Introduction

Development of oral controlled-release system has been a challenge to formulation scientists because of their inability to restrain and localize the system in the targeted area of the gastrointestinal tract. Controlled/sustained release preparations using alternative routes have been formulated but the oral route still remains preferable.

The gastroretentive drug delivery systems can be retained in the stomach. It also assists in improving the delivery of drugs that have an absorption window in a particular region of gastrointestinal tract. It is particularly useful for the drugs that are primarily absorbed in the duodenum and upper jejunum segments. These system helps in continuously releasing the drug before it reaches the absorption window, thus ensuring optimal bioavailability. Several approaches are currently used to prolong gastric retention time. These include buoyant (floating) drug delivery systems, also known as hydrodynamically balance systems, swelling and expanding systems, polymeric bioadhesive systems, modified shaped systems, high density system, in-situ gel formation and other delayed gastric empting devices.

Based on the mechanism of gastroretentive delivery, two distinctly different technologies, i.e. non effervescent and effervescent systems have been utilized in the development of gastroretentive systems. Non effervescent systems use common gel forming or high swell cellulose type hydrocolloids, polysaccharides, and matrices forming polymers such as polycarbonate, polyacrylate, polymethacrylate and polystyrene. Effervescent systems utilize matrices prepared with swellable polymers such as methocel or chitosan and effervescent compounds e. g. sodium bicarbonate and citric acid or tartaric acid or matrices containing chambers of liquid that gasify at body temperature. When the drug is formulated with a gel forming polymer such as semisynthetic derivative of cellulose, it swells in the gastric fluid with a bulk density less than one. It then remains buoyant and floats in the gastric fluid, affecting a prolonged gastric residence time (GRT).

This gastroretentive dosage form is known to enhance bioavailability of the drugs: (i) having a dissolution and/or stability problem in the small intestine fluids, (ii) being locally effective in the stomach, (iii) being absorbed only in the stomach and/or upper part of the intestine.