Keywords: Buprenorphine HCl, Microemulsion, Sublingual permeation.

INTRODUCTION

Poor aqueous solubility of drug entities is today considered as a formidable challenge for pharmaceutical scientist, which is considered as an area of prime importance in the field of biomedical research. To overcome the solubility problems, different formulation approaches have been undertaken to improve oral, buccal & sublingual bioavailability including surfactants[1, 2], cyclodextrin complexes[3], micronization and nanosizing[4], permeation enhancers[5], nanosuspensions[6], microemulsions[7] and lately lipid based formulations[8].

Buprenorphine hydrochloride (BU) is a partial agonist at mu and kappa opioid receptor and antagonist at delta receptors used for the treatment of moderate to severe pain as well as chronic pain[9]. Buprenorphine is a derivative of the opioid alkaloid thebaine which is a more potent (25-40 times) and having longer lasting analgesic activity than morphine.

However oral delivery of BU is suffering with low bioavailability (31%) because of high hydrophobicity (log P=4.98) which is the main cause for the low water solubility and it also undergoes extensive first pass metabolism by hepatic cytochrome P-450 3A4 isozyme. Hence oral formulations of buprenorphine are not available in the market whereas parentral, buccal & sublingual formulations are available[10-12]. With respect to buccal formulations, buprenorphine's buccal film Bunavail® is available in the market. This bilayered film increases the total bioavailability of buprenorphine to more than 40% in healthy subjects[28]. Bai *et al.*, carried out the pharmacokinetic study of buprenorphine buccal film formulation in healthy volunteers and the study revealed that bioavailability of buprenorphine was about 46 to 51%[29]. This indicates further research in the enhancement of the buprenorphine is to be carried out for better bioavailability.

Hence lipid based formulations were chosen to overcome the above barriers and among them microemulsion as drug delivery systems have recently gained wide acceptance due to robust formulations perspectives, ease of production and practical enhancement of drug permeability[13]. These are clear, thermodynamically stable, isotropic liquid mixture of oil, water and surfactant, frequently in combination with a co-surfactant[14]. This o/w microemulsion formulation enhances the sublingual & buccal bioavailability of buprenorphine by facilitating transcellular (across the cell) & paracellular (between the cells) absorption. Buprenorphine being lipophillic drug transported transcellularly by a concentration dependent passive diffusion process and also being formulated into o/w type of microemulsion, therefore it is also subjected to transport via the intercellular porous route i.e. paracellularly.

Based on extensive review of literature, it revealed that controlled delivery buccal patches of buprenorphine has been developed using polyisobutylene, polyisoprene and carbopol 934P as bioadhesive polymer. Nearly 75% of the buprenorphine released after *in vitro* evaluation studies

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SAKSHI KAUSHIK, RAVINDER VERMA, DEEPIKA PUROHIT, PARIJAT PANDEY, MANISH KUMAR, BEENA KUMARI, DEEPAK KAUSHIK

107-117

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VENKATA RAMANA REDDY K., NAGABHUSHANAM M. V., PAMULA REDDY B., RAVINDAR NAIK E.

118-126

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FABRICATION OF AN ABUSE DETERRENT AND MICROEMULSION-BASED SUBLINGUAL FILM OF BUPRENORPHINE HYDROCHLORIDE FOR BREAKTHROUGH PAIN MANAGEMENT

D. MUNDHEY, N. SAPKAL, A. DAUD

127-135

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THERAPEUTIC EVALUATION OF CHEMICALLY SYNTHESIZED COPPER NANOPARTICLES TO PROMOTE FULL-THICKNESS EXCISIONAL WOUND HEALING

ASHISH KUMAR, VINAY PANDIT, UPENDRA NAGAICH

136-142

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PROPRANOLOL HYDROCHLORIDE TOPICAL GEL FOR THE TREATMENT OF INFANTILE HEMANGIOMA

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143-150

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FABRICATION OF AN ABUSE DETERRENT AND MICROEMULSION-BASED SUBLINGUAL FILM OF BUPRENORPHINE HYDROCHLORIDE FOR BREAKTHROUGH PAIN MANAGEMENT

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ABSTRACT

Objective: The present research work aims to develop an abuse deterrent rapidly dissolving buprenorphine microemulsion loaded sublingual film for the treatment of breakthrough pain.

Methods: The Buprenorphine microemulsion loaded sublingual films were prepared using Capmul MCM C8 (oil), tween 20 (surfactant) and propylene glycol (co-surfactant) with different grades of film-forming polymer (HPMC) using film casting machine. The films were evaluated for *in vitro* disintegration and dissolution study, tensile strength, folding endurance, content uniformity, surface pH, thickness and weight variation, % loading of buprenorphine microemulsion in sublingual film, scanning electron microscope, *ex vivo* permeation study, droplet size and polydispersity index, Zeta potential, % moisture content, stability and abuse deterrent potential were evaluated.

Results: The optimized film formulation showed desired mechanical properties with minimum disintegration time of 21s and exhibited 34.45 % loading of Buprenorphine microemulsion. Permeation studies through goat sublingual mucosa, indicated 87% Buprenorphine release, through Buprenorphine microemulsion loaded sublingual film, whereas only 30% Buprenorphine release when it was directly added to film without microemulsion strategy.

Conclusion: The present study concludes that abuse deterrent and fast acting buprenorphine microemulsion-incorporated sublingual film of buprenorphine HCL and naloxone HCL is a promising alternative to mostly marketed buprenorphine injectable delivery systems and a non-invasive route of administration for breakthrough pain management.

Keywords: Buprenorphine HCl, Microemulsion, Sublingual film, Naloxone, Abuse deterrent

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INTRODUCTION

Buprenorphine hydrochloride (BU) is a partial agonist at mu (μ) and kappa (K) opioid receptor and antagonist at delta receptors used for the treatment of moderate to severe pain as well as chronic pain [1]. BU, being a tasteless drug and slightly acidic in nature, has two pKa values of 8.42 and 8.92 and logP of 3.4. Hence, at pH<8.4, it can be well absorbed [2]. The low oral bioavailability of BU (31%) limits its therapeutic utility and it also undergoes extensive first pass metabolism by hepatic cytochrome P-450 3A4 isozyme. Hence oral formulations of BU are not available in the market whereas parenteral, buccal and sublingual formulations are available [3-5]. With respect to buccal formulations, buprenorphine's buccal film Bunavail®is available in the market. This bilayered film increases the total bioavailability of BU to more than 40% in healthy subjects [6]. Bai *et al.*, carried out the pharmacokinetic study of BU buccal film formulation in healthy volunteers and the study revealed that bioavailability of BU was about 46 to 51% [7]. This indicates further research in the enhancement of the BU is to be carried out for better bioavailability.

Poor aqueous solubility of drug entities is today considered as a formidable challenge for pharmaceutical scientist, which is considered as an area of prime importance in the field of biomedical research. Hence lipid based formulations were chosen to overcome the above barriers and among them microemulsion (ME) as drug delivery systems have recently gained wide acceptance due to robust formulations perspectives, ease of production and practical enhancement of drug permeability [8]. The o/w microemulsion formulation enhances the sublingual and buccal bioavailability of lipophillic drug BU by facilitating transcellular (across the cell) and paracellular (between the cells) absorption. Thus literature review reveals lack of information about the bioavailability enhancement of poorly water soluble buprenorphine using microemulsion as drug delivery systems.

Also, opioid analgesics are foremost used for the treatment of breakthrough pain in cancer. To fight the transient breakthrough pain, it is necessary to achieve quick drug release from dosage form for the early onset of action for the purpose of pain management. This can be achieved with the help of a sublingual or buccal delivery of buprenorphine. The added advantage of the geometrical shape and larger surface area of thin films can be utilized to deliver an active drug sublingually [9]. Based on extensive review of literature, it revealed that controlled delivery buccal patches of buprenorphine has been developed using polyisobutylene, polyisoprene and carbopol 934P as bioadhesive polymer. Nearly 75% of the buprenorphine released after *in vitro* evaluation studies from the buccal patches following 24 h incubation period [10]. Also bilayed buccal film of BU is available with bioavailability of more than 40% in healthy subjects [11]. At the same time literature study also revealed that BU sublingual formulations are diverted and utilized outside of an established physician–patient relationship, both for self-medication of withdrawal symptoms and to produce euphoria [12, 13].

Thus, the current study was aimed to develop an abuse deterrent, fast dissolving microemulsion loaded sublingual film of buprenorphine for transient breakthrough pain. To achieve this objective, microemulsion is incorporated into the sublingual film for better sublingual bioavailability. But, since buprenorphine is having a high risk of abuse potential [14-16], naloxone is incorporated in a fixed ratio (1 mg of naloxone per 4 mg of buprenorphine) to deter abuse by parenteral route, such as nasal insufflations or injection. Naloxone hydrochloride (NA) has no therapeutic effect but still added to the formulation to prevent parental abuse. Because when patient tries to abuse this formulation parentally, naloxone binds to the receptor site in the brain and blocks the receptors, thus reducing the effect of BU and prevents the abuse potential of the formulation.

MATERIALS AND METHODS

Materials

BU and NA was purchased from Sun Pharmaceutical Industries Ltd. Propylene Glycol was purchased from Shell Chemicals, Singapore.

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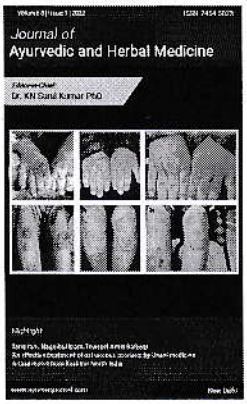

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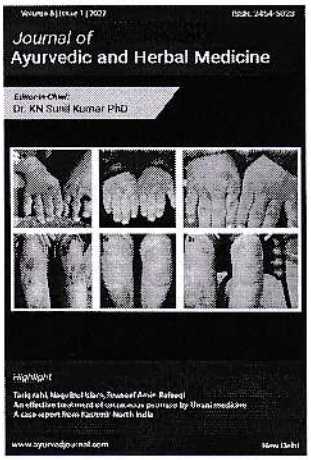

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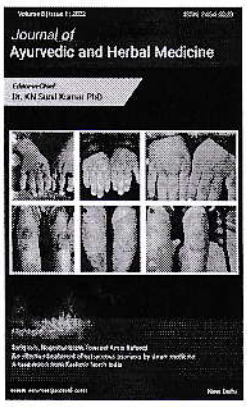

Volume 6 issue 1, 2020

PROSPECTIVE

1 **Whether Herbal Medicines Play an Important Role in the COVID-19 Therapeutics and Boosting Immune as One of the Preventive Solutions: A Science Opinion**
Quang-Ung Le, Horng-Liang Lay
J. Ayu. Herb. Med., 2020;6(1):1-3 **DOI:** 10.31254/jahm.2020.6101
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CASE STUDY

2 **Therapeutic effect of 'Qurs-i-Ziabetus Khas' in Diabetes Mellitus – A Case Report**
Athar Parvez Ansari, Abu Nasir
J. Ayu. Herb. Med., 2020;6(1):4-8 **DOI:** 10.31254/jahm.2020.6102
[Abstract] [HTML Full text] [PDF 388 KB]

3 **Cost effective Management of Chronic Psoriasis using safe Siddha herbal drugs – A Case Report**
Arul Amuthan, Muthu Santhi
J. Ayu. Herb. Med., 2020;6(1):9-11 **DOI:** 10.31254/jahm.2020.6103
[Abstract] [HTML Full text] [PDF 324 KB]

4 **A Case Report on removal of Filiform Warts using Siddha Kaalaani Kalimpu**
Arul Amuthan, Muthu Santhi
J. Ayu. Herb. Med., 2020;6(1):12-14 **DOI:** 10.31254/jahm.2020.6104
[Abstract] [HTML Full text] [PDF 370 KB]

RESEARCH ARTICLE

5 **Phytochemical screening and TLC studies of different extracts of *Chenopodium album***
Sumit K. Arora, Prakash R. Itankar, Subhash R. Yende
J. Ayu. Herb. Med., 2020;6(1):15-20 **DOI:** 10.31254/jahm.2020.6105
[Abstract] [HTML Full text] [PDF 730 KB]

6 **Neerizhivu kudineer (a traditional siddha polyherbal antidiabetic medicine) inhibits α- amylase enzyme and α-glucosidase enzyme**
Jayaraman Raamachandran, Arul Amuthan
J. Ayu. Herb. Med., 2020;6(1):21-25 **DOI:** 10.31254/jahm.2020.6106
[Abstract] [HTML Full text] [PDF 443 KB]

REVIEW ARTICLE

7 **Effect of immune-modulators (Rasayana Dravya) in Janapadodhwansa WSR to COVID-19**
Vaidya Pratigya Chauhan, Bhawna Dutt, Mahesh Vyas, S. K. Gupta
J. Ayu. Herb. Med., 2020;6(1):26-29 **DOI:** 10.31254/jahm.2020.6107
[Abstract] [HTML Full text] [PDF 310 KB]

8 **IUCN status of important ethno botanical plants of Udyavara village (Udupi, Karnataka)**
Mohammed Faisal, Shrikanth P, Niveditha Shetty, Sunil Kumar KN
J. Ayu. Herb. Med., 2020;6(1):30-36 **DOI:** 10.31254/jahm.2020.6108
[Abstract] [HTML Full text] [PDF 1117 KB]

9 **Significance of Rasayana Dravyas for Garbha Poshana- A review**
Kowsalya R.G, Arpana Jain, Swetha Naik A.D
J. Ayu. Herb. Med., 2020;6(1):37-39 **DOI:** 10.31254/jahm.2020.6109
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Phytochemical screening and TLC studies of different extracts of *Chenopodium album*

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ABSTRACT

Chenopodium album (*C. album*), extensively exploit in folk medicine in various parts of world. The plant possesses various therapeutic properties such as antiphlogistic, mildly laxative, anthelmintic, odontalgic properties and antirheumatic. In the present research, Histological examination, phytochemical screening and Thin layer chromatographic identification of leaf and extracts has been studied extensively and provided diagnostic key to detect the presence of adulterant. It is concluded that our study provides the data which helps to isolate and characterize the different medicinal potential of the *C. album* such as diuretic, antiparasitic, hepato-protective, laxative and sedative.

Keywords: *Chenopodium album*, Morphology, Microscopy, Physiochemical, Phytochemical, TLC.

INTRODUCTION

Chenopodium album L., (*C. album*) commonly known as Bathua is having family Chenopodiaceae. The leaves possess various therapeutic properties such as antiphlogistic, mildly laxative, anthelmintic, odontalgic properties and antirheumatic [1]. Moreover, in rheumatism, its aerial parts with alcohol were used in the form of decoction [2]. Different phytoconstituents such as flavonoids [3,4], apocarotenoids and Cinnamic acids amides [5] has been isolated from plants. Flavonoid, polyphenol and flavonone present in from *C. album* have reported to possess significant antioxidant potential, anti-inflammatory and NF kappa B inhibition potential responsible for antirheumatic activity [6]. In this study the attempt was made to establish the Histological examination, phytochemical screening and Thin layer chromatographic identification of leaf and its extracts respectively.

MATERIAL AND METHODS

Identification and authentication of plant

The aerial parts of *C. album* Linn. was collected locally and taxonomic authentication was done by the Botany Department, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. A voucher specimen of the plant material has been preserved and deposited with specimen number RA 9576 in the Herbarium of Botany Department for future reference.

Morphological and microscopical evaluation

The fresh leaves and stem of the *C. album* were procured and examined for various morphological characters such as colour, taste and odour of leaves. The other external characters like venation, surface, base, margin, size and shape of leaves were also studied. The microscopical examination of *C. album* was done with the help of Motic Image plus 2.0 microscope. The air-dried plant material was then, pulverized into a coarse powder and used for research work.

Determination of Physicochemical constants

Physico-chemical constants of *C. album* aerial parts were determined for Ash and Extractive value as per the method described in Pharmacopoeias and reported previously [7].

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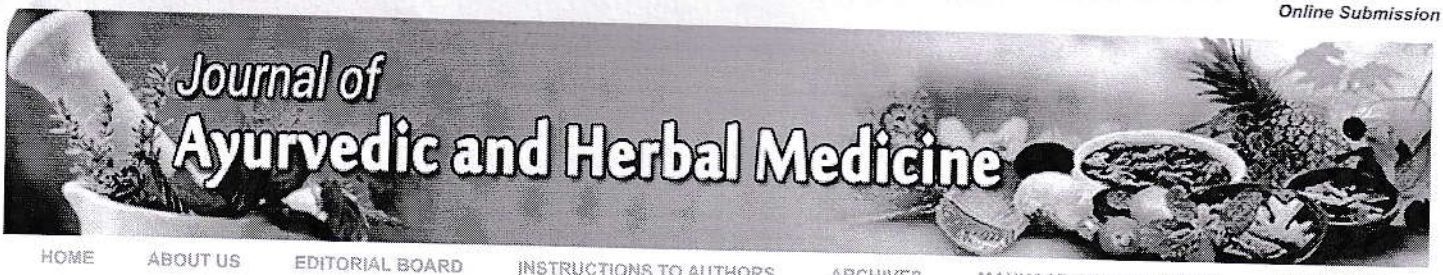

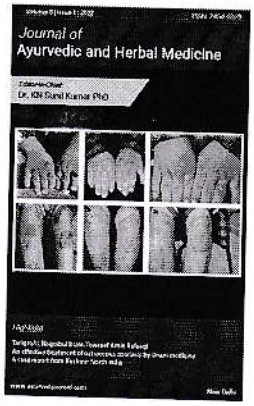

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.mritha Rajan, Ashvini Kumar M, Lohith B A
271-277

pdf

Anatomical Study of Six Ocimum Species: The Valuable Method Used in Indian Systems of Medicines (ISM)

Sagarika Parida, Bikram Keshari Mohapatra, Gyanranjan Mahalik
278-283

pdf

In vitro Anti-Arthritic activity of Pseudarthria viscida against Protein Denaturation and Proteinase enzyme

Pandian P
284-288

pdf

GC-MS Analysis and Phytochemical Screening of Indigofera tinctoria (Linn.) Leaf Extract Characterizing its Medicinal Use

Mishra D N, Gomare K S, Sheelwant S V
289-299

pdf

Assessment of Prevalence and Psychosocial behaviour of Tobacco Addictive School going Children with Awareness for Deaddiction

Prachi Kishor Gulhane, Renu B Rathi, Bharat Rathi
300-305

pdf

Phytochemical Screening and HPTLC study of Padina tetrastromatica (Hauck)

Subhash R Yende, Sumit K Arora, Vipinchandra B Pande, Keshav S Moharir, Abhay M Ittadwar
306-309

pdf

Role of Ashwagandha Taila Matrabasti in the Management of Katigraha

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International Journal of Ayurvedic Medicine, Vol 11 (2), 306-309

Phytochemical Screening and HPTLC study of *Padina tetrastromatica* (Hauck)

Research Article

Subhash R Yende[1*], Sumit K Arora[2], Vipinchandra B Pande[1], Keshav S Moharir[3], Abhay M Ittadwar[4]

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Abstract

The marine ecology is diverse with innumerable types of natural substances, both of plant and animal origin. *Padina tetrastromatica* (PT) (Hauck) is a brown algae belonging to the order Dictyotales, found in coastal region. The objective of present investigation was to evaluate phytochemical profile of extracts of PT. The air dried plant material was defatted and extracted successively with solvents of increasing polarity. Incumbent study was performed with standard qualitative phytochemical tests and HPTLC fingerprint analysis using CAMAG HPTLC system. The results showed the presence of phytoconstituents like sterols, terpenoids, flavonoids, glycosides, alkaloids and carbohydrates. Furthermore, components present in extracts were resolved in best possible solvent system by HPTLC. The chloroform extract of PT displayed eight peaks, in which those with R_f values 0.28 and 0.72 were more predominant. Whereas ethanol extract of PT exhibited nine peaks, in which maximum R_f value was found to be 0.82. In conclusion, the data of this study provide useful guide and suitability for investigation of biological activity of the plant according to the phytochemical groups observed. However, further work is needed to standardize the above chemical constituents in comparison with biomarker and this result can also be measured along with the other data for setting up the standards to this plant.

Key Words: *Padina tetrastromatica, Brown seaweed, Marine microalgae, Phytochemical Screening, Phytoconstituents, HPTLC fingerprint.*

Introduction

Since decades, herbs or plants are used as an imperative resource of medicines due to the presence of bioactive components having therapeutic and pharmaceutical significance (1). Standardization of these plant materials is essential now days, which can be achieved by use of current methods available for describing the identification and quantification of active constituents (2). Several sophisticated analytical and extraction methods like spectrophotometric, chromatographic, electrophoresis are presently used for standardization of herbal extracts and plant based drugs. High performance thin layer chromatography (HPTLC) finger print analysis can serve as potent tool for identification, authentication and quality control of herbal medicine. This technique could be considered as a good alternative, because of its simplicity and reliability (3).

Marine macroalgae or seaweeds are found in coastal region and considered as a good source of bioactive elements as they are able to produce variety of secondary metabolites characterized by their biological activities (4). *Padina tetrastromatica* (Hauck) (PT) is a brown algae belonging to the order Dictyotales of Phaeophyta. The algae is brown to yellowish brown in colour, thallus is fan shaped and divided into several small lobes, foliaceous 5- 55cm long and1-3cm wide, irregularly branched into dichotomously fan shaped segments and apical involute (5). PT is reported for the presence of alginic acid, carbohydrates, sulphated polysaccharide (Fucoidan), fatty acids, sterols and terpenoids (6, 7). Various extracts and isolated elements of PT has been studied for its therapeutic potential. It showed spasmogenic, hypotensive, cytotoxic, antimicrobial, antifungal, antifertility, antioxidant, anti-inflammatory, antihyperglycemic and hypolipidemic activity (8-14). Further, the anxiolytic and anticonvulsant activity of PT has been studied earlier (15, 16).

The current research work was designed to carry out preliminary qualitative phytochemical screening and HPTLC fingerprinting of chloroform and ethanol extract of *Padina tetrastromatica*

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Material and Methods

Collection, authentication and extraction

The brown seaweed, PT was collected from Bhatkarwada; Ratnagiri coast and taxonomic authentication was done by Professor B. B. Chaughule,

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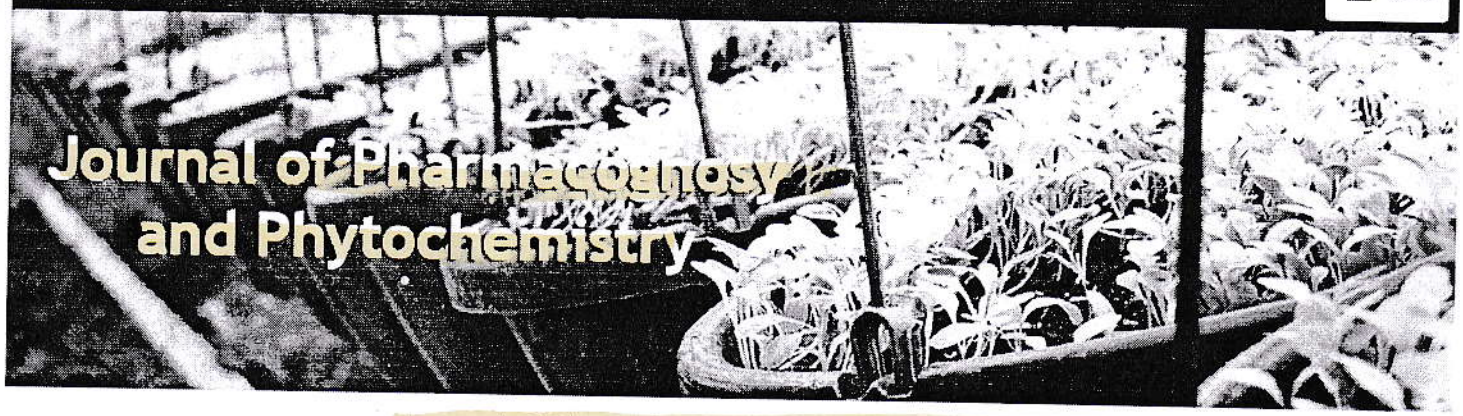

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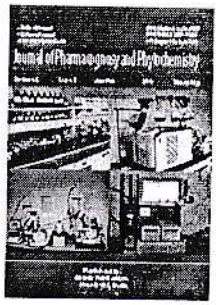

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"I try to give to the poor people for love what the rich could get for money. No, I wouldn't touch a leper for a thousand pounds; yet I willingly cure him for the love of God."

Mother Teresa

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Foam granulation v/s wet granulation: The effect of granulation technique on granule size distribution

Taranpreet Kaur Bamrah, Tirupati Rasala and Shekhar Waikar

Abstract
The licorice root extract has been widely used in the nutriment industry as a sweetening agent as ammonium glycyrrhizin is about 50 times as sweet as cane sugar. There is a growing commercial interest in using licorice root extract in food foams. Foaming properties of licorice extract influence the sensory quality and shelf-life of the final product. So, the licorice has been tried to use as a foaming agent in place of artificial foaming agent and the results of both are compared.

Keywords: Foaming agent, licorice, foam granulation, wet granulation

Introduction
The aim of project work was to study the effect of wet granulation and foam granulation techniques on particle size distribution. Granules by wet granulation technique were prepared. Evaluation of physical parameters of granules prepared by wet granulation technique was done. Granules by foam granulation technique using tween 20, SLS and aqueous solution of liquorice as a foaming agent were also prepared. Evaluation of physical parameters of granules prepared by foam granulation technique was carried out. The results of wet granulation process and foam granulation processes were compared.

Materials and Methods
Crude Liquorice was purchased from local market, Nagpur. All other excipients and solvents used were of analytical grade.

Table 1: Formula for wet granulation

Sr. No.	Name of Ingredient	Quantity Taken
1	Paracetamol	0.5g
2	Lactose	0.5g
3	MCC	0.1g
4	Starch paste	5.0% w/w (1g in 20ml)
5	Talc	0.1% w/w
6	Magnesium stearate	0.1% w/w

Paracetamol, lactose and MCC were taken in respective quantities and triturated well in a mortar & pestle. Starch was weighed in specific amount and added slowly in beaker containing hot water kept over a Bunsen burner, while addition it is stirred well to form a paste. This paste is now added in the mixture of ingredients which were triturated before is now mixed well to form a wet mass which is then passed through a sieve having mesh no.10. In the end, talc and magnesium stearate are sprinkled over the granules and dried in an hot air oven.

Preparation of liquorice solution
The crude liquorice was size reduced to form a coarse powder. Small amount of this powder was added to about 20ml of water in a beaker and kept overnight to macerate well. It was agitated well and then filtered to get a solution of liquorice which was used as a foaming agent.

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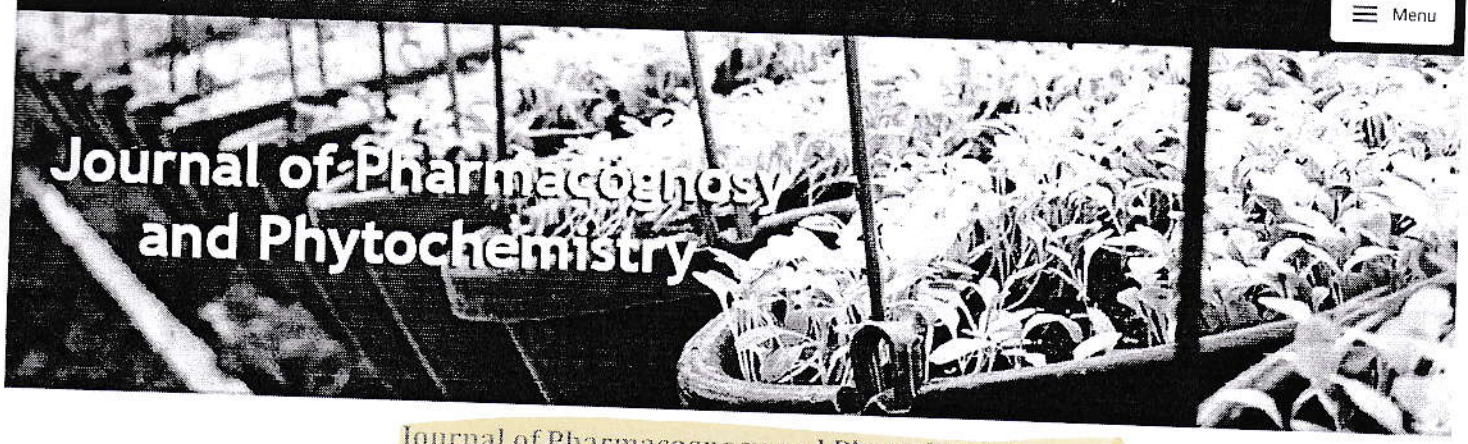

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A Review: Use of Rauwolfia Serpentina for Antihypertensive Activity

Deepali Namdeo Tapre | Dr. Sheelpriya R. Walde [2]

Abstract: The root of sarpgandha is a species of flowering plant in the family Apocynaceae has been traditionally used in Ayurveda for many years to treat the variety of diseases of that at been traditionally apper to bear little similar to one another. Rauwolfia Serpentina is a safe and effective treatment of hypertension. This author reviews the scientific literature with regard to the use of Rauwolfia and the treatment of hypertension. Much smaller dose of reserpine is required to obtain the antihypertensive activity. The present review focuses mainly on chemical composition, pharmacology, mechanism of action, side effect and toxicity and antihypertensive effect of Rauwolfia alkaloids. The plant provide clinician with a safe and effective adjunct to high blood pressure.

Keywords: reserpine, hypertension, serpgandha, rauwolfia serpentina

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Review on Herbal Treatment for Insomnia

Taranpreet Kaur Bamrah | Sheelpriya R. Walde

Abstract: The need for the proper quantity and quality of sleep is a biological drive similar to those of hunger and thirst. We tend to think of sleep as a time when the mind and body shut down. But this is not the case; sleep is an active period in which a lot of important processing, restoration, and strengthening occurs but due to todays stressful lifestyle sleep disorders have become common. Therefore, this review aims in the herbal treatment of sleep disorders in achieving a soundful sleep. All the main plants used in the sleep disorders have been given in the review.

Keywords: Sleep, Sleep disorders, Herbal treatment, Sleep cycle, Insomnia

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A Review on Inflammatory Bowel Disease and their Treatment

Mojabir Hussen Ansari | Dr. Sheelpriya R. Walde [2]

Abstract: Inflammatory Bowel Disease is characterised by chronic inflammation of the gastrointestinal tract and affect patient's quality of life. Treatment of IBD involves induction and maintenance of remission. Current available therapies include anti-inflammatory, amino salicylate, corticosteroids, immunosuppressive agent, antibiotics, and biological agent are available. Oxidative stress could be a major contributing factor to the tissue injury and fibrosis that characterised Crohn's disease. Decreased blood level of vitamin C and E and decreased intestinal mucosal levels of CuZn superoxide dismutase, glutathione, vitamin A, C, E and -carotene have been reported for Crohn's patients. The reduction of brush border enzymes with normal cytoplasmic enzyme in the presence of abnormal morphometry is further evidence of concept of Crohn's disease as a diffuse lesion of the gastrointestinal tract. There has been considerable research in the colonic delivery system and targeting has been achieved by several ways. The primary approach to the colonic delivery of the drug include prodrugs, coating with pH sensitive and time dependant polymers. Eudragit L-100 and Eudragit S-100 are used as an enteric coating material to keep the multi-particulate intact and to release the drug in stomach and upper intestine and produce local and systemic drug effect at the site of colon.

Keywords: Crohns Disease, Inflammatory Bowel disease, Enzymes, Antibiotics

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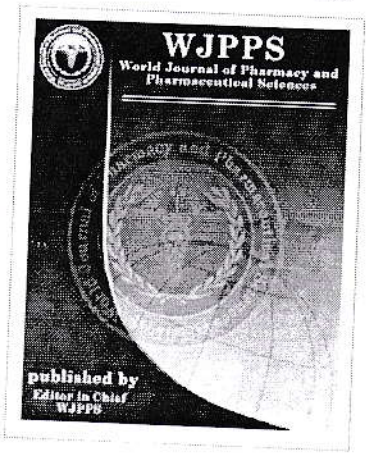

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ADVANTAGES OF NATURAL DIURETICS OVER SYNTHETIC DIURETICS AS A PART OF TREATMENT

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ABSTRACT

Diuretics, in one form or another, have been around for centuries and this review sets out to chart their development and clinical use. Starting with the physiology of the kidney, it progresses to explain how diuretics actually work, via symports on the inside of the renal tubules. The different classes of diuretics are characterized, along with their mode of action. The clinical use of diuretics in conditions like congestive cardiac failure and hypertension. An account of the adverse effects of synthetic diuretics is given along with benefits of natural diuretics over synthetic. Common adverse effects like hypokalaemia and hyponatraemia are prevalent. Medicinal herbs are the significant source as Diuretics. There exist a large number of studies which supports the diuretic effects of traditional herbal medicines. This article reviews the various herbal plants used traditionally as diuretics and chemical constituent of the plant promoting diuresis. This work may mark an important milestone for the researchers in the selection of medicinal plant for carrying their work on diuretics.

KEYWORDS: Natural Diuretics, Herbal Diuretics, Benefits of Natural Diuretics.

INTRODUCTION

The word diuretic has a Greek stem, Diu (through) ovpein (to urinate), and a diuretic is defined as any substance that increases urine flow and thereby water excretion. Diuretics are among the most commonly used drugs .They act by reducing sodium chloride reabsorption at different sites in the nephron, thereby increasing urinary sodium, and consequently, water loss. Paintings found in the ruins of Pompeii have depictions of grapes, ivy, olives and sweet

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ALTERNATIVE APPROACH TO CURRENT MANAGEMENT STRATEGIES IN ULCERATIVE COLITIS

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ABSTRACT

The colon is a site where both the local and systemic delivery of drug takes place. Ulcerative colitis is a chronic idiopathic inflammatory disease of GIT which affects mucosal lining of the colon. Problem related to the colonic formulation can be overcome by optimizing various therapeutic strategies. This review compares primary approach for colon targeted drug delivery, some newer approaches including possible polymers used. It triggers the use of some innovative therapeutic strategies for the development of formulation for colon targeted diseases. The limitations of traditional colon targeted delivery system may be overcome by understanding these better approaches having the careful understanding of the clinical particularities of disease. The future management of ulcerative colitis appears promising as new promising therapies continue to evolve. The therapeutic avenues which are thought out of the box may provide better treatment and quality of life for patient with this disabling disease and it could foster the development of future avenues for translational research.

KEYWORDS: Ulcerative colitis, new therapeutic approaches, polymers.

INTRODUCTION

The oral route of drug administration is the most convenient and important method of administering drugs for systemic effect. Nearly 50% of the drug delivery systems available in the market are oral drug delivery system and these systems have more advantages due to patient acceptance and ease of administration.[1-3] During the last decade there has been interest in developing site-specific formulations for targeting drug tothe colon. Colonic drug delivery has gained increased importance not just for the delivery of thedrugs for the treatment of local diseases associated with the colon like crohn's disease, ulcerative colitis,

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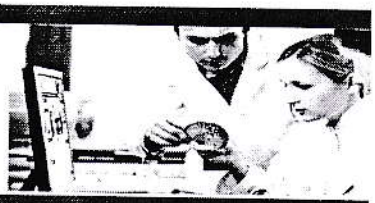

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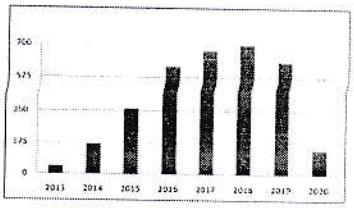

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Review Article

MEDICATED CHEWABLE LOZENGES: A REVIEW

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ABSTRACT

Oral solid dosage form vary and have advantages over other dosage form. Lozenges are one of the widely used oral solid dosage form. They contain one or more medicament, usually in a flavored, sweetened base and are intended to dissolve or disintegrate slowly in the mouth or these are medicated candy intended to be dissolved slowly in the mouth to lubricate and sooth the irritated tissues of throat. They are the most natural and easiest route of drug administration. They are design for local as well as systemic therapy. Lozenges have various advantages and disadvantages. Different types of lozenges and their method of preparation along with the ingredient used in their preparation are discussed. Examples of different synthetic and herbal lozenges with their proven facts and different marketed products can be known from these reviews. The selection criteria for flavoring agent are mentioned, quality control tests of lozenges have been reviewed. The acceptance for lozenges as a dosage form is high by adults and also more by children.

INTRODUCTION

Lozenges are solid, single dose preparation intended to be sucked to obtain, usually, a local effect in the oral cavity and the throat. They contain one or more active substances, usually in a flavored and sweetened base, and are intended to dissolve or disintegrate slowly in mouth when sucked. [1] Lozenges are used for patient who have difficulty in swallowing of solid oral dosage form as well as for the drugs which should be released slowly to yield a constant amount of drug in the oral cavity or to coat throat tissues with the solution of drug. A throat lozenge includes cough drop, troche, cachou or cough sweet which is small, medicated tablet intended to be dissolved slowly in mouth to temporarily arrest coughs, to lubricate and to soothe the irritated tissues of the throat infections (sore throat) caused due to common cold and influenza. Chewable lozenges are popular among the pediatric and geriatric population. [2]

They are intended to treat local irritation or infection of mouth or pharynx and may also be used for systemic drug absorption. Lozenges are intended to achieve local effect as soothing and purging the throat. Lozenges are also used for systemic effect provided the drug is well absorbed through the buccal linings or when it is swallowed. Lozenges are placed in oral cavity. Since the sublingual lozenges may be impractical due to their size, buccal lozenges are formulated and have been extensively used and are intended to be placed between the cheek and the gums. Though the lozenge dissolution time is about 30 minutes, this depends on the patient; as the patient controls the rate of dissolution and absorption by sucking on lozenge until dissolves. Sucking and the subsequent production of saliva may also lead to increased dilution of the drug and accidental swallowing. [3] Lozenges can be prepared by molding (gelatin and/or fused sucrose and sorbitol base) or by compression of sugar-based tablets. Molded lozenges are sometimes referred to as pastilles, whereas compressed lozenges may be referred to as troches. They are used for patients who cannot swallow solid oral dosage forms as well as for medications designed to be released slowly to yield a constant level of drug in the oral cavity or to bath the throat tissues in a solution of the drug. Lozenges historically have been used for the relief of minor sore throat pain and irritation and have been used extensively to deliver topical anesthetics and antibacterial. Today they are used for of drugs like analgesics, anesthetics, antimicrobials, antiseptics, antitussives, aromatics, astringents, corticosteroids, decongestants, and demulcents and other classes and combinations. [4]

Advantages of Lozenges [5, 6]

1. It can be given to those patients who have difficulty in swallowing.
2. Easy to administer to geriatric and pediatric population.
3. It extend the time of drug in the oral cavity to elicit a specific effect.

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NEWS & Conference

A Review on Fixed Dose Combinations: Irrational Drug Combinations and Patient Compliance.

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Abstract - **Medicines play an important role in healthcare delivery, and when used properly, can help cure diseases, relieve symptoms and alleviate patient suffering. Nonetheless, irrational use of medicines remain a major issue facing most health systems across the world.**

keywords - **Irrational drugs combinations, fixed dose combinations, Polypharmacy.**

1. INTRODUCTION:

The Food and Drug Administration, USA defines a combination product as 'a product composed of any combination of a drug and a device or a biological product and a device or a drug and a biological product or a drug, device, and a biological product. When two or more drugs are combined in a fixed dose formulation like tablet, capsule, syrup, powder or injection, then their plasma half-life should approximately be same. The ratio of dose would depend on the volume of distribution and peak plasma concentration.

If the combination of drugs is illogical in terms of plasma half-life and pharmacokinetics of the drug, the combination should be termed as irrational drug combination. Large numbers of such irrational drug combinations are available in the market which unnecessarily increase the cost of medication and add to the side effects of the therapy [1].

The World health organization (WHO) estimates that more than half of all medicines are inappropriately prescribed, dispensed, or sold. Additionally, around 50% of patients fail to take their medicines correctly. The problem of drug combination use is known to be worse in developing countries with weak health systems, where mechanisms for routine monitoring of medicine use are often not well developed or are at times non-existent.

Tackling the issue of drug combination use is considered to be essential not only to improve healthcare delivery towards ensuring patient safety, but also to allow for optimal utilization of resources. This stems from the fact that as much as 25%–70% of overall health expenditure in developing countries is spent on medicines whereas, around 10% of health expenditure in most high-income countries is consumed by medicines [2].

In many developed countries, a well-functioning drug and therapeutics committee (DTC) has been shown to be very effective in addressing drug use problems. However, in many developing countries DTCs do not exist and in others they do not function optimally, often due to lack of local expertise or a lack of incentives [3].

Statistics suggest irrational use of medicines was listed among the top 10 causes of morbidity and mortality in the U.S. and it cost approximately US$870 million to provide care and treatment for those who were admitted to the hospital due to adverse medical events in the UK [4].

The most common problems associated with irrational use of medicines include selection of medicines without consideration for cost-effectiveness and efficacy, inefficient procurement of unnecessarily expensive drugs, failure to prescribe medicines in accordance with standard treatment protocols, poor dispensing practices resulting in medication errors, improper patients adherence to dosing schedules and treatment regimens, and inappropriate self-medication [5].

In addition, more than 50% of patients worldwide failed to take their medications properly. Either overuse or underuse of antibiotics can also result in serious antimicrobial resistance.

The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards [6].

Examples of irrational use of medicines include: use of too many medicines per patient ("poly-pharmacy"); inappropriate use of antimicrobials, often in inadequate dosage, for non-bacterial infections; over-use of injections when oral formulations would be more appropriate; failure to prescribe in accordance with clinical guidelines; inappropriate self-medication, often of prescription-only medicines; non-adherence to dosing regimens [7].

Uses of Fixed Dose Combinations (FDC's) are very prevalent in India by health professionals & physicians in order to provide quickly and better patient compliance. However, it has been found that in most of the cases of treatment, the sufferer or patient are being treated with FDC's that are not relevant to the disease with one or the other drug content of FDC's. Such treatment not only lead to financial burden on patient but also put him/her at the risk of toxicity, serious adverse effect, drug resistance and encourage risk of incompatibility and unethical practices.

From the literature study, it has been evident that developing countries like India is weakly regulated in terms of use of FDC's with irrational combination of drugs. The huge population sufferings, lack of awareness regarding healthcare and literacy especially in rural areas, poor healthcare system, costly and private healthcare facilities are being major concern.

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48. COMPARATIVE STUDIES ON BIOCHEMICAL, HISTOPATHOLOGICAL AND FTIR-ATR SPECTRAL STUDIES OF HYPERLIPIDEMIA INDUCED BY CHOLESTEROL-RICH DIET IN RATS — 2205 — 777 — 0

Objective: To compare the routine biochemical and histological techniques with FTIR-ATR spectroscopic methods in diagnosing hyperlipidemia. Materials: Compositional changes in the serum and tissues reflects the healthy and pathological status of animals. FTIR-ATR was attempted as an additional tool for evaluating the composition in the serum as well as in tissues materials. To achieve this Wistar ...

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49. PHYTOCHEMICAL SCREENING AND EVALUATION OF ANTIOXIDANT, ANTI-MICROBIAL AND ANTI-INFLAMMATORY ACTIVITY OF "CURCUMA CAESIA" — 2652 — 842 — 0

The rhizomes of Curcuma caesia Roxb. (Zingiberaceae) Are traditionally used in the treatment of various ailments and metabolic disorders like leucoderma, asthma, tumors, piles, bronchitis, etc. in Indian system of medicine. Considering the importance of natural products in modern phytomedicine, the antioxidant and ant mutagenic activities of C. caesia Roxb. rhizome extract and its fractions were e...

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50. A COMPARISON OF MENTAL HEALTH, QUALITY OF LIFE, AND HAPPINESS IN MOTHERS OF CHILDREN WITH AUTISM SPECTRUM DISORDERS VERSUS MOTHERS WITH HEALTHY CHILDREN — 2674 — 803 — 0

Introduction: Autism spectrum disorders (ASD) are a group of mental problems that interfere with social interaction skills, and behavioral spectrum. ASDs are one of the most prevalent developmental disorders among children. The purpose of this study was to examine the mental health, quality of life, and happiness in mothers who had ASDs children and compare them with mothers having healthy childre...

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51. THE EFFECT OF PSYCHIATRIC EDUCATION ON THE ATTITUDE OF MEDICAL STUDENTS OF GUILAN UNIVERSITY OF MEDICAL SCIENCES TOWARD PSYCHIATRY — 2000 — 876 — 0

Introduction: While many medical students have a special talent in psychiatry, attracting them to this specialty is a problem. The purpose of this study was to examine the impact of psychiatric education on the attitude of medical students on psychiatric patients. Method: In this observational study, 200 medical externs and interns were recruited. Before and after attending the 4-week psychiatry e...

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52. NATURAL ALTERNATIVES TO TREAT CANCER: A STUDY ON ANTICANCER ACTIVITY OF LAWSONIA INERMIS LINN. — 2228 — 592 — 1

Henna (Lawsonia inermis) is widely used cosmetically and medicinally. Literature survey reveals that the plant henna also has anticancer activity. Most of the anticancer activities of Lawsonia inermis plant are carried out

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NATURAL ALTERNATIVES TO TREAT CANCER: A STUDY ON ANTICANCER ACTIVITY OF *LAWSONIA INERMIS* LINN.

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ABSTRACT: Henna (*Lawsonia inermis*) is widely used cosmetically and medicinally. Literature survey reveals that the plant henna also has anticancer activity. Most of the anticancer activities of *Lawsonia inermis* plant are carried out using total leaves extract, and purified individual compounds also. The cytotoxicity profile of the extracts, as well as purified fractions, was determined by MTT assay on HeLa cell line. As the total ethanolic extract demonstrated growth inhibition in cancer cells, attempts were made to isolate the active compound from total ethanolic extract, with potent activity. Lawsone, 2-hydroxy-1, 4-naphthoquinone is the active constituent of *Lawsonia inermis* (Henna), *L. alba*, and other species of Lythraceae family. It is reported to posses various medicinal properties. The present study reports the anticancer activity of lawsone, naphthoquinone derivative isolated from the henna leaves, and its predictive conformation by spectral studies. Isolated lawsone was tested for the anticancer activity, which showed significant results.

INTRODUCTION: The associated intolerable side effects of the radiation and some chemotherapeutic agents take away the "Quality of Life," of a cancer patient, though they provide effective control over cancer. Some of them are effective and agents of choices by the oncologist. However, the pain and agony through which the cancer patient goes due to side effects are unexplainable. Hence, the other side of cancer is compiling to take a look and give thought process to alternate medicine. Given ancient claims about the utility of plant material on understanding the molecular mechanism of cell multiplication and testing chemical entities for the targeted interruption in the cell proliferation in cancer, modern research indeed revealed some effective phytochemicals for the cancer therapy [1, 2].

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A single plant cell is a huge chemical reactor, that way a plant is a huge chemical factory. And if the chemical structures of latest anticancer drugs are studied their identical or prototypes are already available in plants. Hence, it is not unreasonable to believe that a potent anticancer drug can be isolated from the plant. Interest has reviewed recently, in henna to investigate isolation, purification, and identification of novel anticancer active phytochemicals that might lead to drug development for intolerable and incurable cancer disease. These plant-derived drugs are considered natural, safe, beneficial and affordable [2]. Henna is considered a safe herbal medicine with only a few and insignificant side effects [16, 17].

***Lawsonia Inermis* Linn. (Henna):** *Lawsonia inermis* L., (Henna) belongs to family Lythraceae is an ornamental flowering plant found abundant in Iran, Sudan, Somalia, Egypt, Morocco, Yemen, Niger, India and Pakistan [3]. This plant is multi-branched, deciduous shrub or small tree having 2.6 m height. Leaves of this plant are 1.3-3.2 cm broadly or elliptic-lanceolate and bear grey-white color flowers [4].

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98-102

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EFFECT OF STERILIZATION BY HEATING IN THE PRESENCE OF BACTERICIDE AND BACTERIAL FILTERED MEMBRANE ON THE STABILITY OF EYE DROPS CONTAINING 0.5% CHLORAMPHENICOL AT VARIOUS PH

SRI AGUNG FITRI KUSUMA, MARLINE ABDASSAH
103-109

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EXPLORING THE POTENTIAL OF EUDRAGIT FOR DEVELOPMENT OF MICROPARTICLES OF WATER SOLUBLE DRUG USING QUALITY BY DESIGN APPROACH

SHAILESH SHARMA, NIMRATA SETH
110-116

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CHARGE-TRANSFER COMPLEXES OF CHLORPHENOXAMINE HYDROCHLORIDE WITH CHLORANILIC ACID, 2,3-DICHLORO-5,6-DICYANO-1,4-BENZOQUINONE AND 7,7,8,8-TETRACYANOQUINODIMETHANE AS Π-ACCEPTORS

AKRAM M. EL-DIDAMONY, MOUNIR Z. SAAD, GEHAD M. RAMADAN
117-123

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FORMULATION DEVELOPMENT OF IMMEDIATE RELEASE PELLETS OF TADALAFIL: SOLIDIFICATION APPROACH FOR NANOSUSPENSION
SOLIDIFICATION APPROACH FOR NANOSUSPENSION

SHOBHA UBGADE, VAISHALI KILOR, VIDYA BAHEKAR, ABHAY ITTADWAR
124-131

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FORMULATION AND EVALUATION OF MOUTH DISSOLVING TABLET OF [illegible]

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Original Article

FORMULATION DEVELOPMENT OF IMMEDIATE RELEASE PELLETS OF TADALAFIL: SOLIDIFICATION APPROACH FOR NANOSUSPENSION

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ABSTRACT

Objective: Nanosuspension is known to enhance the saturation solubility and dissolution velocity of poorly soluble drugs owing to the increased surface area of nanosized particles. Stability of these solubility enhancing systems can be improved by converting them into solidified forms. To simultaneously achieve enhanced dissolution and improved stability, an attempt has been made to increase the dissolution rate of poorly soluble drug tadalafil by formulating immediate release pellets of its nanosuspension.

Methods: Tadalafil nanosuspensions were prepared using high shear homogenization technique and hydroxypropyl methylcellulose (HPMC) E 15, sodium dodecyl sulphate (SDS) as stabilizers. Prepared nanosuspensions were subjected to the characterization of particle size distribution, zeta potential, drug loading and saturation solubility. Optimized nanosuspension was solidified by preparing immediate release pellets: for improved stability, where tadalafil nanosuspension was used as a binder. Pellets were prepared by extrusion-spheronization technique using κ-carrageenan as a pelletizing aid.

Results: Prepared immediate release pellets disintegrated within 03 min. *In vitro* dissolution studies showed 85% drug release within 45 min in pH 1.2 buffer from immediate release pellets containing tadalafil nanosuspension.

Conclusion: It can be concluded that formulation of nanosuspension of poorly soluble drug and its use as a binder for the preparation of immediate release pellets markedly improved the dissolution rate.

Keywords: Tadalafil, Nanosuspension, Immediate release, Dissolution enhancement, Solidification

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INTRODUCTION

One of the major challenges of the pharmaceutical researchers is to develop an enabling formulation which can make poorly water-soluble drugs highly soluble to overcome the low bioavailability problem of the drugs. Many strategies are used to improve the aqueous solubility of the poorly soluble drugs such as complexation [1], micronisation [2], lipid based formulations, use of cosolvents, solid dispersions [3] etc. However, these techniques often lead to poor solubility, toxicity [4], high production costs [5] and therefore fails at commercial level.

Nanotechnology-based formulations have been valuable in improving the solubility of poorly soluble drugs, as nanosuspension formulations have shown good results in many cases in improving saturation solubility due to the increased surface area available for dissolution [6,7]. Literature reports use of high shear homogenization for the preparation of oral nanosuspension formulations of some poorly water-soluble drugs. Since nanosuspensions suffer from stability problems like aggregation, sedimentation, crystalline transformation, nanosuspension can be solidified by using spray drying method [8], fluid bed drying [9] or by converting into oral thin film [10] formulation. However, these methods may lead to the increased cost of the product. Thus, an approach is required that is not only providing solubility improvement but also imparting stability to the formulation during shelf life and also which involves simple techniques that can be easily employed for commercial production.

Pelletization is an agglomeration process that converts fine powders or granules of bulk drugs and excipients into small, free-flowing, spherical or semi-spherical units, referred to as pellets. Pellets range in size; typically, between 0.5 mm and 1.5 mm. Pellets being smaller in size offer a larger surface area for dissolution than any other solid dosage form [11]. The surface area can further be increased by making these pellets disintegrate immediately. Decreasing the particle size of poorly soluble drugs is an established approach for improving solubility, thus improving bioavailability [12].

In the present research work, tadalafil was used as a model drug and its nanosuspensions were prepared using high shear homogenization method for the dissolution improvement. Optimized nanosuspension was used as a binder for the preparation of immediate release (IR) pellets, where, κ-carrageenan was used as a pelletizing agent [13].

The objective of the study was to investigate the feasibility of using high shear homogenizer for the preparation of nanosuspension and use of drug-loaded nanosuspension as a binder for the preparation of immediate release pellets in order to improve the dissolution rate of model drug tadalafil. Tadalafil is a BCS Class II drug and possess poor solubility. It is primarily used to treat erectile dysfunction, benign prostate hyperplasia and primary pulmonary hypertension [14]. High selectivity and better efficacy, makes it a drug of choice for the treatment of erectile dysfunction.

Physicochemical properties of nanosuspension including particle size, zeta potential, and saturation solubility were evaluated. IR pellets were prepared using κ-carrageenan as a pelletizing agent. Since, the disintegration of pellets will lead to increase in surface area of the drug which is already in nanosize, therefore, stabilizing the nanosuspension by preparing its IR pellets would be a suitable approach leading to high surface area and increased dissolution rate. Disintegration time and drug dissolution rates of the prepared pellets were investigated. Scanning electron microscopy (SEM) of pellets was carried out to get further insight into the mechanism of dissolution enhancement.

MATERIALS AND METHODS

Materials

Tadalafil (Zim Laboratories Ltd., Nagpur, India) was used as a model drug, hydroxypropyl methyl cellulose (HPMC E 15) (Zim Laboratories Ltd., Nagpur, India) and sodium dodecyl sulfate (SDS) (Merck, Mumbai, India) were used as stabilizers to stabilize the nanosuspension. K-carrageenan (Sigma Life Sciences, Sigma Aldrich, USA) and microcrystalline cellulose (Research Lab Fine Chem Industries, Mumbai) were used as pelletizing agents for preparing immediate release pellets. Sodium starch glycolate (Himedia Laboratories Pvt. Ltd., Mumbai) and crosscarmellose sodium (Research Lab Fine Chem Industries, Mumbai) were used for disintegrating the immediate

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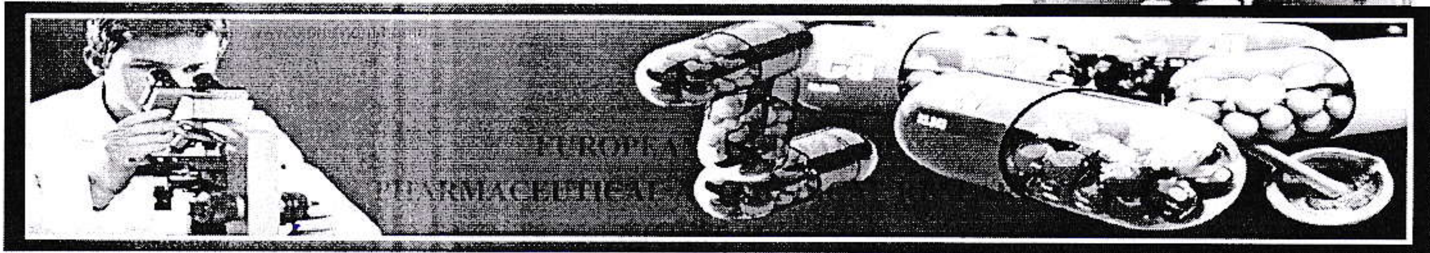

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Research Article

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EFFECT OF SANJEEVANI VATI AN AYURVEDIC MEDICINE IN TYPHOID FEVER - A CLINICAL STUDY

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ABSTRACT

Typhoid fever is one of the major bacterial infections worldwide. The causative Organism is Salmonella typhi, and paratyphi A, B or C. Its highest incidence can be found in Asia, about 100 cases/100,000 population occurs each year. Typhoid requires treatment for 7- 21 days. It has high social & economical impact due to hospitalization requires in acute disease condition, complication and the loss of income attributed to the duration of medical illness. Resistance to multiple antibiotics is increasing among Salmonella. Reduced susceptibility to *Fluoroquinolones* and the emergence of multidrug-resistance has complicated the treatment of such infections. The Clinical features of typhoid fever highly resembles with the symptoms of *vata-kapha* dominated fever explained in *Ayurved samhitas*. In *Sharangdhar Samhita*, *Sanjeevani Vati* is mentioned which consist of ten ingredients. It is mainly indicated for gastro-intestinal problems, possessing the property of carminative, mild laxative, antitoxic, antipyretic & vata - kapha shamak in effects. Total 23 patients of age group 05-15 years suffering from fever with positive Widal test were selected for this clinical study purpose. Commonly found symptom of typhoid ie. fever, loss of appetite, headache, Cough & Cold, and Rash, were considered for clinical observation. The observations were recorded on 0^{th}, 2^{nd}, 4^{th} & 7^{th} day of the treatment and evaluated by percentage of relief. 97.05% (21) patients were free from fever within due course of treatment. The p value < 0.001, this was statistically significant. Thus the Sanjeevani vati was effective in the treatment of typhoid fever.

KEYWORD: Typhoid fever, Sanjeevani vati, vata-kaphaj jwar, Ayurvedic medicine.

INTRODUCTION

Typhoid fever is one of the major bacterial infections worldwide.[1] The causative Organism is Salmonella typhi, and paratyphi A, B or C. Its highest incidence can be found in Asia, about 100 cases/100,000 population occurs each year. Typhoid requires treatment for 7- 21 days. Typhoid fever has a considerably longer incubation period (median of 5 to 9 days) and longer duration of symptoms (fever persists for approximately three weeks). Typhoid fever is a systemic infection during which S. Typhi colonizes the liver, spleen and bone marrow in addition to the intestine and the mesenteric lymph nodes.[2,3] Its real impact is difficult to estimate because the clinical picture is confused with those of many other febrile infections. According to CDC (centre of disease control) almost 21.5 million people in developing countries contract typhoid each year.[4]

Typhoid fever also has a very high social and economic impact because of the hospitalization of patients with acute disease, the complications and loss of income attributable to the duration of the clinical illness.[5] Between 1% and 5% of patients with acute typhoid infection have been reported to become chronic carriers of the infection in the gall bladder, depending on age, sex and treatment regimen. The propensity to become a carrier follows the epidemiology of gall bladder disease, increasing with age and being greater in females than in males. The propensity to become a chronic carrier may have changed with the present availability and selection of antibiotics as well as with the antibiotic resistance of the prevalent strains. Third generation antibiotics fluoroquinolones are the optimal choice for the treatment of typhoid fever in adults and that they may also be used in children. There are disturbing recent reports of the emergence of fluorquinolone-resistant isolates in various parts of Asia.[6,7,8] and there have been a few reports of resistance to third-generation cephalopsorins in the same region. Reduced susceptibility to fluoroquinolones and the emergence of multidrug resistance has complicated

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Case Report
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FORMULATION AND EVALUATION OF ANTISEPTIC FILM FORMING LIQUID FOR SKIN INJURY

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ABSTRACT

Objective-The localized treatment of body tissues, skin diseases, injury and wounds requires that the particular pharmaceutical components be maintained at the site of treatment for an effective period of time but dermatological administration of creams, foams, gels and lotions are considered to reside for a relatively short period of time at the targeted site. To overcome this problem here the approach chosen for the new dosage form is a in-situ film forming polymeric formulations. On the skin surface this formulation solidifies into a film which is able to deliver the active moiety to the skin. **Materials**-Materials used for this dosage form are Eudragit L-100, Polyethylene glycol, Isopropyl alcohol, 6.8 phosphate buffer and Povidone-iodine (API). **Methods**- Methods used are Solvent casting method and Spray method. **Conclusion**-The formed film was sufficiently substantial to provide a sustained drug release to the skin and prevent the deposition of dust particles which reduces the chances of further infection. **Result**-Prepared films were evaluated by evaluation parameters appearance, thickness of film, drying time, moisture absorption, water vapor transmission, folding endurance, weight variation, in vitro drug diffusion study.

KEYWORDS: In-situ film, Drug diffusion, Solvent Casting, Skin, Sustained release.

I. INTRODUCTION

The approach chosen for the new dosage form is an in-situ film forming polymeric formulations. On the skin surface the solution solidifies into a film which is able to deliver the active moiety to the skin. In-situ Film forming preparations or formulations are defined as non-solid dosage forms that produce a substantial film in situ after application on the skin or any other body surface. Such compositions can either be liquids or semisolids with a film forming polymer as basic material for the matrix.[1] Film forming preparations have been known predominantly from the field of surgery or wound care. Film forming solutions or gels has been used for example as tissue glues for the sealing of operative wounds. A wide variety of other ingredients such as fragrances, glycerol, petroleum jelly, dyes, preservatives, proteins and stabilizing agents are commonly added to polymeric formulations and can be used for the delivery of medication such as Antibiotics, Antiseptics, Antifungal, Anti-acne agents, Corticosteroids, Moisturizing or Protective agents (such as calamine) related to skin disorders and/or injury.[2&3]

Advantages of in-situ film forming pharmaceutical preparations

1. Many agents are applied to the skin deliberately with *beneficial outcomes. Conventional formulations intended* for topical and dermatological administration of drugs such as creams, foams, gels and lotions are considered to reside for a relatively short period of time at the targeted site. The localized treatment of body tissues, diseases and wounds requires that the particular pharmaceutical component be maintained at the site of treatment for an effective period of time. In-situ Film forming formulations are potential drug delivery systems for topical application to the skin. Topical film forming formulations are intended for skin application or to certain mucosal surfaces for local action or percutaneous penetration of medicament or for their emollient or protective actions. These compositions adhere to the body tissue, forming a thin transparent film and provide a localized delivery of the pharmaceuticals to the body tissue.

2. Topical drug delivery is an attractive route for local and systemic treatment. The delivery of drugs onto the skin is recognized as an effective means of therapy for local dermatological diseases. It can penetrate deeper into skin and hence give better absorption. Majority of the skin diseases may be treated topically with treatment delivered directly to the desired site of action, thereby avoiding or at least attenuate the potential systemic side effects. The skin became popular as a potential site for drug delivery because of the characteristics such as: (a) Avoid the problems of stomach emptying, pH effects, *and enzyme deactivation associated with gastrointestinal* passage (b) To avoid hepatic first-pass metabolism and

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THE EFFECT OF DIFFERENT STORAGE TEMPERATURES ON ANTISEPTIC GEL STABILITY CONTAINING GREEN TEA EXTRACT FORMULATED WITH ALOE VERA GEL

SRI AGUNG FITRI KUSUMA, DEFU YUSUF, ARDIAN BAITARIZA

224-229

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STUDIES ON EFFECT OF FORMULATION AND PROCESSING PARAMETERS ON STABILITY OF KETOROLAC TROMETHAMINE ORALLY DISSOLVING FILMS

NIDHI P. SAPKAL, MINAL N. BONDE, MANGESH GAWANDE, ANWAR S. DAUD

230-235

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d 10.22159/ijap.2019v11i4.32026

A FORMULATION OF ORALLY DISINTEGRATING SECANG (CAESALPINIA SAPPAN L.) TABLETS AS AN ANTIOXIDANT WITH HYDROXYPROPYL CELLULOSE AS A MASKING AGENT

RESMI MUSTARICHIE, DRADJAD PRIAMBODO

236-241

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ENHANCED ORAL BIOAVAILABILITY OF TENOFOVIR FROM IONOTROPICALLY GELLED MICROBEADS

DHANDAPANI NAGASAMY VENKATESH, PREETY RAO, RAMAN RAJESHKUMAR

242-250

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OPTIMIZATION OF AQUEOUS-BASED FILM COATING PROCESS PARAMETERS CONTAINING GLUCOSAMINE SULFATE POTASSIUM CHLORIDE

NISHANT OZA, AKRUTI KHODAKIYA, SWATI SAGAR

251-257

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APPLICATION OF 1H-NMR SPECTA AND MULTIVARIATE ANALYSIS FOR THE AUTHENTICATION OF *CURCUMA XANTHORRHIZA* FROM *ZINGIBER CASSUMUNAR*

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Original Article

STUDIES ON EFFECT OF FORMULATION AND PROCESSING PARAMETERS ON STABILITY OF KETOROLAC TROMETHAMINE ORALLY DISSOLVING FILMS

NIDHI P. SAPKAL[1*], MINAL N. BONDE[2], MANGESH GAWANDE[2], ANWAR S. DAUD[2]

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ABSTRACT

Objective: The objective of the proposed work was to study the effect of various formulation and process parameters of solvent casting method on the physical and chemical stability of Ketorolac Tromethamine (KT) in the orally dissolving film dosage form.

Methods: KT-excipient interaction study was carried out both in solid state and by processing samples through the solvent casting technique. The samples were evaluated using IR spectroscopy (IR) and X-ray diffractometry (XRD). Solvent casting method was used to prepare KT films using different film-forming polymers, and solvents. The drying temperature and pH of the dispersion were also varied to study the effect of these parameters on the stability of KT. All the formulations were analysed chemically initially and after one month of storage at 40 °C/75% RH.

Results: During KT-excipient interaction study in solid state KT was found to be stable. No significant changes were observed in its impurity profile. Interaction between different polymers and KT was observed after the solvent casting process as revealed by IR and XRD analysis. The interaction was further confirmed in the film formulations upon chemical analysis. The polymers showing interaction with KT in XRD and IR were making it unstable chemically and were responsible for its chemical degradation as revealed by chemical analysis. It was also revealed that KT is most stable when processed using water as the solvent. KT was found to be stable when processed at a higher temperature and at acidic pH during film formation. It was found that chemical stability is more when Polyethylene oxide (PEO) and water under acidic pH are used and films are dried at a higher temperature.

Conclusion: Both formulation parameters and processing conditions of the solvent casting technique affects the stability of drugs and hence should be studied as part of pre-formulation studies while developing orally dissolving films of drugs.

Keywords: Ketorolac, Tromethamine, Orally dissolving films

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INTRODUCTION

Orally disintegrating strips are relatively a new dosage form. These are very thin, rectangular, paper-like films that disintegrate quickly when kept on the tongue. These are becoming a very popular dosage form for special need patient population like pediatric, geriatric, dysphagic, mentally challenged and bedridden. Few products are already available in the market and many are under development.

These thin films are prepared using the solvent casting method. This method is distinctly different from manufacturing methods of other oral solid dosage forms. In the solvent casting method, all the ingredients are mixed uniformly in aqueous or hydro-alcoholic solvents to form a uniform dispersion of desired consistency. This dispersion is then spread in the form of a thin film of uniform thickness and dried in the drying chamber. The quantity of moisture and exposure to high temperature is significantly more in this process as compared to any other manufacturing process, like, granulation, tableting, pelletization, coating etc. Due to this, physicochemical interactions may take place that may affect the stability of the product. This might be the reason that despite being very useful dosage form, not many products are being launched in the market.

Ketorolac tromethamine (KT) is a salt of (*RS*)-5-benzoyl-2,3-dihydro-1*H*-pyrrolizine-1-carboxylate with 2-amino-2-(hydroxymethyl) propane-1,3-diol [1]. It has both anti-inflammatory and analgesic activity with the analgesic activity being 800 times more potent than aspirin [2]. Degradation behavior of KT has been studied by several researchers in the presence of different factors like pH, temperature, oxidant, and light. The acidic, basic and neutral solution of the drug was found to degrade in hydrolytic, photolytic and thermal conditions but the solid form of the drug was found to be stable under photolytic condition [2-6]. Study of the literature suggests that KT being sensitive molecules may not yield stable film formulation when formulated into orally dissolving films using the solvent casting technique.

KT is already available commercially in the form of oral tablets [7], solution for injection [8], nasal sprays [9] and ophthalmic solutions [10]. Strategies for stabilizing KT in these formulations are already established and known. Some film based dosage forms of KT like, transdermal patches [11], nanocomposite ophthalmic films [12], sublingual films [13], orobuccal films [14] are reported in the literature, but none of them reports the effect of formulation and process parameters on the stability of KT.

The proposed work aims to study the effect of various film-forming polymers and process parameters of solvent casting method on the physical and chemical stability of KT in the orally dispersible film dosage form.

MATERIALS AND METHODS

Materials

KT was procured from Symed Labs. Commercial grade excipients Hypromellose (HPMC) and Polyethylene oxide (PEO) were purchased from Dow Chemicals, Hydroxypropyl cellulose (HPC) was from Ruitai and Kollicoat IR from BASF. The plasticizer Propylene glycol and antioxidant Butylated hydroxyanisole (BHA) were purchased from Finar Limited. All the excipients were stored as received under optimum storage conditions until use.

Methods

Analytical method

A complete analysis of impurities was determined using a Shimadzu HPLC system and C18 column (250 mm X 4.6 m, 5 µm) (Suprisorb ODS-100). The mobile phase was Methanol: Water: Glacial Acetic acid (550:440:10) with a flow rate of 1.2 ml/min. The UV detector was used at 254 nm. The column temperature was 30 °C.

Drug-excipient interaction study in the solid state

In a detailed KT-excipient interaction study, KT was intimately mixed with each excipient as per the ratio mentioned in table 1

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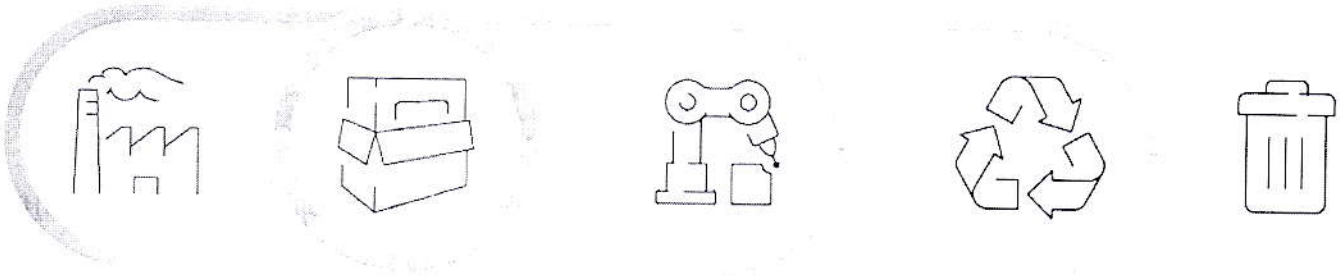

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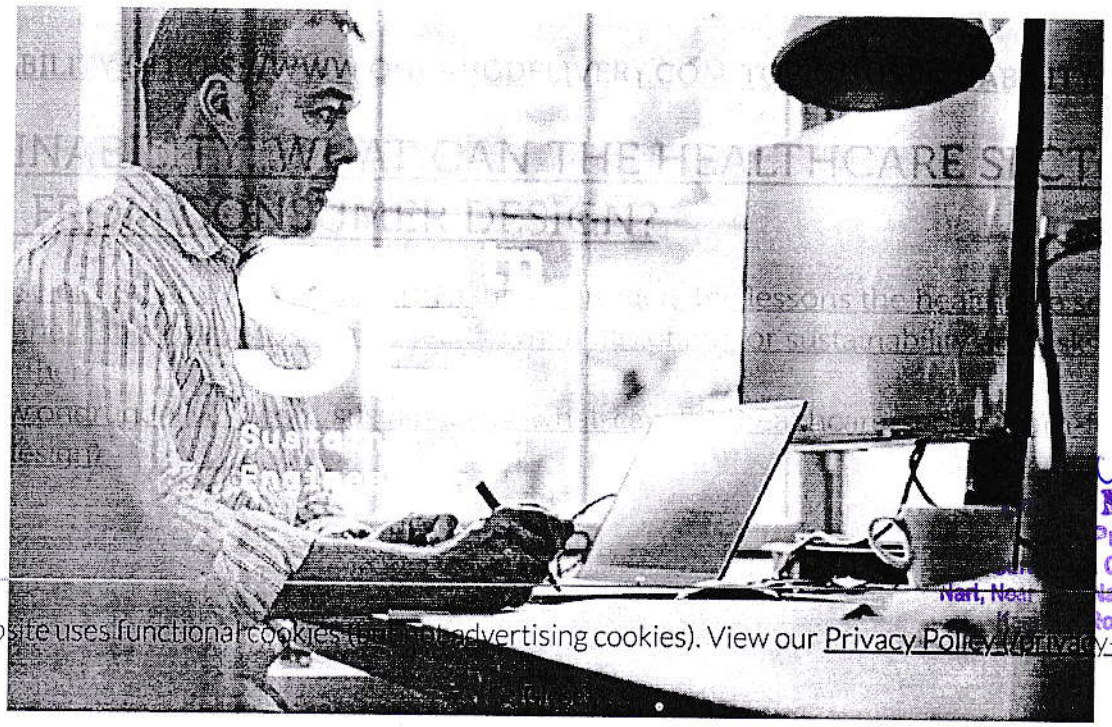

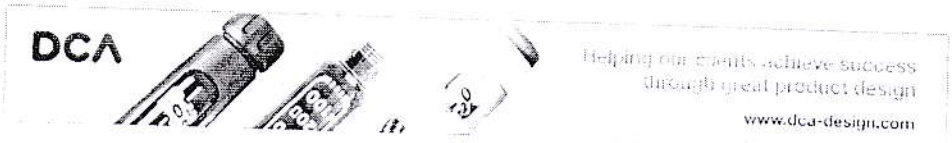

13th August 2018

ORAL THIN FILMS: NOVEL TECHNOLOGY & ITS CHALLENGES

Citation: Sapkal NP, Daud AS, "Oral Thin Films: Novel Technology & Its Challenges", ONdrugDelivery Magazine, Issue 89 (Aug 2018), pp 66-68.

Presented from both the technology and formulation perspectives, Nidhi Prakash Sapkal and Anwar Siraj Daud discuss the challenges of industrialising oral thin films, a promising but difficult dosage form.

INTRODUCTION

In the last decade, oral thin films (OTFs) have been gaining widespread acceptance as a drug delivery solution amongst pharma manufacturing companies. These films have significant visual and functional differences from the other solid oral dosage forms, such as tablets and capsules, and thus provide strong product differentiation. The fact that these films disintegrate and dissolve in the mouth makes them particularly desirable for certain patient groups, such as paediatric, geriatric, dysphagic and bed-ridden patients. Table 1 describes some such patient populations and their specific needs.

Patient Type	Examples of Specific Needs and Problems
Paediatric	• Uncooperative patients • Prescribed liquids as they can't swallow pills • Liquid formulations are associated • with administration of imprecise doses • Liquids have handling, storage and transport problems
Geriatric	• With increasing age, swallowing is more difficult • Because of many chronic problems, pill burden is high • Dependent upon caregiver
Dysphagic	• Inherent difficulty in swallowing
Suffering from neurological disorder	• Uncooperative patients • Voluntary swallowing absent • Tendency to spit out the medicines
Bed ridden	• Difficult to sit in upright position to consume water • • Dependent upon caregiver
Nauseous because of other primary problems like emesis, migraine	• Consumption of water, or anything, • potentiates nausea and triggers emesis • Medication with rapid onset of action is highly desirable
Suffering from urology related problems, or anorexia	• Consumption of water leads to worsening of symptoms like increased • Oralgesia or reduced appetite.

Table 1: Problems and requirements of different patient groups which drug delivery can address.

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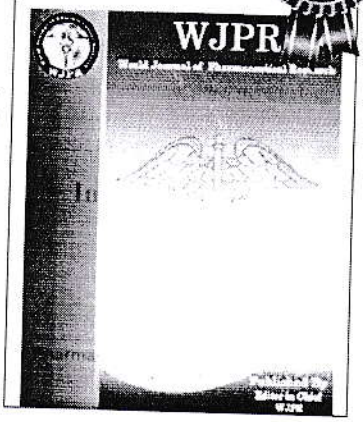

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VARIOUS APPROACHES TOWARDS ENHANCEMENT OF BIOAVAILABILITY OF CURCUMIN – A POTENT PHYTOCHEMICAL

Dr. Mitali Milind Bodhankar* and Shubham Chikhle

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ABSTRACT

Herbal medicine is the oldest form of health care known to mankind. Turmaric (Curcuma longa Linn), a nature's precious and most popular Indian spice belonging to family zingiberaceae is cultivated throughout the Indian sub continent because of its excellent medicinal properties. Curcumin is a specially gifted molecule provided by Mother-Nature to protect humans from chronic health problem. Although curcumin has shown therapeutic efficacy against many human ailment, one of the major problems with the curcumin is its poor bioavailability, which appears to be primarily due to poor absorption, rapid metabolism and rapid systemic circulation. Nanotechnology is an innovative idea that can be used to overcome the problems associated with curcumin solubility, stability and bioavailability. In this review, the various problems, methods of preparation, various types of curcumin nano-drug delivery system of curcumin nanoparticles and its novel approach are discussed. The introduction of gold and silver nanoparticles, Liposomes, Niosomes and so on provides a solution towards increased bioavailability of curcumin. Design and development of herbal nanoparticles has become a frontier research in the nanoformulation arena. However, most of the known activities of curcumin are based only on *in vitro* and *in vivo* studies and this nanotechnology-based medicine may become a reality in clinical applications.

KEYWORDS: Curcumin, Nanoparticles, Liposomes, enhancement of bioavailability.

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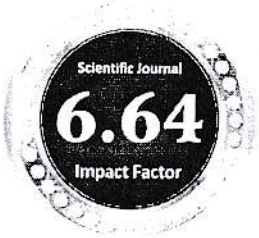

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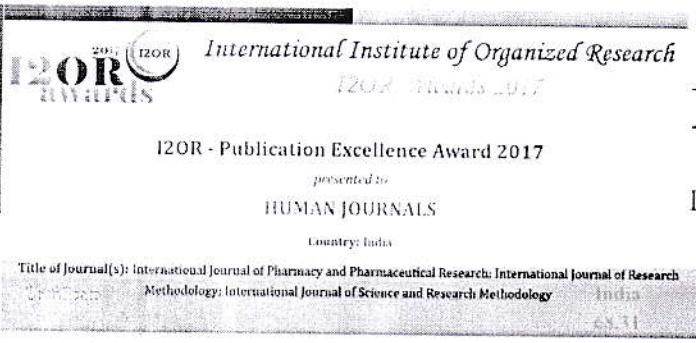

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ABSTRACT

During the last few decades, there has been immense exposure to electromagnetic radiation through mobile phones, Wi-Fi towers, and other devices. Many studies have been conducted regarding their biological effects, pathological, physiological, behavioral, transgenetic studies and more. In the present literature review, it is observed that among the various studies that were performed on electromagnetic emission for various durations and radio-frequencies of irradiation on animals, the subchronic exposure i.e. between one month to three months duration shows maximum alterations in the biochemical parameters, physiological and pathological or behavioral conditions. Acute exposure, of up to one week, to electromagnetic field (emf), does not alter these conditions to much extent. There are fewer studies performed on chronic continuous exposure to rfemf thereby providing less data for prediction of biological effects of chronic exposure to rfemf.

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Extraction, isolation and identification of flavonoid from *Chenopodium album* aerial parts

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ABSTRACT

Chenopodium album L., (*C. album*) (family: Chenopodiaceae) is an annual shrub widely grown in Asia, Africa, Europe and North America. It is commonly known as Bathua (in Hindi), pigweed, fat hen or lamb-quarters. The leaves of *C. album* are applied as a poultice to bug bites, sunstroke, rheumatic joints and as mild laxative. The flavonoids contained in *C. album* aerial parts were extracted, identified and characterized. Sequential soxhlet extraction was subjected to preliminary phytochemical screening and flavonoid quantification. The results showed that maximum yield of the flavonoid (7.335 mg/g) were obtained from acetone extract. This acetone extract was subjected to flash chromatography for isolation of flavonoid. Characterization of isolated flavonoid was done by UV, IR, 1H & 13C NMR and MS. On the basis of chemical and spectral analysis structure was elucidated as 2-(3, 4-dihydroxyphenyl)-3, 5, 7-trihydroxy-4H-chromen-4-one, a flavonoid.

1. Introduction

Polyphenols appear to be important metabolic modulators by virtue of their ability to influence several cellular pathways and molecules that have been reported as potential targets for polyphenolic compounds. Flavonoids are "the most common group of polyphenolic compounds in the human diet and are found *ubiquitously* in plants". Although more than 4000 flavonoids have been identified, several appear to be important components of many fruits and vegetables. According to the differences in functional groups and their relative positions of the 15-carbon skeleton (aglycons), flavonoids are classified into several subgroups such as flavone, flavanone, flavonol, isoflavonoid, anthocyanidin, and chalcones.[1] Flavonols, the original bioflavonoids such as quercetin, are also found ubiquitously, but in lesser quantities. Flavonoids, a subclass of polyphenols, are a group of phytochemicals that are among the most potent and abundant antioxidants in our diet and also possesses various activities such as anti inflammatory, anti cancer etc.

Chenopodium album L., (*C. album*) (family: Chenopodiaceae) is an annual shrub widely grown in Asia, Africa, Europe and North America. It is commonly known as Bathua (in Hindi), pigweed, fat hen or lamb-quarters. The leaves of *C. album* are applied as a poultice to bug bites, sunstroke, rheumatic joints and as mild laxative.

The plant is used in folk medicine in different parts of the world as diuretic, laxative, sedative, hepato-protective and antiparasitic. The leaves possesses anthelmentic, antiphlogistic, antirheumatic, mildly laxative and odontalgic properties, applied as wash or poultice to bug bites, sunstroke, rheumatic joints and swollen feets.[2] Additionally, decoction of its aerial parts mixed with alcohol was used in the rheumatism.[3] Cinnamic acids amides.,[4] flavonoids[5,6] and apocarotenoids[7] have also been isolated from this species. Flavonoid from *C. album* has significant potential to scavenge free radicals, NF kappa B inhibition, anti-inflammatory, and hence have got antirheumatic potential.[8]

The aim of the study was to isolate the flavonoids using Flash Chromatography and was characterized through their spectral analysis like IR, 1H, 13C NMR and MS.

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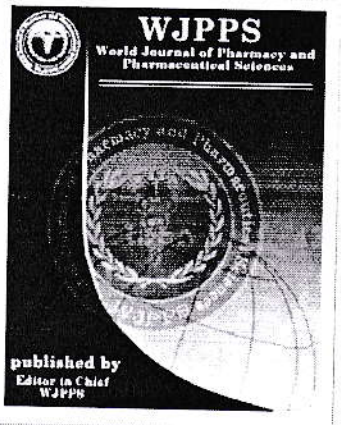

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PHYTO-CHEMICAL EXTRACTION AND ANTI-MICROBIAL ACTIVITY OF SELAGINELLA BRYOPTERIS

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ABSTRACT

The present study was performed to determine the preliminary anti-microbial activity of *Selaginella Bryopteris* belonging to family *Selaginellaceae*. The antibacterial activity of the methanolic extract was done some standard bacterial strains such as *Staphylococcus aureus, Bacillus subtilis* and *Escherichia coli.* The testing was done by the agar cup plate method. Zone of Inhibition of extract was compared with standard Gentamicin. Results indicate that 50 mg/ml methanolic extracts showed the maximum inhibitory effects against *E. coli* (7mm).

KEYWORDS: *Selaginella Bryopteris,* Antibacterial, *E. coli,* Zone of inhibition.

INTRODUCTION

The *Selaginella bryopteris* also known as Devanagari or Sanjeevani. It has medicinal use and it depends on decaying plants and rain water for its nutrients. The grow on rocks. Sanjeevani refers to "One that Infuses Life".[1] The nanoparticle of *Selaginella bryopteris* shows targeted delivery.[2] The nanotechnology platform could serve as customizable targeted drug delivery.[3] Nanotechnology involves a convergence of multiple areas of science and molecular biology.[4]

Selaginella species have attracted attention of researchers worldwide due to the presence of high molecules such as flavonoid, bioflavonoids, tannin, saponin, triterpene, steroid and many other secondary metabolites.[5,6,7] The pharmacological properties of bioflavonoids were well reported that includes antimicrobial, antiviral, anticancer, anti-inflammatory activities.[8,9,10] *S. bryopteris* is one of the Sanjeevani-like plants enriched with flavonoids and

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Formulation and Evaluation of Aloe Vera Gel and Film From Fresh Pulp of the Leaves of Aloe Barbadensis

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ABSTRACT

The historians have recorded many applications of aloe species both in the medical field as well as in cosmetics. It is used to heal burns, to prevent blisters for the treatment of wounds and in various kinds of damaged skin. Burns are serious traumas related to skin damage, causing extreme pain and natural drugs such as Aloe vera is beneficial in formulations for wound healing. The aim of this work is to develop and evaluate polymeric films containing Aloe Vera crude extracts to smoothen and treat minor wounds caused by burns. Polymeric films containing different quantities of HPMC and polyvinyl alcohol (PVA) were characterized for their mechanical properties. The polymeric films, which were formulated, were found to be thin, flexible, resistant, and suitable for application on damaged skin, such as in burns & wounds. The formulated gel was evaluated for evaluations parameters were thickness, tensile strength and water vapour permeability. general appearance, homogeneity, pH, spreadability test, washed test and skin irritation test. Film

Keywords: Aloe Vera, Gel and Film.

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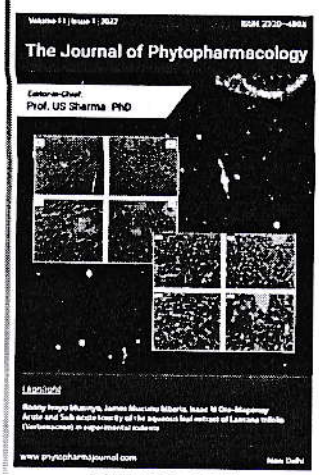

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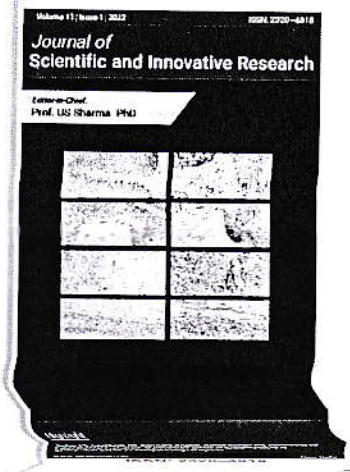

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Markkas, Madhuramozhi Govindharajalu*
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Cytotoxicological evaluation of semi-purified extracts of some dye yielding plants of the Kashmir Valley on Normal Intestinal Cell Line (IEC-6) by MTT assay
Qazi Gazala*, Shoukat Ara, K.M Ansari, Imtiyaz Murtaza, Hina Qazi
The Journal of Phytopharmacology, 2018;7(1):5-9
DOI: 10.31254/phyto.2018.7102

Effect of ethanolic extract of *Reissantia indica* on the human breast cancer cell line (mcf-7)
Gayathri P, Dhana Sekar V*, Sudhakar K, Sangeetha M, Chamundeeswari D
The Journal of Phytopharmacology, 2018;7(1):10-12
DOI: 10.31254/phyto.2018.7103

Adding value to wild Himalayan fig (*Ficus palmata*): Composition, functional and sensory characteristics of jam
Kajal Kumari, Somesh Sharma*, V.K. Joshi, Surabhi Sharma
The Journal of Phytopharmacology, 2018;7(1):13-18
DOI: 10.31254/phyto.2018.7104

Evaluation of anxiolytic activity of *W. chinensis* Merrill leaves
Kundan Singh Bora*, Ankita Pant
The Journal of Phytopharmacology, 2018;7(1):19-24
DOI: 10.31254/phyto.2018.7105

Phytochemical screening and anticonvulsant activity of *Sargassum ilicifolium* (brown algae) in mice
Subhash R. Yende*, Uday N. Harle, Sumit K. Arora, Vipinchandra B. Pande
The Journal of Phytopharmacology, 2018;7(1):25-28
DOI: 10.31254/phyto.2018.7106

Sedative activity of ethanolic and aqueous extracts of *Euphorbia hirta*
Dhanapal Venkatachalam*, Samuel Thavamani B, Sampath Kumar
The Journal of Phytopharmacology, 2018;7(1):29-32
DOI: 10.31254/phyto.2018.7107

Understanding the role of quercetin during neurotoxicity induced by Chlorpyrifos
Soheil Fereidounni*, Davindar Kumar Dhawan
The Journal of Phytopharmacology, 2018;7(1):33-39
DOI: 10.31254/phyto.2018.7108

Quality standards for Urai Mathirai - A siddha immunomodulator formulation for children
Sathiyarajeswaran P*, Shree Devi MS, Sunil Kumar Koppala Narayana, Muthu Tamizh Manoharn, Satheesh Durairaj, Brindha Sundaramoorty, Dhanaraj K, Patturayan R
The Journal of Phytopharmacology, 2018;7(1):40-44
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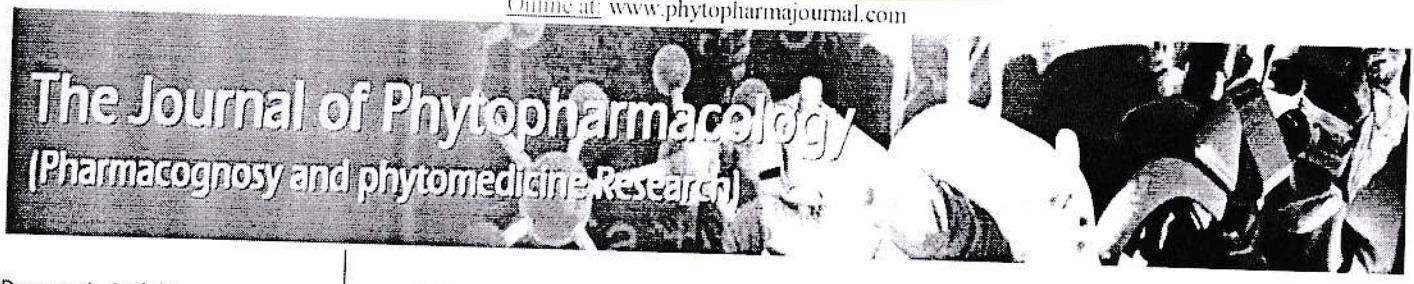

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Phytochemical screening and anticonvulsant activity of *Sargassum ilicifolium* (brown algae) in mice

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ABSTRACT

Sargassum ilicifolium (SI) is a tropical and subtropical marine macroalgae (brown algae) found in coastal area of India. Thais study investigated the anticonvulsant activity of SI in maximal electroshock (MES) induced convulsion and pentylenetetrazole (PTZ) induced convulsion in mice. The result of present study indicated that chloroform extract (600 mg/kg) and ethanol extract (400 mg/kg and 600 mg/kg) of SI significantly decreased the duration of tonic hind limb extension in MES model, as well as it significantly increased the latency to onset of convulsions in PTZ model. These results were comparatively similar with the effect of phenytoin (25 mg/kg) and phenobarbitone (20 mg/kg). This activity may be due to the presence of alkaloids, terpenoids, flavonoids, steroids and saponin in chloroform and ethanol extract of *Sargassum ilicifolium*. However, further research will be necessary to investigate the exact mechanism underlying this anticonvulsant activity.

Keywords: Anticonvulsant activity; *Sargassum ilicifolium*; Brown algae; MES induced convulsion; PTZ induced convulsion.

INTRODUCTION

Marine macroalgae or seaweeds are found in the coastal region between high tide to low tide and in the sub-tidal region up to a depth where 0.01 % photosynthetic light is available and can be classified into three classes: Brown algae (Phaeophyta), Green algae (Chlorophyta) and Red algae (Rhodophyta). Marine macroalgae have created a promising significance in the biomedical area, mainly because of their contents of bioactive substances. Polysaccharides, terpenoids, phlorotanins, fucoidans, sterols and glycolipids obtained from marine macroalgae showed wide range of pharmacological properties which includes anticancer, anti-inflammatory, antimicrobial, antiviral, antioxidant, hypoglycaemic, hepatoprotective and neuroprotective activities [1-3]. Also, some marine organism and marine macroalgae showed the potential as a source of new drugs for the treatment of neurological disorders [4, 5]. Many traditional herbs and herbal medicines have been reported for their CNS activities whereas, the marine flora has not explored up to that extent. Hence, we undertook the study to evaluate CNS potential of some marine macroalgae.

Sargassum ilicifolium (Turner) C. Agardh is tropical and sub-tropical brown algae, distributed in intertidal open coast of Gujarat, Maharashtra, Goa, Karnataka and Lakshadweep. Ethyl acetate extract of *Sargassum ilicifolium* has been reported to possess [illegible]

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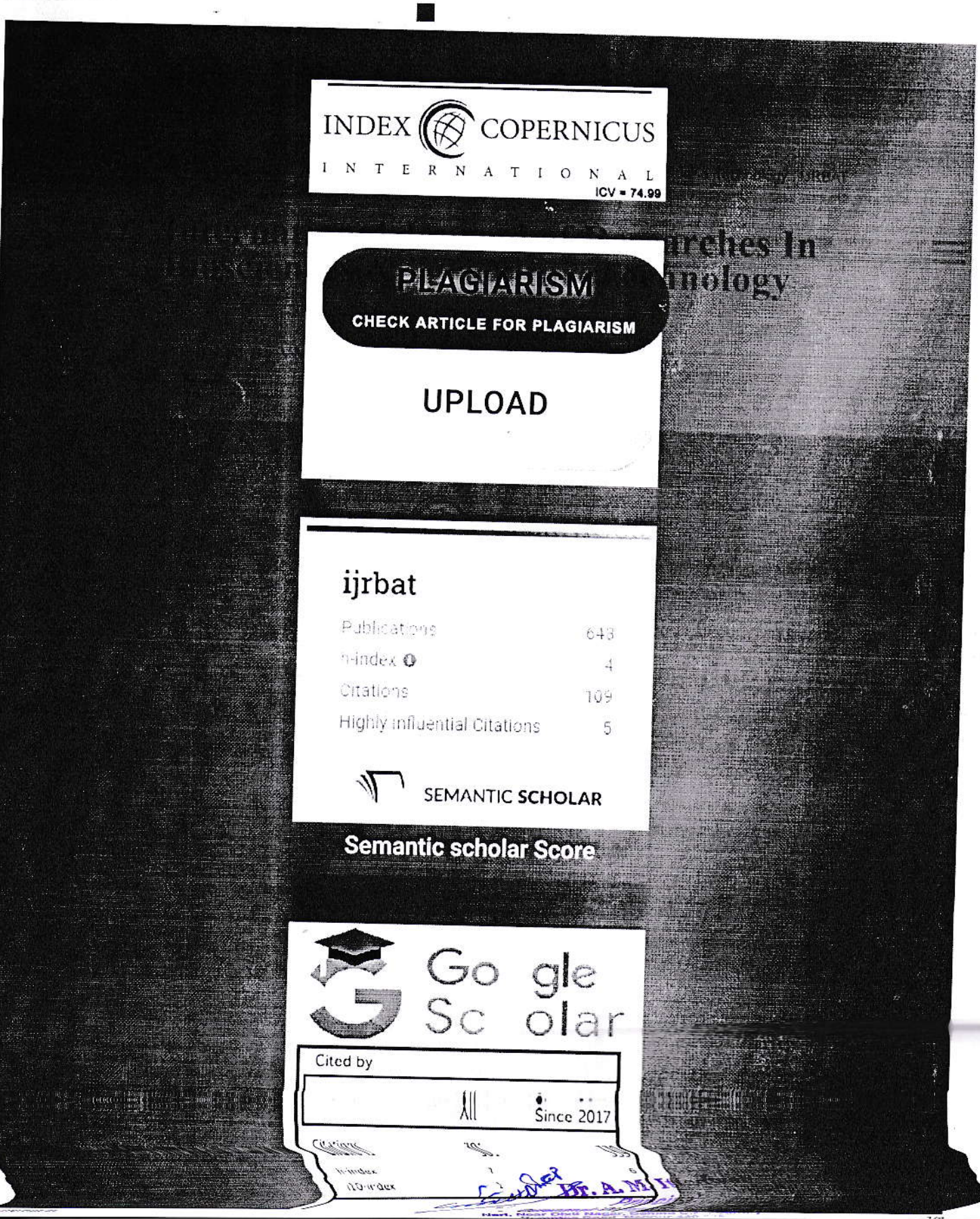

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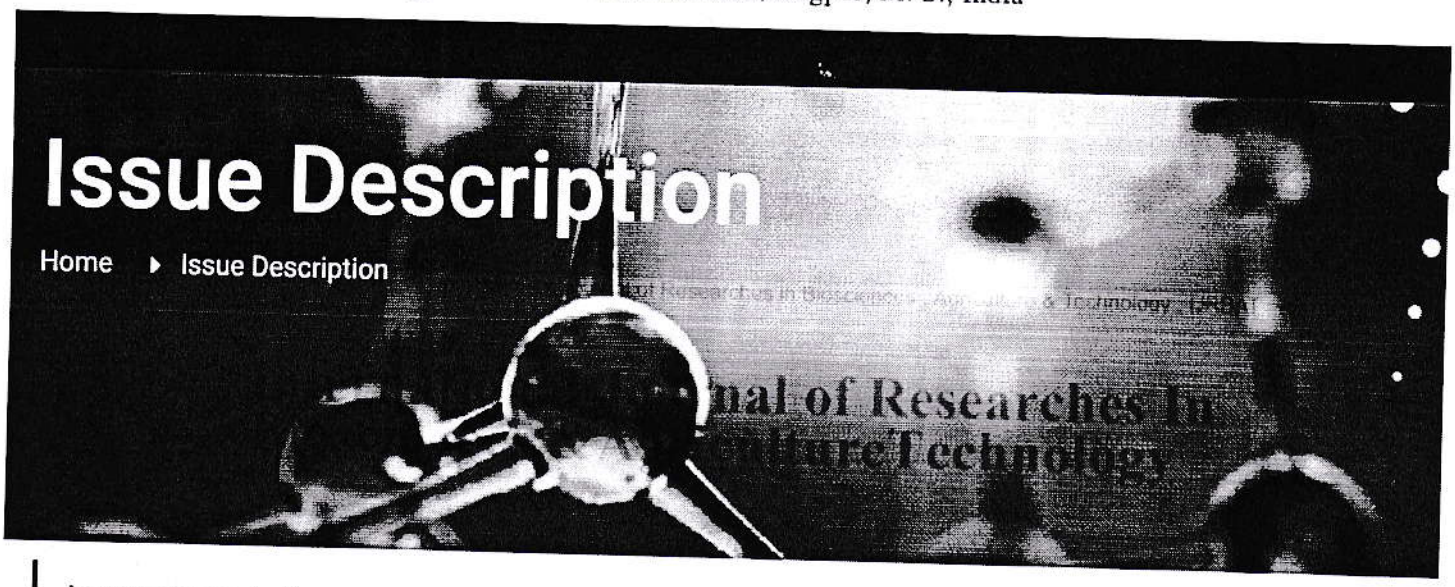

Issue Description

LAWSONIA INERMIS L.: PHYTOCHEMICAL AND PHARMACOLOGICAL ACTIVITIES. A REVIEW

Authors : Mungle A N,. Ittadwar A M

Page Nos : 119-152

Description :
Lawsonia inermis Linn is a welknown plant for centuries and is widely used medicinally and cosmetologicaly, all over the world. Since ancient culture, this plant is known for its dyeing pigment, Lawsone and hence found its application in cosmetic and textile industries as a dyeing agent. Henna is being applied to dye/colour palms, soles or feet, hairs, finger nails and other body parts. Nowadays, Henna body art is most commonly seen in the form of tattoos. Apart from this, this plant is reported to contain several phytoconstituents and has therapeutic uses. Hence, this article aims to review the most recent information about both therapeutic applications of Henna and its active constituents.

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Waste Water Treatment: Design and Develop Waste Water Disposal Method for Pharmaceutics Laboratory

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(Gurunanak College of Pharmacy, Nagpur Maharashtra 440026)
Corresponding Auther: Snehal V. Pimpalshende

Abstract: *Waste water is any water that has been adversely affected in quality by anthropogenic influence. Many pharmaceutical industries is responsible to generates toxic effluent. The waste water generated from these industries possess solids, biodegradable and nonbiodegradable organic compounds. Pharmaceutical compounds typically produced in batch process leading to the presence of a wide variety of products in waste water which are generated in different operations. Various sources of pharmaceutical industries are different sectors of Active pharmaceutical ingredients (API), bulk drugs, and formulation department. Pharmaceutical residues and/or metabolites are usually detected in the environment at trace levels but even that low concentration levels but can induce toxic effects. Pharmaceutical waste water if disposed with insufficient treatment may leads to great damage to the environment and ground resources. Need of waste water treatment is to remove organic and inorganic matter this would otherwise cause pollution, to remove pathogenic disease-causing organism, in order to protect the environment and human health. The treatment of waste water is divided into three parts physical, biological and chemical. Waste water treatment process may reduce suspended solids, biodegradable organics, and pathogenic bacteria. Sand filtration, followed by chemical treatment is a proven procedure to treat the the pharmaceutical waste water for disposal as well as reuse. Method develop to treat the collected laboratory waste water. Various materials were used to treat this collected pharmaceutics laboratory waste water. With the help of various parameters pharmaceutical waste water were evaluated, parameters use for the evaluation of pharmaceutical waste water are Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Total dissolved solids (TDS), Total suspended solids (TSS), colour, Turbidity, Microbial analysis.*

Keywords- *Waste water, Biochemical oxygen demand, Total dissolved solids.*

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I. Introduction

Water, pre-requisite for life and key resource of humanity is in abundance on earth. Water that exists on the Earth surface is present as a water of oceans, lakes, rivers and glaciers. [1]Although India occupies only 3.29 million km^2 geographical area which forms 2.4% of the worlds land area, it supports over 15% of world's population with only 4% of the world's water resources. Waste water is full of contaminant including bacteria, chemicals and other toxins. Its treatment aims at reducing the contaminants to acceptable levels to make the water safe for discharge back into the environment [2]

Need to remove organic and inorganic matter this would otherwise cause pollution.
To remove pathogenic (disease causing) organisms.In order to protect:
The environment
Human health [3]

Water pollution is of widespread national concern. Industrial activities generate a large number and variety of waste products. The nature of industrial waste depends upon the industrial processes in which they originate. The problem of adequately handling industrial waste waters is more complex and much more difficult because industrial waste water vary in nature from relatively clean rinse waters to waste liquors than are heavily laden with organic or mineral matter or with corrosive, poisonous, inflammable or explosive substances. As a result of rapid industrial growth following World War II, the amount of waste material generated by industries has increased manifold and the treatment/removal of these contaminants from the natural resources such as air and water in which they are released has progressed into a special science, involving chemical, mechanical and biological processes. The inpure water containing inorganic salts, organic compounds, microbial contamination and turbidity disturbing the natural hydrologic cycle (water cycle). The hydrologic cycle can be maintained by the removal of toxic chemicals by many scientifically simple yet sometimes technologically very complex methods. [4]

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DEVELOPMENT OF STABLE NANOSUSPENSION LOADED ORAL FILMS OF GLIMEPIRIDE WITH IMPROVED BIOAVAILABILITY

VAISHALI KILOR, NIDHI SAPKAL, ANWAR DAUD, SHRUTI HUMNE, TUSHAR GUPTA

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47-51

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Original Article

DEVELOPMENT OF STABLE NANOSUSPENSION LOADED ORAL FILMS OF GLIMEPIRIDE WITH IMPROVED BIOAVAILABILITY

VAISHALI KILOR*[1], NIDHI SAPKAL[1], ANWAR DAUD[2], SHRUTI HUMNE[1], TUSHAR GUPTA[1]

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ABSTRACT

Objective: In the present work attempt has been made to stabilize optimized nanosuspensions of glimepiride by solidification using a novel Oral Thin Film (OTF) formulation.

Methods: Nanosuspensions were characterized for particle size, zeta potential as well as *in vitro* dissolution profile. As nanosuspensions are prone to destabilization by Ostwald's ripening or agglomeration/aggregation, OTF formulation as a novel approach for stabilization through solidification of optimized nanosuspension was attempted. OTF formulation method is a simple, easy and scalable method for the preparation of solid oral dosage form. Prepared formulations were evaluated for physicochemical parameters like folding endurance, disintegration time, tensile strength, *in vitro* drug release, *in vivo* bioavailability and stability.

Results: The mean particle size of the nanoparticles in OTF was found to be 57.2 nm. It was observed from the results of *in vivo* bioavailability studies that high plasma drug concentrations(Cmax) were achieved for nanosuspension loaded OTF (NSOTF) i.e. 4900 ng/ml as compared to marketed oral formulation (Cmax-2900 ng/ml). Results of the stability studies indicated that nanosize of the particles was retained even after 3 mo of the study.

Conclusion: Therefore it can be concluded that OTF formulation has a potential for stabilization of nanosuspensions.

Keywords: Nanosuspension, Glimepiride, Stabilization, Solidification, *In vivo* studies

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INTRODUCTION

Nanotechnology-based techniques have been valuable in improving the solubility of poorly water soluble drugs [1]. Nanosuspensions in many cases have given good results in improving saturation solubility by increasing the surface area available for dissolution [2]. Various researchers have reported the development of nanosuspensions with high drug loading, increased dissolution and better bioavailability [3, 4]. Studies have also been done to report non-toxic nature of these nanosuspensions [5]. Stability of nanosuspension is the major challenge associated with it. These are thermodynamically unstable and tend to show particle growth during storage. The change in particle size reverses all the advantages of solubility, dissolution and bioavailability. Various stabilizers like hydrophilic polymers [6-8] non-ionic or ionic surfactants and food proteins [9] have been used for stabilizing particle size of nanosuspensions, but the efficacy of these stabilizers is questionable upon dissolution, high temperature and pH changes. Further, as solidified form of nanosuspension is preferred over liquid form, significant work is reported on solidification techniques of nanosuspensions. These are solidified either using spray dryer [10, 11] or freeze dryer [12]. But it was observed that both of these techniques involve the control of multiple process parameters and still have problems of agglomeration during storage. Nanosuspensions have also been converted to hydrogels for the purpose of drug delivery and stability [13], but these hydrogels contain a large amount of water so may not be a system of choice for moisture sensitive drug.

Recently attempts have also been made to convert nanosuspensions into thin film formulation that offer both stability and ease of administration [14, 15]. Thin films can further improve the solubility of drugs. Improved stability and bioavailability have been demonstrated [16, 17] for poorly water soluble drugs.

Glimepiride is one of the third generation sulfonyl urea used for the treatment of type 2 diabetes. It belongs to class II of Biopharmaceutical classification system showing poor aqueous solubility (0.0082 mmol) and high permeability [18]. Several attempts have been made to improve solubility of Glimepiride using approaches like solid dispersion [19] inclusion complexation [20] co-solvency [18] etc. But no systematic studies have been reported for enhancement of solubility using nanosuspension technique.

In the present work, an attempt has been made to prepare nanosuspension by using high shear homogenization to improve solubility of glimepiride and to improve the stability of glimepiride loaded nanosuspension by formulating into OTF.

MATERIALS AND METHODS

Materials

Glimepiride and Hydroxypropyl methylcellulose (HPMC) E 15 were obtained as gift samples from Zim Laboratories ltd., Nagpur, India. Sodium Dodecyl Sulfate (SDS) (Merck, Mumbai, India), PEG 400 (Loba Chemie Ltd. Mumbai, india) were procured commercially. All other chemicals and reagents were of analytical grade and were used without further purification.

Preparation of glimepiride nanosuspension by high shear homogenization

Glimepiride loaded nanosuspensions were prepared using high shear homogenization method. Stabilizer solution was prepared using 1% HPMC and 12% SDS. The concentration of both of these stabilizers was selected during preliminary trials. The solution was stirred using high shear homogenizer (Remi-RQT-127 A/D, Mumbai, India) at 4000 rpm for 15 min. Glimepiride (0.4 g) was then added to this solution while stirring and homogenization was continued at 8000 rpm for 150 min at ambient conditions. To study the effect of stirring time on nanosuspension properties, above procedure was repeated by increasing homogenization time to 180 min. Clear nanosuspensions so obtained were labeled as GNS1 and GNS2 and were stored in capped glass vials till further evaluation at room temperature.

Evaluation of glimepiride nanosuspensions

Particle size distribution and polydispersity index

Particle size was determined using Photon correlation spectroscopy

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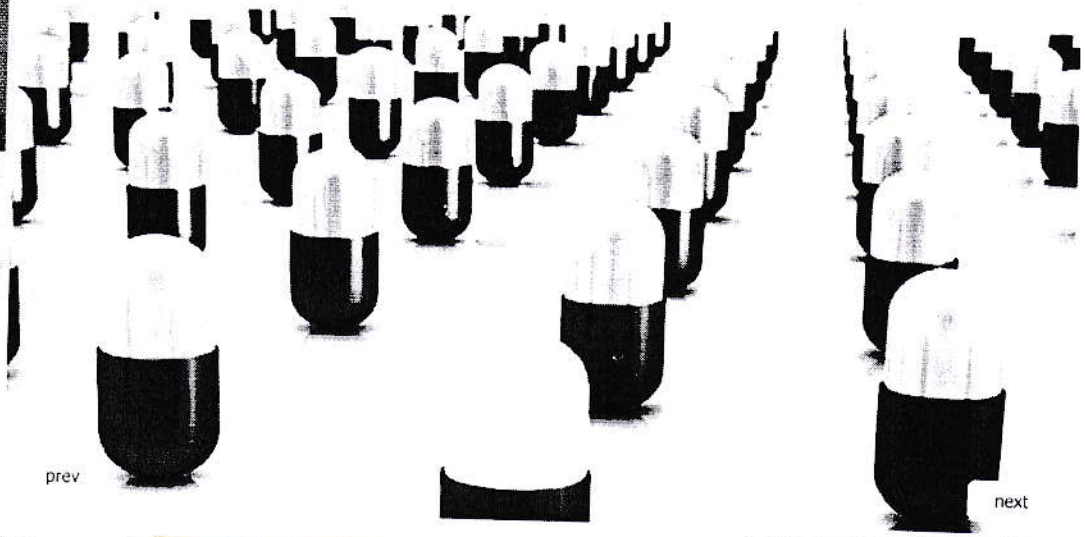

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REVIEW ON ANTI-MICROBIAL POTENTIALS OF FLUOROQUINOLONES

Gulshan A. Gurunani[1]*, Sheelpriya R. Walde[2], Abhay M. Ittadwar[2]

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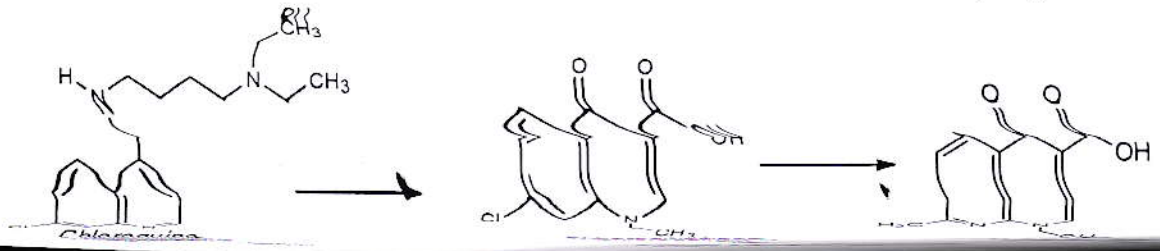
ABSTRACT

Fluoroquinolones are one of the most promising and successful broad spectrum bactericidal agents inhibiting DNA synthesis. These agents have many favorable properties like excellent bioavailability, good tissue penetrability and a relatively low incidence of adverse and toxic effects. Fluoroquinolones target the bacterial enzymes DNA gyrase and DNA topoisomerase IV, wherever they stabilize a covalent enzyme-DNA complex in which the dna is cleaved in both strands. This results in cell death and seems to be a very effective way of killing microorganism. Although they share a common mechanism of action, they differ considerably in their antimicrobial activity, their pharmacokinetic characteristics, and, to a lesser degree, their safety profiles. they have a relatively simple molecular nucleus, which is amenable to many structural modifications. However, resistance to fluoroquinolones is increasingly problematic, and alternative compounds are urgently needed. They have been found effective in treatment of various infectious diseases. This paper provides an outline of fluoroquinolones, their mechanism of action, their spectrum of activity, resistance development and their uses.

KEYWORDS: Fluoroquinolones, Antimicrobial agents, Broad spectrum antibiotics, Antibacterial agents.

INTRODUCTION

The first quinolone emerged in the early 1960s, with the isolation of 7-chloro-1-ethyl-1, 4-dihydro-4-oxoquinoline-3-carboxylic acid, a by-product of the commercial preparation of chloroquine. Origin of the quinolones is given in Fig. 1. This compound was found to have anti-bacterial activity and was subsequently modified to produce nalidixic acid, a 1, 8-naphthyridine[1].



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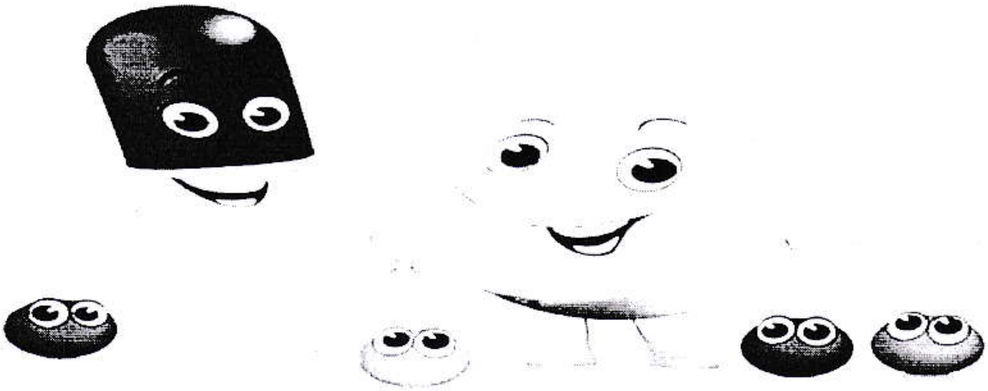

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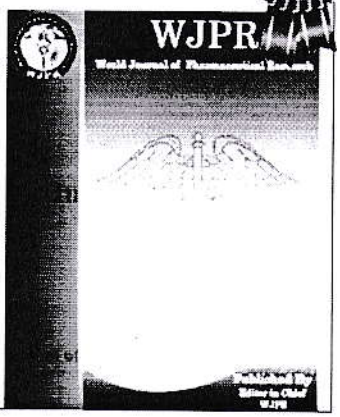

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MICROBIAL EVALUATION OF A MARKETED HERBO-MINERAL FORMULATION *TRIBHUVAN KIRTI RAS*

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ABSTRACT

Ayurvedic herbal medicines and their finished herbal products have been used since ancient times to treat a wide range of diseases. WHO survey shows 70-80% of world population rely on non-conventional medicines mainly herbal products for their primary health care. The microbial contaminations of these medicines may reduce or even inactivate the therapeutic activity of the products and has the potential to adversely affect patients. *Tribhuvan Kirti Ras* is one of the commonly used herbo-mineral formulation for acute or chronic fever related with respiratory tract infections, Present study was performed to assess the pathogenic proliferation in the locally available commercial *Tribhuvan Kirti Ras*. The pathogenic load was compared with the microbiological standard given by the WHO. The TVAC was found to be 9.3×10^4, 4.5×10^4 and 5.8×10^4 CFU/g in three samples respectively, All three samples were found to be contaminated with the fungi species of *Gliodium*, *Papulospora*, *Geomyces* and *Rhizopus* as well as Gram positive and Gram negative bacteria. The presence of bacteria and fungi in these samples suggested that there is need to improve the quality of manufacturing and labelled the condition of product.

KEYWORDS: Microbial condition, *Tribhuvan kirti ras*, Herbomineral formulation.

INTRODUCTION

Ayurvedic herbal and herbomineral products have been used since ancient times to treat a [illegible] survey shows 70-80% of world population rely on [illegible]

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89-97

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DETERMINATION OF NIFEDIPINE IN RAT PLASMA USING HPLC-UV DETECTOR: A SIMPLE METHOD FOR PHARMACOKINETICS AND ORAL BIOAVAILABILITY STUDIES

MOSAB ARAFAT, ZAHAA AHMED, MOMIR MIKOV

98-102

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THE EFFECT OF INDONESIAN VELVET BEAN EXTRACT ON THE FERTILITY OF ALBINO MALE MICE

RATNANINGSIH EKO SARDJONO, VIENSA PRADIPTA, IQBAL MUSTHAPA

103-106

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HEPATOPROTECTIVE ACTIVITY OF MONASCUS PURPUREUS (RED RICE YEAST) IN DIABETIC RATS ALONE OR IN COMBINATION WITH PIOGLITAZONE: AN EFFECT MEDIATED THROUGH CYTOKINES, ANTIOXIDANTS AND LIPID BIOMARKERS

GEHAD A. ABDEL JALEEL, DALIA O. SALEH, SALLY A. EL AWDAN, MANAL BADAWI

107-114

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DESIGN AND DEVELOPMENT OF *NICOTIANA TABACUM* FILM USING FACTORIAL DESIGN

ANWAR DAUD, ASHOK PEEPLIWAL, MINAL BONDE, NIDHI SAPKAL, NARESH GAIKWAD, C. B. GUNAWARDENA

115-123

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IN VITRO-IN VIVO EVALUATION OF FAST-DISSOLVING TABLETS CONTAINING SOLID DISPERSION OF OXCARBAZEPINE

ARTI MOHAN, G. SANGEETHA

124-131

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NIYOGI PARTHA, PATTNAIK SNIGDHA, MAHARANA LAXMIDHAR

132-141

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Original Article

DESIGN AND DEVELOPMENT OF *NICOTIANA TABACUM* FILM USING FACTORIAL DESIGN

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ABSTRACT

Objective: The objective of the present investigation was to develop and optimize *Nicotiana tabacum* oral dissolving films with optimized physicomechanical and chemical properties for improved patient compliance. *Nicotiana tabacum* oral dissolving films are used to help people stop smoking cigarettes.

Methods: *Nicotiana tabacum* oral dissolving films were prepared by solvent casting method using hydroxymethylpropyl cellulose as film forming polymer and polyethylene glycol 6000 as a surfactant. The process was optimized using the design of experiments. Four process parameters were studied at two levels using 2^4 design. Further, the optimized *Nicotiana tabacum* oral dissolving films were evaluated for HPTLC analysis, microbial limit test, organoleptic evaluation, stability studies and clinical efficacy studies.

Results: It was found that the thickness of wet film and viscosity of solution has a significant influence on thickness as well as disintegration time. Folding endurance and tensile strength of the film was influenced by the thickness of the wet film, machine speed and viscosity of the solution. Drying temperature does not have any significant influence on the selected response. By controlling the thickness of wet film 0.5 mm, the viscosity of the solution 5000 cps and machine speed 15 min, disintegration time, folding endurance and tensile strength of this formulation can be controlled.

Conclusion: It was noted that *Nicotiana tabacum* oral dissolving films are being accepted by patients in general and showed a marked reduction in craving for smoking. Prepared formulation was stable for 6 mo stability as per ICH guidelines.

Keywords: *Nicotianna tabacum*, Factorial designs, Pilot scale clinical efficacy studies

INTRODUCTION

Cigarette causes the early death of nearly 5 million people each year. These people are not killed by the nicotine in the cigarette, but by other constituents of tobacco smoke such as carbon monoxide and the other 4000 chemicals present in tobacco. Out of the major cigarette smoke constituents only nicotine has stimulant and depressant property while all others have been categorized as carcinogenic, cytotoxic, tumor accelerator and poisonous [1]. Nicotine replacement therapy (NRT) helps to damp down the urges to smoke that most smokers have in the early days and weeks after quitting. It gives the smoker the chance to break smoking cues in their daily lives, and might provide a more comfortable exit from the smoking habit. NRT is a way of getting nicotine into the bloodstream without smoking. There are nicotine gums, patches, inhalers, tablets, lozenges and sprays [2]. No oral dissolving films (ODFs) have been reported. Thus the aim of the present investigation is to develop and optimize ODFs of *Nicotiana tabacum* (NT) Linn with ideal physicomechanical and chemical properties with improved patient compliance and convenience.

ODFs are gaining popularity among drug delivery systems for delivering medicament to pediatric, geriatric and many other patients due to a high degree of patient convenience. This dosage form exhibits better patient compliance during travelling as there is no need of water to swallow the dosage form. These are thin films and when kept on the tongue these dissolve rapidly and deliver unit dose accurately.

MATERIALS AND METHODS

Materials

Nicotiana tabacum extract was procured as a gift sample from Unijules Life Science Limited, Nagpur, India. HPMC 15 cps, tween 80, mentha oil and spearmint oil were procured from SD Fine Chemical Lab., A. B. Enterprises, and Mumbai, India. All other chemicals and reagents were of analytical grades. Deionized double-distilled water was used throughout the study.

Preparation of *Nicotiana tabacum* ODFs

ODFs of NT extract were prepared using solvent casting method [3]. The composition of the formulation is presented in table 1. NT extract was mixed with measured amount of water using over headed stirrer for 5 min. The extract was then filtered through the muslin cloth. To this filtered extract of NT, successively measured amount of HPMC, PEG6000, polysorbate 80, sweetening and flavoring agents were added and the solution was stirred for 30 min. The thick, viscous solution was degassed to remove entrapped air by ultrasonication. The solution was then cast on a glass plate to uniform thickness and dried in hot air oven. The films were stored in aluminium foil and air tight polythene packs in desiccators until further use.

Table 1: Composition of prototype formulation of *Nicotiana tabacum* ODFs

Ingredients	mg/film
Nicotiana tabacum	20
HPMC 15 cps	55
PEG 6000	15
Polysorbate 80	10
Sucralose	1
Menthe oil	1
Distilled water	Q. S.

Study of the effects of process parameters A factorial design evaluating 4 factors at two levels was studied

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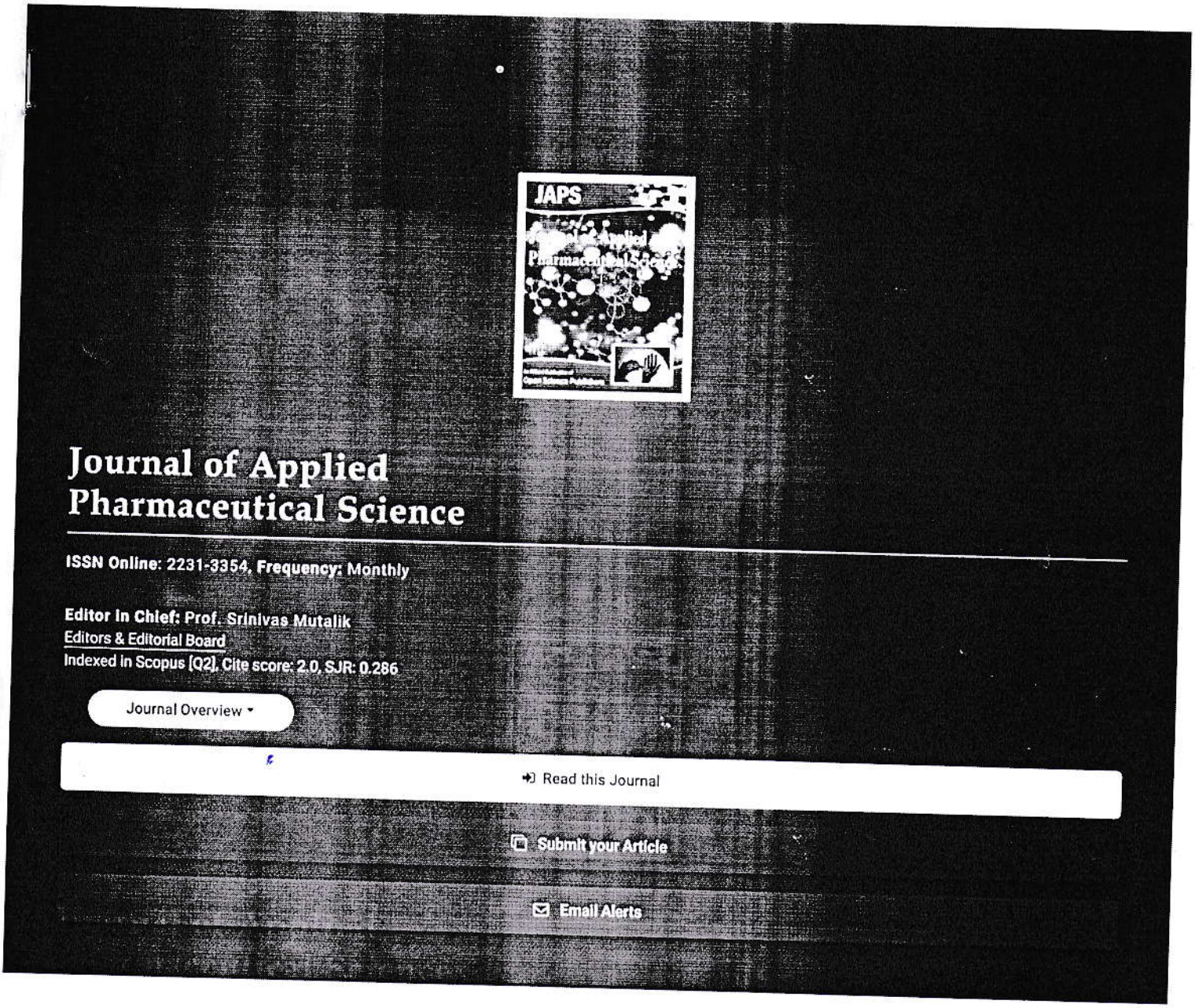

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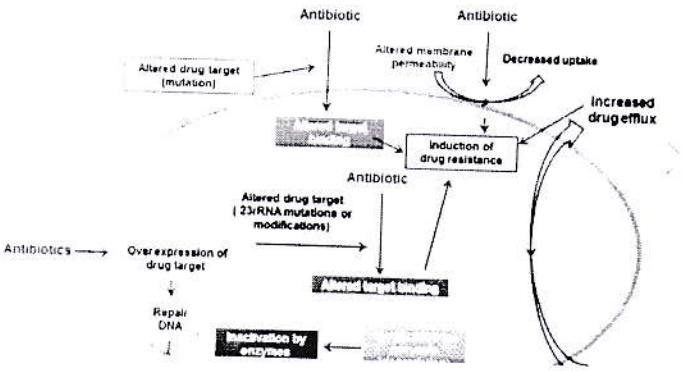

Urinary tract infections: Virulence factors, resistance to antibiotics, and management of uropathogenic bacteria with medicinal plants—A review

Mbarga Manga Joseph Arsene, Podoprigora Irina Viktorovna, Anyutoulou Kitio Linda Davares, Ngah Esther, Senyagin Alexander Nikolaevich

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A Study of Method Development, Validation and Forced Degradation for Quantification of Buprenorphine Hydrochloride in a Microemulsion Formulation

Dhanashree Arun Mundhey, Vishal V. Rajkondawar, Anwar S. Daud, Nidhi P. Sapkal

DOI: 10.7324/JAPS.2016.601022 Pages: 159-169

Abstract PDF

29 Oct, 2016 Research Article

Effect of high intensity interval training on 8-oxoguanine DNA glycosylase and 8-hydroxy-2'-deoxyguanosine contents in the brain and liver of rats

Ehsan Afroozi-Gerow, Mohammad Esmaiel Afzalpour, Hossein TaheriChadorneshin, Seyed Hosein Abtahi-Eivary

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Mohamed Azmi Hassali, Fahad Saleem, Alian A. Alrasheedy, Zeehan Shanaz Ibrahim, Tahir Mehmood Khan, Hisham Aljadhey

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A Study of Method Development, Validation and Forced Degradation for Quantification of Buprenorphine Hydrochloride in a Microemulsion Formulation

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Key words: Buprenorphine hydrochloride, High-performance liquid chromatography, Microemulsion formulation, forced degradation study.

ABSTRACT

Objective: Development and validated of a simple, selective RP-HPLC method for the determination of buprenorphine hydrochloride in pharmaceutical microemulsion formulation. A forced degradation study of developed formulation was carried out in accordance with International Conference on Harmonization (ICH) guidelines Q1 (R2). **Method:** The chromatogram was obtained with 10 $mmolL^{-1}$ potassium phosphate buffer adjusted to pH 6.0 with triethanolamine and acetonitrile (17:83, v/v) as mobile phase, C18 HPLC column (250 × 4.6 mm i.d., 5 µm) kept at 30°C and UV detection at 284 nm. The compound was eluted isocratically at a flow rate of 1.0 mL min^{-1}. **Results:** The average retention time for buprenorphine was 14.319 min. The method was validated according to the ICH guidelines. The validation characteristics included accuracy, precision, linearity, range, specificity, limit of Quantitation and robustness. The calibration curves were linear ($R^2 > 0.999$) over the concentration range 1.0 – 500.0 μgmL^{-1} for buprenorphine hydrochloride and recovery study for the compound was above 95 %. No spectral or chromatographic interferences from the microemulsion excipients were found. The drug was found to be labile under oxidative stress condition; whereas stable under all other stress conditions. **Conclusion:** This method is simple, rapid and suitable for routine quality control analysis.

INTRODUCTION

Buprenorphine hydrochloride (BU) is chemically known as (6R, 7R, 14S)-17cyclopropylmethyl- 7, 8-dihydro-7-[(1 S)-1-hydroxy-1, 2, 2 trimethylpropyl]-6-0-methyl-6, 14-ethano-17-normorphine hydrochloride (USP, 2007; Drugbank, 2016; Sweetman, 2009; Ash *et al.*, 1996). The molecular formula of BU is $C_{29}H_{41}NO_4$, HCl and the molecular weight is 504.1 (Fig. 1). It is a potent semi-synthetic opiate analgesic with a potency of 20-40 times higher than that of morphine (Heel *et al.*, 1979). As an analgesic, it is used successfully by intramuscular, intravenous and sublingual routes to treat moderate to severe pain as well as chronic pain (Hoskin *et al.*, 1991). It is also indicated to treat opioid dependence by sublingual route (Dailymed, 2016).

Literature survey reveals various analytical methods available for the quantitative determination of BU, individually and in combination with other drugs.

BU in biological samples analyzed mainly using chromatographic methods such as gas chromatography with electron-capture detector (Everhart *et al.*, 1997), HPLC with UV detector (Tebbett *et al.*, 1985; Hackett *et al.*, 1986); fluorescence detector (Liu *et al.*, 2005; Garrett *et al.*, 1985); electrochemical detector (Garcia-Fernandez *et al.*, 2001) and some hyphenated techniques like HPLC-MS (Polettini *et al.*, 1997; Moody *et al.*, 2002; Pirnay *et al.*, 2006; Rodriguez-Ross *et al.*, 2007). But, as these methods reported for analysis of biological samples, these involve sample preparation steps consisting of extraction and/or derivatization before analysis. Thus, these methods are not suitable for analyzing BU in bulk drug or formulations. Mostafavi *et al.* reported a simultaneous estimation method for BU along with naloxone and noroxymorphine for tablet formulation using HPLC

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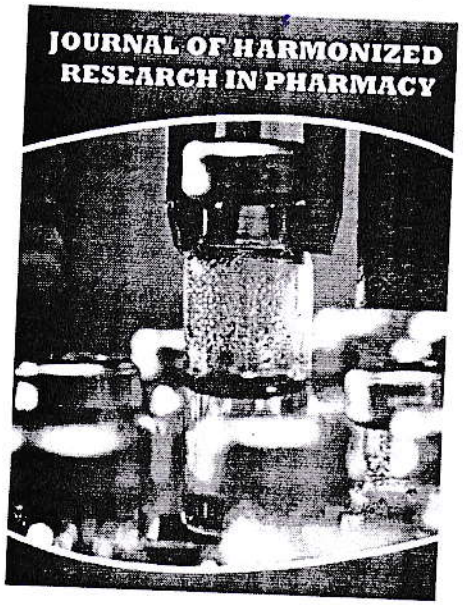

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Vol 8 (2019)

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Shifa A. Sheikh* and Dr. D. C. Goupale

Abstract | PDF

Research Article

ANTIMICROBIAL POTENTIAL OF CREAM FORMULATION CONTAINING ESSENTIAL OIL (CITRONELLA OIL) OF CYMBOPOGON

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Volume 5, Issue 2 (2016)

Review Article
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Srijita Dutta
Abstract PDF

Research Article
STANDARDIZATION OF SOME BIOACTIVES IN GINGER EXTRACT
Namita Sagar Girhepunje and Dr S.K.Tilloo
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ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF GREWIA UMBELLIFERA
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Abstract PDF

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Original Research Article

STANDARDIZATION OF SOME BIOACTIVES IN GINGER EXTRACT

[1]Namita Sagar Girhepunje and [2]Dr S.K.Tilloo

[1]Dadasaheb Balpande College of Pharmacy Besa, Nagpur
[2]Gurunanak College of Pharmacy Mauza Nari, Nagpur

Abstract: The aim of the present study was to estimate the bioactives from some marketed preparations of ginger especially with reference to gingerol and to compare with active constituents present in crude drug and estimation of the gingerol contents with the help of different analytical techniques like TLC, IR and UV spectrphotometry also evaluation of antibacterial activity of the marketed ginger preparations and to correlate it with gingerol contents. From the study, it was observed that the range of gingerol is from 90.08% to 104.92%w/w., which was found to be fairly compliant with the I.P. specifications i.e.90-120% w/w. These differences in the range of gingerol content suggest that there must be different exogenous and endogenous factors affecting the quality and purity of the drug, it is very essential, being vital and important. Due to this reason the need was generated for the pharmacological, phytochemical evaluation and standardization of various formulations available in the market. The present study was extended for determination of antibacterial property by cup plate method by taking Ofloxacine as a Standard.The sample of Green Pharmacy indicated that there was high antibacterial property. Hence from the result it was clear that presence of high amount of gingerol in ethanol extract (Green Pharmacy)

Key words:-Ginger, gingerol, standardization, antibacterial

Introduction: The standardization procedure applicable only to herbal extracts. The ginger extract commonly used therapeutically. [1]The ginger extracts used in such preparations may be collected in various conditions and from different geographical regions. Therefore, we may expect a wide variation in the gingerol contents present in various marketed herbal drug preparations herbal drugs are used. The biological studies of the ginger extracts showed the high antimicrobial effects. This may be used in food industries as preserver of food product against spoilage by bacteria and fungi. The UV spectrophotometric procedure is a quick and

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