Commentary

Evaluation of Hydrophobic Coated Buoyant Core as Floating Drug Delivery System

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ABSTRACT

An inert hydrophobic buoyant coated core was developed as Floating Drug Delivery System (FDDS) for sustained release of cisapride using direct compression technology. Core contained low density, porous ethyl cellulose, which was coated with an impermeable, insoluble hydrophobic coating polymer such as rosin. It was further seal coated with low viscosity hydroxypropyl methyl cellulose (HPMC E15) to minimize moisture permeation and better adhesion with an outer drug layer. It was found that stable buoyant core was sufficient to float

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INTRODUCTION

The key challenge in the oral delivery of drugs acting locally in the stomach or having narrow absorption window in the gastrointestinal tract is the retention of the dosage form in the upper gastrointestinal tract for lingering therapeutic effect. Several approaches have been attempted to prolong the gastric retention of solid dosage forms in the stomach including floatation, sedimentation, expansion, modifying shape, or by simultaneous administration of pharmacological agents that delay gastric emptying. Among these, FDDS or hydrodynamic balanced systems (HBS) have demonstrated to be the promising method due to its capacity to retain the dosage form in the stomach for a predetermined time. Several parameters such polymers, dosage form density, formulation and processing variables, addition of gas forming agents etcaffects the successful delivery of a floating drug delivery systems, and needs prime consideration. The choice of the polymer is based on its bulk density, ability to form a cohesive gel barrier, and capability to control the release of the drug over a period of time. Hydrophilic polymers are widely investigated and found to be the most apposite in controlling the release of drug in floating drug delivery systems. Matrix tablets based on HPMC, upon contact with gastric fluid, the systems takes up water and swell. As the increase in volume is greater than increase in mass during swelling, the densities of these devices decrease and the system start to float after a short lag time.

DETERMINATION OF FLOATING BEHAVIOR

This magnitude of floating strength may vary as function of time and usually decreases after immersion of dosage form into the fluid as a result of the development of its hydrodynamic equilibrium. To monitor the total vertical force F acting on an immersed object, a modified apparatus according to Sandra et.al was used. All experiments were done in triplicate and average values were taken. The prepared formulation was subjected to dissolution tests for were withdrawn at predetermined time intervals, filtered through millipore membrane filter and was replaced by an equal volume of dissolution medium.

CONCLUSION

Stable, reliable, and persistent buoyancy was achieved by entrapping air inside an inert core and maintaining the porosity by an impermeable, water insoluble coating. This study showed that there is a potential for this novel intragastric, floating, core-coat tablet to remain in the stomach for a longer period of time and to have a better in vivo drug release compared with the conventional slow release tablet. Moreover, the regulation of drug release kinetics could be entirely done by suitable manipulation of polymers in the drug layer. Stable c ore will support the external drug layer even with the gradual or complete loss of gas generating system.

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