Objective

A peptic ulcer is a sore on the lining of the stomach or duodenum, the beginning of the small intestine. Each year in the United States, about half a million people develop a peptic ulcer\(^{23}\). Helicobacter pylori (H. pylori) cause more than half of peptic ulcers worldwide.

Famotidine, H\(_2\) receptor antagonist, is 8 times more potent than ranitidine and 20 times more potent than Cimetidine. Famotidine is rapidly and incompletely absorbed from gastrointestinal tract (GIT) with the bioavailability of about 43 %, elimination half life (t\(_{1/2}\)) of 3 hours. Some patients with reflux oesophagitis who are being treated with proton pump inhibitor may continue to produce acid in the night (nocturnal acid breakthrough) and could be benefited by taking a sustained release formulation of H\(_2\) receptor antagonist.

The incomplete and variable absorption require dosage form that would be presented at the absorption site over a prolonged period improving its bioavailability and reducing its wastage. Moreover, being a weak base, famotidine with a pKa of 7.06 (BP, 1998) has pH dependant solubility and its gastric retention would allow adequate time for its dissolution, the rate-limiting step in drug absorption.

The otherwise excellent concept of floating system suffers from a disadvantage that it effective only when the fluid level in the stomach is sufficient high; however as the stomach empties, the buoyancy of the dosage form may be impeded. This serious limitation can be overcome by using bioadhesive polymers to enable it to adhere with mucous lining of the stomach wall. Floating and bioadhesive drug delivery systems offer the advantages of increased contact time with stomach mucosa, more effective absorption and bioavailability of drugs with absorption windows near proximal intestine and stomach, and low dosing frequencies\(^{24,25}\).

In most countries, H. pylori infection is associated with peptic ulcer and a four to six fold increased risk of gastric cancer: this means that the majority of gastric carcinomas in the world are related to H. Pylori infection. The bacterium lives deep in the gastric mucus, a logical way to improve the effectiveness of therapeutics is to develop gastroretentive dosage forms in order to release drugs as long as possible in the ecological niche of the bacterium.

Amoxycillin (\(\alpha\)-amino-hydroxybenzylpenicillin) have been also used as model drug in present study, is orally absorbed, broad-spectrum antibiotic, about 60% of an oral dose is
excreted in the urine as unchanged drug in 6 h and 20% as the inactive metabolite, plasma half-life- 1 h, is still widely used in the standard eradication treatment of gastric and duodenal ulcers associated with H. pylori infection combined with a other antibiotic and an acid suppressing agent 26-28. Increase in the residence time may reduce the treatment time of such diseases, improvement in the bioavailability of the drug 4.

In the context of above principles, a strong need is to be recognized for the development of a dosage form to deliver Famotidine/Amoxicillin in the stomach and to increase the efficiency of the drug, providing sustained action. The present investigation applied a systematic approach to the development of gastroretentive Famotidine dosage forms. Buoyancy is to be achieved by non-effervescent approach like using low density porous carrier/polymer like hydrophilic polymers, polyethylene oxide, natural and synthetic polymers like Guar gum, Xanthan gum, carbopol, sodium alginate, eudragit etc.