ABSTRACT

A gastroretentive sustained release system of itopride hydrochloride was formulated to increase the gastric residence time and modulate its release behavior. Itopride hydrochloride is a prokinetic drug used in the treatment of gastroesophageal reflux disease, Non-ulcer dyspepsia and as an antiemetic. Hence, itopride hydrochloride beads were prepared by emulsion gelation method by employing low methoxy pectin and sodium alginate as sustained release polymers in three different ratios alone and in combination and sunflower oil was used to enable floating property to the beads. The effect of variation in polymer and their concentration was investigated. The beads were evaluated for production yield, particle size, swelling index, density measurement, buoyancy, drug content, drug entrapment efficiency, in vitro release characteristics and release kinetic study. Based on drug entrapment efficiency, buoyancy, swelling and in vitro release, F9 was selected as the optimized formulation. F9 was further subjected to surface morphology by SEM, in vitro release comparison with marketed formulation, in vivo floating study in rabbits and stability study for 90 days. In vitro release follows zero order and fitted in Korsmeyer peppas model (Non-Fickian release). Therefore, the rate of drug release is due to the combined effect of drug diffusion and polymer swelling. The in vivo X-ray studies revealed that the beads were floating in the rabbit stomach up to 10 hours. Thus, it was concluded that the sustained release formulation containing itopride hydrochloride was found to improve patient compliance, minimize the side effects and decrease the frequency of administration.

KEYWORDS: Itopride hydrochloride; floating drug delivery system; low methoxy pectin; sodium alginate; sunflower oil; oil entrapped floating bead.

Introduction

Oral drug delivery is the most widely utilized route of administration for systemic delivery of drugs via pharmaceutical products of different dosage form among all the explored routes. Oral route is considered most natural, uncomplicated, convenient and safe due to its ease of administration, patient acceptance and cost effective manufacturing process.

Floating Drug Delivery Systems (FDDS) have a bulk density lower than gastric fluids and thus remain buoyant in the stomach for a prolonged period of time, without affecting the gastric emptying rate. While the system is floating on the gastric contents, the drug is released slowly at a desired rate from the system. After the release of the drug, the residual system is emptied from the stomach. This results in an increase in the GRT and a better control of fluctuations in the plasma drug concentrations. Floating systems can be classified into two distinct categories, non-effervescent and effervescent systems. It is evident from the recent scientific and patient literature that an increased interest in novel dosage forms that are retained in stomach for a prolonged and predictable period of time exists today in academic and industrial research groups. One of the most feasible approaches for achieving a prolonged and predictable drug delivery in the gastrointestinal tract is to control the gastric residence time, i.e. gastro retentive dosage form. The continuing effort to improve pharmaceutical formulation in order to optimize therapy and patient compliance, various efforts have been tried to develop a modified release, once a day formulations. As a result of such efforts, many modified formulations are available (Chandira et al., 2010).

Non ulcer dyspepsia (NUD) and gastroesophageal reflux disease (GERD) are commonly encountered disorders of gastric motility in clinical practice. An acetylcholinesterase inhibitor or anticholinesterase agent that inhibits the enzyme acetylcholine esterase (AChE) responsible for degradation of acetylcholine possesses...