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Design and Evaluation of Natural Mucilage Microspheres of Sesamol for Gastroretentive Drug Delivery

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Abstract: The mucilages are polysaccharide obtained from various seeds. The mucilage have good swelling and water holding capacity. The mucoadhesive potential of mucilage is recently explored area. Thus, present study aimed to formulate *Mimosa pudica* mucilage based microspheres for gastroretentive delivery of sesamol. The drug loaded microspheres were formulated using ionic gelation method and evaluated for physicochemical properties, mucoadhesive potential, swelling index and *in vitro* drug release study. The microspheres showed good particle size and drug entrapment. The good swelling ability, mucoadhesive potential coupled with sustained drug release could be promising for gastroretentive drug delivery. Thus, natural mucilage could be alternative carrier for preparation of mucoadhesive microspheres of drug.

Keywords: Sesamol, Natural mucilage, *Mimosa pudica*, Microspheres, Gastroretentive drug delivery

Citation: Subhranshu Panda, Umesh Jirole, Santosh Jadhav, Dhanashree Jirole and Vivek Kulkarni: Design and evaluation of natural mucilage microspheres of sesamol for gastroretentive drug delivery. Intern. J. Zool. Invest. 9(Special Issue 3): 1-8, 2023.

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Introduction

The oral route is most common, safe and convenient route of drug administration. The solid oral dosage form like tablet is most popular oral dosage form because of ease of handling, large scale production and stability. About 80% oral dosage forms are available in the form of tablet. However, these dosage forms suffer with number of limitations like; the daily administration of dosage form is require which is difficult to monitor and greater chance of missing dose. The dosage form like tablet is available with fixed strength thus careful calculation is required to prevent overdosing. It is difficult to calculate exact dose of drug required for a child and

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Gastroretentive Drug Delivery through Natural Mucilage Based Microspheres: A Concise Review

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Abstract: The use of novel drug delivery systems for efficient delivery of drug is recently explored area. Several novel drug delivery systems have been proved to be effective in delivery of drug. Many scientific experts have showed efficacy of novel drug delivery systems in animal models. The carrier mediated drug delivery involves use of various drug loaded carriers like nanoparticles, microparticles, microspheres, microsponge, liposomes, ethosomes, transfersomes, phytosomes and glycerosomes. The microspheres are micron sized drug loaded spherical particles. The use of natural gums and mucilage for fabrication of drug loaded microspheres is recently explored area for gastrorentive drug delivery. Thus, present review highlights use of these natural mucilage based microspheres for fabrication of drug loaded microsphere.

Keywords: Natural gums, Mucilage, Microspheres, Gelation of mucilage

Citation: Subhranshu Panda, Umesh Jirole, Santosh Jadhav and Vivek Kulkarni: Gastroretentive drug delivery through natural mucilage based microspheres: A concise review. Intern. J. Zool. Invest. 9(Special Issue 3): 15-26, 2023.

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Introduction

The oral route is most common, safe and convenient route of drug administration. The solid oral dosage form like tablet is most popular oral dosage form because of ease of handling, large scale production and stability (Natarajan *et al.*, 2011). About 80% oral dosage forms are available in the form of tablet. However, these dosage forms suffer with number of limitations like:

1. The daily administration of dosage form is required which is difficult to monitor and greater chance of missing dose.
2. The dosage form like tablet is available with fixed strength thus careful calculation is required to prevent overdosing. It is difficult to

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DEVELOPMENT AND EVALUATION OF SESAMOL LOADED *LINUM USITATISSIMUM* SEED MUCILAGE BASED MICROSPHERES

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Abstract
The mucilages are polysaccharide obtained from various seeds. Thus, present study is started with aim to formulate *Linum usitatissimum* seed mucilage based microspheres of sesamol. The drug loaded microspheres were formulated using ionic gelation method and evaluated for physicochemical properties. The mucilage showed acceptable colour, odour and taste. The microspheres showed good swelling ability, mucoadhesive potential and sustained drug release. Thus, *linseed* mucilage could be promising alternative for fabrication of gastroretentive drug delivery system.

Keywords: Sesamol, *Linum usitatissimum*, Natural Mucilage, Microspheres, Antihyperlipidemic

1. INTRODUCTION

The oral route is most common, safe and convenient route of drug administration. The solid oral dosage form like tablet is most popular oral dosage form because of ease of handling, large scale production and stability [1]. About 80% oral dosage forms are available in the form of tablet. However these dosage forms suffer with number of limitations like; the daily administration of dosage form is require which is difficult to monitor and greater chance of missing dose. The dosage form like tablet is available with fixed strength thus careful calculation is required to prevent overdosing. It is difficult to calculate exact dose of drug required for a child and geriatric patients.

Extensive researches have been conducted to minimize the limitations associated with conventional drug delivery systems. The fruitful outcome of these researches is developed modified drug release systems. The desirable characteristic of such system is the duration of drug action. The controlled release system should provide therapeutic drug concentration for prolonged period of time. This can be achieved by controlled release of drug from system. The controlled release is possibly achieved by combining drug with the release modifying polymer. Gastroretentive drug delivery system is a novel approach to prolong gastric residence time, these dosage forms can retain in the gastric region for long periods and hence significantly prolong the gastric retention time (GRT) of drugs [2]. Another

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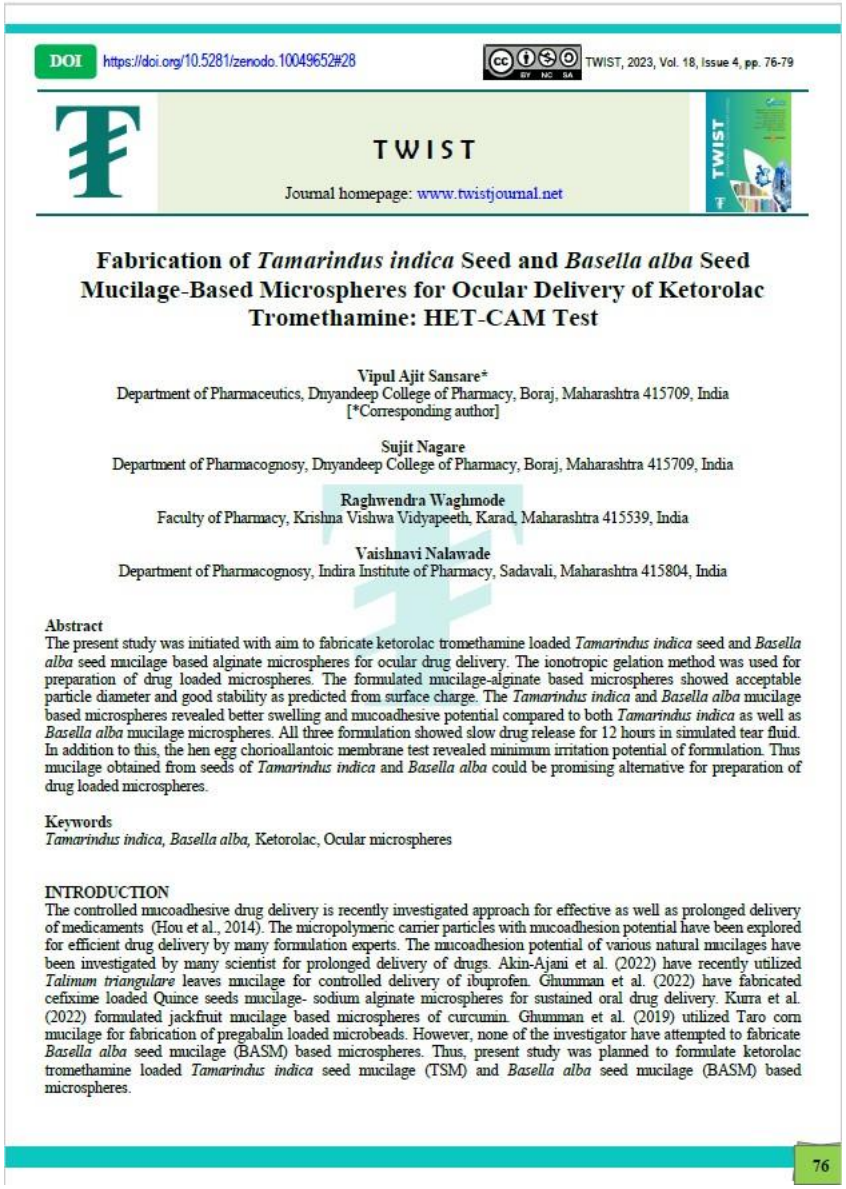

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Fabrication of *Tamarindus indica* Seed and *Basella alba* Seed Mucilage-Based Microspheres for Ocular Delivery of Ketorolac Tromethamine: HET-CAM Test

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Abstract
The present study was initiated with aim to fabricate ketorolac tromethamine loaded *Tamarindus indica* seed and *Basella alba* seed mucilage based alginate microspheres for ocular drug delivery. The ionotropic gelation method was used for preparation of drug loaded microspheres. The formulated mucilage-alginate based microspheres showed acceptable particle diameter and good stability as predicted from surface charge. The *Tamarindus indica* and *Basella alba* mucilage based microspheres revealed better swelling and mucoadhesive potential compared to both *Tamarindus indica* as well as *Basella alba* mucilage microspheres. All three formulation showed slow drug release for 12 hours in simulated tear fluid. In addition to this, the hen egg chorioallantoic membrane test revealed minimum irritation potential of formulation. Thus mucilage obtained from seeds of *Tamarindus indica* and *Basella alba* could be promising alternative for preparation of drug loaded microspheres.

Keywords
Tamarindus indica, Basella alba, Ketorolac, Ocular microspheres

INTRODUCTION

The controlled mucoadhesive drug delivery is recently investigated approach for effective as well as prolonged delivery of medicaments (Hou et al., 2014). The micropolymeric carrier particles with mucoadhesion potential have been explored for efficient drug delivery by many formulation experts. The mucoadhesion potential of various natural mucilages have been investigated by many scientist for prolonged delivery of drugs. Akin-Ajani et al. (2022) have recently utilized *Talinum triangulare* leaves mucilage for controlled delivery of ibuprofen. Ghumman et al. (2022) have fabricated cefixime loaded Quince seeds mucilage- sodium alginate microspheres for sustained oral drug delivery. Kurra et al. (2022) formulated jackfruit mucilage based microspheres of curcumin. Ghumman et al. (2019) utilized Taro corn mucilage for fabrication of pregabalin loaded microbeads. However, none of the investigator have attempted to fabricate *Basella alba* seed mucilage (BASM) based microspheres. Thus, present study was planned to formulate ketorolac tromethamine loaded *Tamarindus indica* seed mucilage (TSM) and *Basella alba* seed mucilage (BASM) based microspheres.

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Concise review on strategies of nanomedicine targeting to hepatocytes

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Abstract
Liver disease especially liver cirrhosis is major cause of death in India. The major causative factor responsible for liver cirrhosis is chronic alcohol consumption. Numerous drugs have been approved for management of liver cirrhosis. However, these drugs suffers with common limitations like limited solubility, off-target distribution and poor bioavailability. The nanotechnology domain has solved many drawbacks associated with conventional delivery of drugs. Numerous scientific experts have attempted to load drugs in nanocarriers. Various nanocarriers like liposomes, nanoparticles, lipid nanoparticles, nanostructured lipid carriers and niosomeshave been evaluated for delivery of liver protective drugs. Furthermore, the nanocarriers can be surface modify with liver targeting ligand for better delivery of drugs directly at liver cellular level. The receptors like carbohydrate receptors, lactobionic acid receptors and asioglycoprotein receptors have been utilized targeting of drug loaded nanocarriers to hepatocytes. Thus current book chapter represent liver targeting concept with nanocarriers by highlighting various recent investigations.

Keywords: Liver targeting, liver diseases, Hepatocytes, Nanomedicines, Nanoparticles

Introduction

Liver diseases are worldwide major causes for morbidity and mortality. Liver cirrhosis is a significant cause of global health burden, with more than one million deaths [1]. The viral hepatitis, metabolic disorders, malnutrition, alcohol abuse, or autoimmune diseases are causes of chronic liver injury and subsequent complications such as liver cirrhosis or hepatocellular carcinoma. Novel nanocarrier based drugs delivery may overcome many of the hurdles of conventional drug delivery systems, because they bear the advantage of enabling a cell targeted drug delivery based on binding to a specific surface receptors. Cell-specificity increases the drug concentration at the defective/diseased cell or tissue, while reducing toxicity to normal cells. This is an important feature of nanocarriers, since many common drugs have limited efficacy because their concentration at the target site is too low. The use of drug loaded nanocarriers for management of liver diseases has been reported in many literatures.

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