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RESEARCH ARTICLE

A Review on Current Applications of Bilayer Tablets

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ABSTRACT:
Bilayer tablet technology is an improved beneficial technology to overcome the shortcomings of the single-layered tablet. The introduction of bilayer tablets into the pharmaceutical industry has enabled the development of pre-determined release profiles of active ingredients and incorporation of incompatible active ingredients into a single unit dosage form. Bilayer tablets provide one of the important design approaches where incompatible drugs, with a different indication, and same drug with different release rate can be incorporated in a single unit. Bilayer tablet is suitable for sequential release of two drugs in combination, and for sustained release tablets in which one Layer is immediately released as initial dose and the second layer is a maintenance dose. Bilayer formulations carry one drug, and deliver each of them without any pharmacokinetic or dynamic interactions, with their individual rate of delivery. Controlled release dosage forms have been extensively used to improve therapy with several important drugs. Use of bilayer tablet is a very different aspect for anti-inflammatory and analgesic drugs. This review discusses various applications of bilayer tablets such as controlling of delivery rate, providing synergic property and agonistic effect, administration of fixed-dose combinations etc. In sustained release tablet formulations, the commonly used functional ingredient is HPMC and in immediate release, the commonly used functional ingredients are Sodium Starch Glycollate, Crospovidone, and Croscarmellose sodium.

KEYWORDS: Bilayer tablet, immediate release, sustained release, super disintegrant, release pattern.

INTRODUCTION:

Various developed and developing countries move towards a combination therapy for treatment of various diseases and disorders requiring long-term therapy[1]. Bilayer tablet is a fixed-dose combination intended for oral application. It is an improved technique to overcome the limitations of the single-layered tablet[2]. Bilayer tablets contain immediate and sustained release layers. The immediate release layer delivers the initial dose; it contains super disintegrants which promote the drug release rate and attain the onset of action quickly (loading dose). Whereas, sustained release (maintenance dose) layer releases the drug in a sustained manner for a prolonged period of time by using various polymers.

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Diabetic, antihypertensive, antihistamines, analgesics, antipyretics, anti-allergic agents are mainly suitable for this type of drug delivery[3]. Bilayer tablets have certain key advantages and applications as compared to conventional monolayer tablets[4].

Applications of bilayer tablets[5]:
Modify total surface area
Control the delivery rate
Provide synergic property
Provide the agonistic effect
Administer fixed dose combination

Modify the total surface area of apis:
Bilayer tablet is developed to modify the total surface area of active pharmaceutical ingredients either by sandwiching with one or two inactive layers in order to achieve swellable/ erodible barriers for modified release[5].

Control the delivery rate:
The bilayer tablet is used to control the delivery rate of either single or two different active pharmaceutical ingredients. Various controlled release bilayer tablets are

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RESEARCH ARTICLE

A Compilation on Anti-Diabetic Profile of *Cocos nucifera*

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ABSTRACT:

Diabetes mellitus is one of the chronic metabolic disorder that the world faces today. The mortality rate caused by this dreadful disease is increasing at an alarming rate. It is quite amazing that even, we have a lot of oral hypoglycemic agents, we couldn't able to bring the glycemia to a normal level, but situation leads to a worsened manner due to the macrovascular, microvascular complications and the adverse effects of synthetic agents. Traditional medicines have always a great demand in the curing of various dreadful conditions including cardiovascular diseases, metabolic diseases, cancer etc.. The advantages offered by these medicines are able to supersede problems created by the use of chemicals and have a better therapeutic approach. Cocos nucifera belongs to the Arecaceae family is a very good option for the management of Diabetes mellitus. The different products obtained from this palm has not only commercial importance but also nutritional and medicinal value. Both in-vitro and in-vivo studies on various parts of Cocos nucifera have been carried out by researchers and this review presents an outline of various such studies conducted.

KEYWORDS: Cocos nucifera, Diabetes mellitus, Anti-diabetic, Coconut palm, Coconut oil, Endocarp, Coconut flower.

INTRODUCTION:

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by disturbances in the Carbohydrate, protein and lipid metabolism leading to microvascular and macrovascular complications. Metabolic regulation of glucose is an interplay between two hormones, namely insulin and glucagon, which is secreted from the β and α cells of pancreas respectively. When this regulation gets disrupted due to genetic factors or environmental factors, like sedentary lifestyle, DM results.[1] But in the present situation, the chronic use of the oral hypoglycemic agents also cannot bring a constant control on hyperglycemia rather than it brings upon increased incidence of adverse effects.[2] The situation calls for some other alternative that could be more safer economically acceptable.

Researchers tirelessly work on herbal plants to come up as a suitable surrogate to synthetic agents. Though the efficacy of natural products did not come so close to that of synthetic agents in terms of its onset and duration of action, the safety aspects, economic feasibility encourages patient welfare and agricultural enrichment. Moreover, the herbal plants possess auxiliary therapeutic benefits, in contrast to the adverse effects of synthetic ones, it promotes a holistic approach in treatment and maintains a constant therapeutic effect rather than any withdrawal effects. Isolation of active moieties from the plants and its further development to formulation still favors the better therapeutic outcome and they can also act as lead molecules for the evolution of drugs with more efficacy and least adverse effects.The present work aims to identify the various pharmacological properties of Cocos nucifera and to reveal its potentiality as an antihyperglycemic agent, parts possessing antidiabetic activity, explore the various studies conducted on this specific plant.

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RESEARCH ARTICLE

A Comprehensive Exploration on Therapeutic Options of *Stevia rebaudiana* with Emphasize on Anti-diabetic Attribute

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ABSTRACT:

Diabetes mellitus (DM) is one among the chronic metabolic disorders that challenge the world today. The mortality rate caused by this dreadful disease is increasing at a terrifying rate. It is quite stunning that even, we have a lot of oral hypoglycemic agents, we couldn't able to bring the glycemic responses to a controllable level, and the situation moving to a worsened manner due to the macrovascular, microvascular complications and the adverse effects of synthetic agents. Traditional medicines have always a great demand in the healing of various dreadful conditions including cardiovascular diseases, metabolic diseases, cancer etc. The advantages offered by these medicines are capable to override problems created by the use of chemicals and have a better therapeutic approach. *Stevia rebaudiana* belongs to the Asteraceae family is a very good option for the management of Diabetes mellitus.

KEYWORDS: Chronic metabolic disorders, Terrifying rate, hypoglycemic agents.

INTRODUCTION:

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by disturbances in the Carbohydrate, protein and lipid metabolism leading to microvascular and macrovascular complications. Metabolic regulation of glucose is an interplay between two hormones, namely insulin, and glucagon, which is secreted from the β and α cells of pancreas respectively and other GIT hormones. When this balance gets disrupted due to genetic or environmental factors, like sedentary lifestyle, DM results.[1] But in the present situation, the chronic use of the oral hypoglycemic agents are also incapable to bring a constant control on the hyperglycemic response, rather it brings upon increased incidence of adverse effects.[2] The situation calls for some other substitutes that could be more safer economically acceptable. Researchers tirelessly work on herbal mines to come up as a suitable surrogate to synthetic agents.

Though the efficacy of natural products did not come so close to that of synthetic agents in terms of its onset and duration of action, the safety aspects, economic feasibility encourages patient welfare and agricultural enrichment. Moreover, the herbal plants possess auxiliary therapeutic benefits, in contrast to the adverse effects of synthetic ones, it promotes a holistic approach in treatment and maintains a constant therapeutic effect rather than any withdrawal effects. Isolation of active moieties from the plants and its further development to formulation still favors the better therapeutic results and they can also act as lead molecules for the evolution of drugs with more efficacy and least adverse effects. The present work aims to identify the various pharmacological properties of Stevia rebaudiana and to reveal its potentiality as an antihyperglycemic agent, parts possessing antidiabetic activity, explore the various studies conducted on this specific plant.

METHODOLOGY:

Selected both research and review articles published in peer review journals, on the various activities of different plant parts of the Stevia rebaudiana. Sources include Google Scholar, Pubmed, Science direct. Initially, the papers were categorized based on the response produced via *in-vivo* for the different parts and later they were compared to identify the potential part of the plant.

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RESEARCH ARTICLE

Preparation of Nimesulide magnetite nanoparticles for targeted drug delivery

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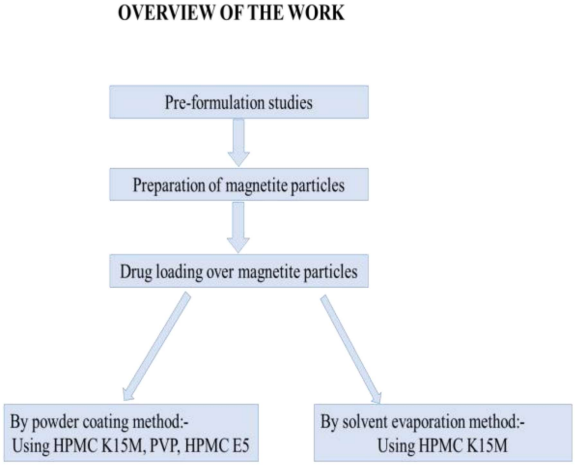
ABSTRACT:
Nimesulide is a relatively COX-2 selective, non-steroidal anti-inflammatory drug (NSAID) with analgesic and antipyretic properties. It is used for the treatment of acute pain, inflammation and for the symptomatic treatment of osteoarthritis. But nimesulide is banned in many countries due to liver failure. Thus the present study was aimed to develop a suitable dosage form to apply topically at inflammatory conditions, without affecting internal organs. This study covert nimesulide into magnetically modulated topical gel for topical application. The magnetic field over the applied area helps to retard the movement of drug into the deeper tissues. This results in accumulation of dosage form and delivery of drug at controlled rate in the target site. Nanosized magnetite particles were prepared for the study. The nimesulide drug has loaded over the magnetite particles using HPMC K15M, PVP and HPMC E5 rate controlling polymers. The polymer and its concentrations were optimized. The prepared drug loaded magnetite particles were converted into topical gel preparation.

KEYWORDS: Magnetite nanoparticles, nimesulide, co-precipitation, powder coating.

INTRODUCTION:
Nimesulide is a preferential COX-2 inhibitor that has been effectively used for the treatment of a variety of inflammatory and painful conditions, including osteoarthritis. Nimesulide is almost completely absorbed orally, 99% plasma protein bound and have a half-life of 2-5 hours.[1] Nimesulide upon oral administration cause liver failure. It has a volume of distribution (Vd) of 12-27 L. Thus it is not highly distributed and remains on the systemic circulation mainly, which may be a reason for liver failure. [2] The drug has low extraction ratio of 0.1 [2], which indicates the drug is presenting more into the eliminating organ like liver – it is again harmful. This made the situation to bypass the route of administration from oral to topical, in diseases accompanying with symptoms like pain and inflammation. The drug loaded magnetite nanoparticles can be localized at a specific targeted area by application of external magnetic field where the drug molecules are gradually released. Thus the therapeutic efficacy of the drug is improved by lowering the toxic side effects on healthy tissues [3]. The aim of the present study was to formulate and evaluate nimesulide loaded magnetite nanoparticles.

MATERIALS AND METHODS:
Nimesulide was purchased from Research lab fine chem industries, Mumbai. Ferrous sulphate and ferric chloride was purchased from Nice chemicals (P) LTD, Kochi. All the other chemicals used were of analytical grade.



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RESEARCH ARTICLE

An In-Depth Investigation of Diverse Therapeutic Benefits of *Psidium guajava* with Major Emphasis on Anti-Diabetic effect

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ABSTRACT:

Herbal remedies, or phytotherapy, is the science of using herbal medicines to treat the sick. Natural herbs are the highly esteemed source of medicine throughout human history. *Psidium guajava* (PG), the common Guava tree popularly known as 'poor man's apple of the tropics is an important dietary plant having a long history of traditional use for a wide range of ailments. The medicinal properties of guava fruit, leaf and other parts of the plant are also well known in the indigenous system of medicine. In view of the immense medicinal importance of PG, this study reveals the efficacy of PG in the amelioration of diabetes, a chronic metabolic disorder that affects the body's ability to produce or use insulin. Treatments could be achieved by the use of synthetic oral hypoglycaemic agents. But due to the major to minor side effects that have been reported so far there is a persistent need to search for safe and effective alternatives.

KEYWORDS: *Psidium guajava*, Diabetes, Chronic metabolic disorder, Oral hypoglycaemic agents, Herbal medicine.

INTRODUCTION:

The practice of using plants as medicines precedes written human history. Herbs for Diabetes treatment are not contemporary. Since ancient times, plants and plant extracts were used to counter Diabetes.[1] Diabetes mellitus is a lifetime disease caused by inherited and/or acquired deficiency in the production of insulin by the pancreas, or by the inaction of the insulin produced. Such a deficiency may result in increased levels of glucose in the blood, which in turn impair many of the body's systems, in particular, the blood vessels and nerves. Recently compiled data show that approximately 150 million people have Diabetes mellitus worldwide and that this number may well double by 2025. The management of Diabetes includes the following components of treatment such as Diet and Exercise, Oral hypoglycemic therapy and Insulin therapy.[2]

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The Allopathic drugs are often limited in adequacy, carry the risk of unwanted effects, and are often expensive. Whereas herbs represent a vast source of potentially useful dietary supplements for improving blood glucose control and preventing long-term complications in type 2 diabetes mellitus[3]. Thus the aim of this work is to summarize the studies conducted on both *in-vivo* as well as in-vitro biological activities of *Psidium guajava* (PG) by various researchers based on a comprehensive review of pieces literature.

METHODOLOGY:

Data from various articles both review as well as research articles were collected from various Databases such as Google Scholar, Pubmed, and Science direct on the different *in-vivo* and *in-vitro* studies of PG. Gone through the articles in detail and a better understanding of the various activities with major emphasis on anti-diabetic studies was made.

Plant Description:

Guava is a low evergreen tree or shrub of 6 to 25 feet high, with wide-spreading branches and square, downy