Shyale S, et al. (2005) developed matrix tablets of albendazole using guar gum as carrier for colon targeting in order to provide an effective and safe therapy for helminthiasis. To improve its bioavailability, the formation of inclusion complexes of albendazole with cyclodextrin was investigated. Matrix tablets of albendazole- β-CD prepared by wet granulation using guar gum in various propositions; 20%, 30% and 40%. The formulation containing 30% guar gum showed 67.70±1.9% of albendazole release in presence of rat caecal contents, whereas in the control study the formulation released only 29.7±0.2% of albendazole. A significant difference (P<0.001) was observed at 24hrs in the amount of albendazole release from the formulation containing 30%-guar gum when compared to dissolution study with out rat caecal contents. The study showed that the release of albendazole in physiological environment of colon is due to the microbial degradation of guar gum compression coated tablets in presence of rat caecal contents.

Chowdary KPR, et al. (2003) formulated mucoadhesive tablets with nifedipine alone and its inclusion complex with β-CD and mucoadhesive polymer sodium carboxy methyl cellulose and Carbopol were investigated with a view to the design of oral controlled release tablets of nifedipine. Complexation of nifedipine with β-CD has markedly enhanced the solubility and dissolution rate of nifedipine. The phase solubility study indicated the formulation of nifedipine- β-CD inclusion complex with a stability content of 121M^−1. A 20.6 fold increase in the dissolution rate of nifedipine has observed with of nifedipine- β-CD (1:2) solid inclusion complex mucoadhesive tablets formulated employing nifedipine along gave very low dissolution whereas those formulated its β-CD complexes gave slow controlled and release spread over a period of 12 hr. Drug release from these tablets followed zero order kinetics up to 85-95% release and the release was diffusion controlled. Good controlled release two layered tablet formulation of nifedipine, satisfying the theoretical sustained release requirements based on its pharmacokinetics, were developed using its inclusion complexes with β-CD.

Chowdary KPR, et al. (2006) prepared complexation of celecoxib with HP- β-CD in the presence and absence of three hydrophilic polymers, PVP, HPMC and PEG was investigated with an objective of evaluating the effect of the hydrophilic polymers on the complexation and the solubilizing efficiencies of HP- β-CD and on the dissolution rate of celecoxib from the HP- β-CD complexes. From the results it was found that addition of hydrophilic polymers markedly enhanced the complexation and solubilizing efficiencies of HP- β-CD. Solid inclusion complexes of celecoxib- HP- β-CD were prepared in 1:1 and 1:2 ratios by the kneading method, with and with out the addition of hydrophilic polymers. The solubility and dissolution rate of celecoxib were improved by complexation with HP- β-CD. The celecoxib- HP- β-CD 1:2 inclusion complex yielded a 36.57 fold increase in the dissolution rate of celecoxib. The dissolution of hydrophilic polymers also markedly enhanced the dissolution rate of celecoxib from HP- β-
CD complexes; a 72.60, 61.25 and 39.15 fold increase was observed with PVP, HPMC and PEG respectively. DSC and XRD indicated stronger drug amorphisation and entrapment in HP- β-CD because of combined action of HP- β-CD and the hydrophilic polymers.

Desai S, et al.27 (1993) developed noncompressed sustain release tablets that remained a float on gastric fluids. The tablet formulation comprised 75% of drug and 2% to 6.5% of gelling agent and water. The noncompressed tablet had a density of less than 1 and sufficient mechanical stability for production and handling.

Wu W, et al.28 (1997) developed floating sustained release tablets of nimodipine by using HPMC and PEG 6000. Prior to formulation of floating tablets, nimodipine was incorporated into polaxamer-188 solid dispersion after which it was directly compressed into floating tablets. It was observed that by increasing the HPMC and decreasing the PEG 6000 content a decline in in vitro release of nimodipine occurred.

Bhaskaran S, et al.29 (2001) formulated oral floating dosage form of Diltiazem hydrochloride in order to prolong the gastric emptying time of the preparation. This is achieved by allowing a part of the dosage form to float in the stomach by coating ordinary drug loaded sustained release pellets with an effervescent layer and a swellable layer. In this system the fluid from the stomach enters the swellable layer and reacts with the effervescent layer like a balloon and thus making it to float in gastric juice. The enteric coating of the pellets passes into the intestine like an ordinary sustained release pellets. Thus the presence of sustained dosage form at the absorptive site can be improved for longer duration.

El-Kamel AH, et al.30 (2001) studied sustained release system for Ketoprofen to increase its residence time in the stomach without contact with the mucosa and was achieved through the preparation of floating microparticles by the emulsion solvent diffusion technique. All the floating microparticle formulations were evaluated for flow properties, packability and drug release rate.

Chauhan B, et al.31 (2004) studied multi-unit floating systems of a highly hydrophilic drug residonate sodium-gelurice following melt granulation technique in the range of 1:1 and 1:3 similarly RDS:GE:ethylcellulose and RDS:GE:Eudragit NE30D formulations were evaluated for in vivo and invitro floating ability, and invitro drug release studies. The in vivo & invitro results proved that the gelurice presence decreases the side effects of resideonate with prolonged gastric retention.

Upadhye AA, et al.32 (2004) studied floating drug delivery system using water insoluble, cross linking polymers containing salt forming ion exchange resins. Chlorpheniramine maleate was chosen as model cationic drug. The tablets are prepared by following variables affecting the drug release and floating
ability from matrix tablets using HPMC K4M and K15M complexes and by adding ion exchange resins following compression. The addition ion exchange resins to HPMC-matrices got floating within 15 minutes and significantly modified the release of CPM. The drug release also varied with the particle size of resin and the drug: resin ratio.

Archana R, et al.\textsuperscript{33} (2004) studied floating multi-unit controlled release gastro retentive drug delivery system of celecoxib for improve bioavailability, capsules were prepared by phase separation coaservation technique was used for encapsulating granules containing drug, gel forming polymer (sodium alginate) in various combinations with ethyl cellulose and PVP K-30 and gas generating agents from polymeric membrane in cyclohexane as microencapsulating medium. The ratio of 2:1 of gas generating agents was found to provide the granules with good buoyancy and controlled release. Increase in EC decreased the rate of release and increase in the Hydrophilic polymer in the coat increased the release extent.

Narasimhamurthy S, et al.\textsuperscript{34} (1997) developed novel method to prepare floating microcapsules loaded with drug by core solubilisation technique to improve resident time to stay in gastrointestinal tract. Microcapsules were prepared by using polymer Ethyl cellulose, diethyl phthalate and drug were dispersed in ethanol: dichloromethane (1:4) solvent system and coated on lactose beads. Formulations containing one part of drug with 2, 4, 6, 8 and 10 parts of polymer were prepared. The formulations were found to be stable at all storage conditions and release followed first order kinetics.

Dorozynski P, et al.\textsuperscript{35} (2004) prepared hydrodynamically balanced systems by using macromolecular polymers as excepients. Hard gelatin capsules were filled with polymeric substances belonging to various chemical groups like chitosan, sodium alginate, HPMC and evaluated for parameters like density, hydration, erosion, and floating force, solvent penetrating was observed by magnetic resonance imaging (MRI) technique into the HBS. Formulation containing HPMC and Sodium alginate showed less buoyancy lag time they float with in half-hour after immersion with the release mechanism of erosion.

Klausner EA, et al.\textsuperscript{36} (2002) studied novel gastrroretentive dosage form (GRDF’S) based on unfolding multilayer polymeric films. To investigate the mechanism of gastrroretetivity and its effect on absorption of riboflavin in dogs, the dosage forms were constructed in multilayer films with inner and outer layers. Inner layer composed of polymer-drug matrix (drug+shellac 7:3) and outer layer with swellable polymers like L.polylactic acid, EC, Eudragit RS100. Formulations were evaluated for invitro and in vivo characteristics in beagle dogs. GRT is determined by X-Ray pictures using radio opaque markers. Large dosage form with increased rigid frame had showed prolonged GRT.
Patel A, et al. (2006) studied method to prepare metformin hydrochloride floating microspheres, by a non-aqueous solvent evaporation method, drug and EC were mixed in acetone at various ratios i.e. drug: polymer (EC) 1:1 and 2:1 and introduced into 30ml of liquid paraffin and stirred at 1200 RPM up to 2 hours. The micro spheres collected were evaluated for IR spectra, % yield, particle size analysis, drug entrapment efficiency and surface morphology by scanning electron microscope (SEM) and invitro evaluation of floating ability in simulated GI fluid contain 1% tween as a dispersing medium. Statistical optimization is carried to adjust drug polymer ratio and release. The optimized multi-unit floating metformin HCl delivery system showed maximum bioavailability.

Moursy NM, et al. (2003) formulated sustained release floating capsules of nicardipine hydrochloride. A hydrocolloid of high viscosity grade was used for the floating systems and sodium bicarbonate is used to evolve CO2 to aid buoyancy. Seven capsule formulae were prepared following wet granulation method. Prepared capsules were evaluated for floating time and the kinetics of drug release and compared to marketed formulation “Micard”. Results stated that the floating time is increased with increasing the proportion of the hydrocolloid and succeeded in capsule buoyancy. Plasma concentration time curves of prepared capsule revealed a longer drug release 16 hours compared to marketed conventional product about 8 hours.

Li S, et al. (2003) studied the effect of formulation variables on drug release and floating properties of the delivery system. HPMC of different viscosity grades and carbopol 934P were used in formulating the gastric floating drug delivery systems employing 2X3 full factorial design. Main effects and interaction terms of the formulation variables were evaluated quantitatively by a mathematical model. The decrease in the release rate was observed with an increase in the viscosity of the polymeric system. Incorporation of carbopol however was found to compromise the floating capacity of GFDDS and release rate.

Krogel I, et al. (1999) studied floating and pulsating drug delivery systems based on a reservoir system consisting of a drug containing effervescent core and a polymeric coating, and identified important core and coating properties for the two systems. The mechanical properties of acrylic (Eudragit RS, RL or NE) and cellulosic (cellulose acetate, ethyl cellulose) polymers were characterized for core preparation. A polymer (CAP and HPMC) is added to the core to control the drug release and flotation is controlled by the composition and hardness of the tablet core and thickness of the coating. A quick releasing core was formulated in order to obtain a rapid drug release after the rupture of the polymeric coating.

Umamaheshwari RB, et al. (2003) prepared cellulose acetate butyrate (CAB) - coated cholestyramine microcapsules as an intragastric floating drug delivery system endowed with floating ability due to the CO2 generation when exposed to gastric fluid. The effect of CAB: drug-resin ratio (2:1, 4:1, 6:1 w/w) on
The particle size, floating time, and drug release was determined. Cholestyramine microcapsules were characterized for shape, surface characteristics, and size distribution. A longer floating time was observed with a higher polymer: drug resin complex ratio (6:1). Results obtained stated that the cholestyramine microcapsules were distributed throughout the stomach and exhibited prolonged gastric residence via mucoadhesion and CAB-coated microcapsules showed floating as well as mucoadhesive properties.

Thanoo BC, et al.\(^{42}\) (1993) developed oral sustained drug delivery systems by preparing polycarbonate microspheres loaded with aspirin, griseofulvin and P-nitroaniline following solvent evaporation technique. High drug loading >50% was achieved by this process. Drug-loaded microspheres were found to float on simulated gastric fluid. Drug release studies stated increasing the drug to polymer ratio in the microspheres increased both their mean particle size and the release rate of the drugs.

Aldrete ME, et al.\(^{43}\) (1997) prepared matrix tablets of metranidazole with hydroxyl propyl methyl cellulose viscosity ranging from 15cps to 30,000 cps and particle size ranging from 163 \(\mu\)m to 505 \(\mu\)m. There was a linear relationship between the inverse of release rate and viscosity grade at polymer concentration of 10%. A linear relationship between the release rate and cube of the diameter particle size is also determined.

Nagarsenkar MS, et al.\(^{44}\) (2004) designed gastro retentive system of cinnarizine for controlled release drug delivery. The tablets are compressed by slugging method using HPMC (K4CMR) as swelling and rate retarding agent; Sodium glycines carbonate (SGC) and sodium bicarbonate as effervescent ingredients. The drug release studies were carried out in simulated gastric fluid pH 1.2 using USP I dissolution test apparatus. Tables found buoyant for 12 hours and the drug released is between 85-90% in zero order kinetics. It was observed that tablets containing SGC and containing sodium bicarbonate showed similar release pattern.

Mahesh CP, et al.\(^{45}\) (2011) studied sustain released gastro retentive drug delivery system for ofloxacin to prolong gastric retention time of the drug delivery systems. Different polymers such as psyllium husk, HPMC K100M, crospovidone and its combinations are tried in order to get desired sustain release profile over a period of 24 hrs. Formulations were evaluated for buoyancy lag time, duration of buoyancy, drug content uniformity, and \textit{in vitro} drug release profile. It was found that dimensional stability of the formulation increases with the increase in crospovidone due to high water uptake. The optimized formulation was subjected to stability studies at different temperature and humidity conditions as per ICH guide lines.

Dumal RS, et al.\(^{46}\) (2004) studied floating bilayer tablet containing cefuroxime axetil following direct compression method containing immediate release layer (IR) and a floating matrix layer (FL) using
HPMC. Tablets were evaluated for buoyancy lag time (BLT) and tablets showed BLT 7 to 34 min and remained floated in 0.07 N HCl for more than 18 hrs. the 50% drug released within initial 20-30 min. thereafter drug release was slower but continuous with 65 to 100% drug released at end of 10 hrs. Bilayer tablets comprising of immediate layer and HPMC based floating matrix tablet showed floating and controlled drug releases after immediate release.

Shah SP, et al.\(^ {47}(2004)\) studied Gastroretentive drug delivery system in the form of caplets, of dimension 7mmX17mm by dry blending of verpamil hydrochloride using swellable polymers and gas generating agent along with suitable diluents. The ratio of drug: polymer was optimized from 1:1.5 to 1:2 and also amount of bicarbonate source was optimized from 25 mg to 100mg using factorial design. The developed formulation showed uniform extended release of more than 90% in 12 hrs. The release followed Higuchi kinetics; diffusion through the gel barrier. The drug content was found to be with in limits and remained buoyant for more than 12hrs.

Shoufeng Li, et al.\(^ {48}(2002)\) studied contribution of the formulation variables on the floating properties of gastric floating drug delivery system using a continuous floating monitoring system and tiguchi statistical experimental design. Several formulation variables such as different types of HPMC, varying HPMC/Carbopol ratio and addition of magnesium stearate were evaluated. It was founded that the HPMC of higher viscosity grade generally exhibited greater floating capacity but the effect was not statistically significant. It was also concluded that incorporation of hydrophobic agents such as magnesium stearate could significantly improve the floating capacity of the GRDDS. A better floating behavior was achieved at higher HPMC/Carbopol ratio. Carbopol appeared to have a negative effect on the floating behavior.

Ali J, et al.\(^ {49}(2006)\) studied single unit and multi unit GRDSS for ofloxacin by physical mixing of various grades of HPMC and PEO alone as well as in combinations and cellular acetate phthalate, liquid paraffin and ethyl cellulose used as release modifiers in case of single unit capsule GRDDS and by solvent diffusion technique using two different solvents using various grades of eudragit and PEO for multi-unit floating micro spheres. The capsule prepared with PEO WSR60K and drug coated with 2.5% ethyl cellulose gave the best in vitro percent drug release. Both floating capsule and micro spheres gave 96.02% and 95.83 % drug release in 12hrs respectively. Both followed the higuchi model showing that drug release followed non-fickian diffusion mechanism.

Rajinikanth PS, et al.\(^ {50}(2007)\) studied novel floating in-situ gelling systems of amoxicillin (AFIG) for eradication of H.Pylori by dissolving varying concentrations of gellan gum in de-ionized water containing sodium citrate, to which varying concentrations of drug and calcium carbonate, as gas forming agent was added and dissolved by the stirring. The in vitro and in vivo studies showed that the prepared AFIG has
feasibility of forming rigid cells in gastric environment and eradicated H.Pylori from GI tract more effectively than amoxicillin suspension because of prolonged gastro-intestinal residence time of the formulation.

Tang YD, et al.\textsuperscript{51}(2007) studied sustained release of hydrophobic and hydrophilic drugs from a floating dosage form was studied by making multi units beads with calcium alginate, sunflower oil and drug through an emulsification/gelation process. In this, three kinds of drugs with different hydrophilicities, Ibuprofen, Niacinamide and Metaclopramide HCl were tested. Both hydrophobic drug, Ibuprofen and hydrophilic drugs, Niacinamide and Metaclopramide HCl were released in a sustained manner for 12hrs.

Goole J, et al.\textsuperscript{52}(2007) studied new multi-unit mini tablet of levadopa sustained release floating dosage forms by melt granulation subsequent compression. The importance of composition and manufacturing parameters of the mini tablets on their floating and dissolution properties was examined. Best floating and dissolution properties were obtained with 3mm mini tablet containing HPMC K15M prepared with low compression forces ranging between 50 and 100N.

Tripathi G, et al.\textsuperscript{53}(2011) studied the effort to augment the anti-\textit{Helicobacter pylori} (\textit{H. pylori}) effect of acetohydroxamic acid (Aha), pH sensitive microbeads, which have the ability to reside in the gastrointestinal tract for an extended period, were prepared. The prepared beads of pectin based, wherein, the oil was entrapped, blended with hydroxypropyl methyl cellulose or Carbopol 934 with calcium carbonate were prepared by ionic gelation technique. The scanning electron microscope photograph indicated that beads were almost spherical in shape, discreet and free flowing, buoyancy, encapsulation efficiency and drug content obtained from all batches were satisfactory. The formulation exhibited sustained release behaviour and the goodness of fitting the release data to the model was indicated by high correlation coefficient ($R^2$) and small errors. Subsequent coating of the selected batch of microbeads exhibited zero-order sustained pattern of the drug release up to 8 h. The optimized formulation batch was found to be excellent mucosal retention and antimicrobial efficacy against the isolated \textit{H. pylori} strain. The result provides evidence that the optimized formulation may be used effectively for pH sensitive gastric targeted antiinfective such as Aha.