Aim of present investigation
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Historically, oral drug administration has been the predominant route for drug delivery. During the past two decades, numerous oral delivery systems have been developed to act as drug reservoirs from which the active substance can be released over a defined period of time at a predetermined and controlled rate. From a pharmacokinetic point of view, the ideal sustained and controlled release dosage form should be comparable with an intravenous infusion, which supplies continuously the amount of drug needed to maintain constant plasma levels once the steady state is reached.

Although some important applications, including oral administration of peptide and protein drugs, can be used to prepare colonic drug delivery systems, targeting drugs to the colon by the oral route. More often, drug absorption is unsatisfactory and highly variable among and between individuals, despite excellent in vitro release patterns. The reasons for this are essentially physiological and usually affected by the gastrointestinal (GI) transit of the form, especially its gastric residence time (GRT), which appears to be one of the major causes of the overall transit time variability.

Over the past three decades, the pursuit and exploration of devices designed to be retained in the upper part of the GI tract has advanced consistently in terms of technology and diversity, encompassing a variety of systems and devices such as floating systems, raft systems, expanding systems, swelling systems, bioadhesive systems and low-density systems. Stomach specific (gastricretention) will provide advantages such as the delivery of drugs with narrow absorption windows in the small intestinal region. Also, longer residence time in the stomach could be advantageous for local action in the upper part of the small intestine, for example treatment of peptic ulcer disease.

Furthermore, improved bioavailability is expected for drugs that are absorbed readily upon release in the GI tract. These drugs can be delivered ideally by slow release from the stomach. Many drugs categorized as once-a-day delivery have been demonstrated to have suboptimal absorption due to dependence on the transit time of the dosage form, making traditional extended release development challenging. Therefore, a system designed for...
longer gastric retention will extend the time within which drug absorption can occur in the small intestine.

Optimization techniques have been applied in the present study to systemically study the influence of process variables on the formulation of dosage forms. These designs provide an effective means for studying the effect of various parameters on the dependent variables. Thus, factorial designs were applied to optimize the formulation and development of mucoadhesive microspheres and in situ gel. In vivo studies of the formulations were also conducted to ascertain the effect of the designed dosage forms in vivo.

The present study was aimed at the development of stomach specific drug delivery systems using various approaches like mucoadhesive or floating. Mucoadhesive microspheres of amoxicillin, in situ gelling system of famotidine and mucoadhesive/floating tablets of glipizide were prepared. Different formulation variables were studied and optimized to achieve the desired mucoadhesive or floating properties and release profiles. The stability of the formulations was evaluated after 3 months of storage at accelerated stability conditions.