



Formulation and Evaluation of Piperine Alginate Beads for Stomach-Specific Delivery

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Abstract:

Gastric irritation is one of the very common problems associated with various stomach related disorders. The present work was undertaken to formulate floating calcium alginate beads of Piperine for targeting the gastric mucosa and prolonging their gastric residence time. Piperine {[1-5-(1, 3)-benzodioxol-5-yl]-1-oxo-2, 4-pentadienyl]-piperidine} is an alkaloid responsible for the pungency of Piper longum and Piper nigrum. The pharmacological studies on piperine have revealed that this compound elicited diverse pharmacological activities; analgesic, anti-pyretic, anti-inflammatory, anti-ulcer, anti-convulsant and CNS-depressant activities. The beads were prepared by suspending piperine in calcium alginate solution. The beads were prepared using calcium alginate and Piperine (1:1) and were evaluated. The mean diameter, drug loading and entrapment efficiency were evaluated. Thus, the present investigation aimed in formulating stomach specific drug delivery useful in the treatment of gastric problems.

Keywords: Piperine, Calcium alginate beads, Stomach specific.

Introduction

Gastric ulcer is one of the serious health problems in almost all developing countries like India, with a significant economic burden associated with high morbidity and mortality. Any therapeutic drug must therefore be able to penetrate the gastric mucus layer and maintain a concentration sufficient for antibacterial activity at the infected site. [1-2]

Calcium alginate (CA) has been used to treat symptoms of reflux esophagitis and results have shown that alginate is more effective, and costs less than cisapride, to treat symptoms presented by patients with reflux without severe esophagitis. The widespread use of CA for sustained release of drugs, targeting to the gastric mucosa and increasing the bioavailability of drugs is due to the ability of alginate to form a stable and bioadhesive gel with calcium ions [3]. In addition, the alginate bead preparation method involves the use of an aqueous solvent, avoiding exposure of the components to high temperatures and toxic organic solvents. Additionally, the resulting preparation is non-immunogenic, with bioadhesive and floating properties that may be suitable for stomach-targeted drug delivery [4].

Piperine, along with its isomer chavicine, is the alkaloid responsible for the pungency of black pepper and long pepper. It is used in some forms of traditional medicine. Due to its poor solubility in water, piperine is usually extracted from black pepper using organic solvents such as dichloromethane. Piperine content varies from 1-2% in long pepper to 5-10% in commercial white and black pepper. Piperine can also be prepared by treating a concentrated alcoholic extract of black pepper with an alcoholic solution of potassium hydroxide to remove the resin, which is an isomer of piperine. The solution is decanted from the insoluble residue and left to stand

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Latin American Journal of Pharmacy

Scopus coverage years: from 1989 to Present

Publisher: Colegio de Farmaceuticos de la Provincia de Buenos Aires

ISSN: 0326-2383

Subject area: [Pharmacology, Toxicology and Pharmaceutics: Drug Discovery](#) [Pharmacology, Toxicology and Pharmaceutics: Pharmaceutical Science](#)

Source type: Journal

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