Introduction:
The identification of new diseases and the resistance shown towards the existing drugs called for the introduction of new therapeutic molecules. In response, a large number of chemical entities have been introduced, of which some have absorption all over the gastrointestinal tract (GIT), some have absorption windows (i.e. absorption sites, especially the upper part of the small intestine) and some drugs have poor solubility in intestinal media. The drugs belonging to the second and third categories, and the drugs which are required for local action in the stomach, require a specialized delivery system. [Y.S. Tanwar, 2006]

All the above requirements can be met and effective delivery of the drugs to the absorption window, for local action and for the treatment of gastric disorders such as gastro-esophageal reflux, can be achieved by floating dosage systems (FDS). To date, a number of FDS involving various technologies, carrying their own advantages and limitations were developed such as, single and multiple unit hydrodynamically balanced systems (HBS), single and multiple unit gas generating systems, hollow microspheres and raft forming systems. Various factors such as gastrointestinal physiology, dosage form characteristics and patient related factors control the behavior of FDS. [S. Arora et al, 2005]

Several approaches have been attempted in the preparation of gastro-retentive drug delivery systems. These include floating systems, swellable and expandable systems, high density systems, bioadhesive systems, altered shape systems, gel forming solution or suspension systems and sachet systems. Several difficulties are faced in designing controlled release systems for better absorption and enhanced bioavailability. One of such difficulties is the inability to confine the dosage form in the desired area of the gastrointestinal tract. Drug absorption from the gastrointestinal tract is a complex procedure and is subject to many variables. It is widely acknowledged that the extent of gastrointestinal tract drug absorption is related to contact time with the small intestinal mucosa. Thus, small intestinal transit time is an important parameter for drugs that are incompletely absorbed. [S. Arora et al, 2005]

Gastroretentive systems can remain in the gastric region for several hours and hence significantly prolong the gastric residence time of drugs. Prolonged gastric retention improves bioavailability, reduces drug waste, and improves solubility for drugs that are less soluble in a high pH environment. It has applications also for local drug
delivery to the stomach and proximal small intestines. Gastro retention helps to provide better availability of new products with new therapeutic possibilities and substantial benefits for patients. [Pawar A. P. 2007]

A number of different means have up to now been investigated to slow down the gastric emptying of a drug delivery system e.g., more particularly, the use of floating dosage forms having a bulk density lower than that of the gastric fluids. Floating oral delivery systems are expected to remain buoyant in a lasting way upon the gastric contents and to consequently enhance the bioavailability of all drugs which are well-absorbed from the proximal gastrointestinal tract. The lasting intragastric buoyancy of a controlled release dosage form might also provide a suitable manner to constantly deliver a drug locally into the stomach and hence achieve a sustained site-specific therapeutic action. [E. Bulgarelli, 2000]

Scintigraphic studies involving measurements of gastric emptying rates in healthy human subjects have revealed that an orally administered CR dosage form is mainly subject to two physiological adversities: the short GRT and the variable (unpredictable) GET. Yet another major adversity encountered through the oral route is the first-pass effect, which leads to reduced systemic bioavailability of a large of drugs. Overall, the relatively brief GI transit time of most drug products, which is approximately 8–12 h, impedes the formulation of a once daily dosage form for most drugs. These problems that occur due to factors such as age, race, sex, and disease states, as they may seriously affect the release of a drug from the DDS. It is, therefore, desirable to have a CR product that exhibits an extended GI residence and a drug release profile independent of patient related variables. [F. M. Sakr, 2009]