Controlled release drug delivery is a new way to treat illnesses. Over the last 20 years, it has become more popular as a way to treat diseases such as cancer, diabetes, asthma, and heart disease. Control release drug system generally involves implanting an engineered polymer directly into the organ or system that is affectedly a disease. Control release drug delivery system requires drug binder or drug carrier. These materials release the drug at a control rate over certain period of time.

Protein, Peptides, Natural polysaccharide, chitosan, guar gum, cellulose and starch & their derivatives are useful as a drug binder or a drug carrier. Guar gum is a glactomannan and derived from Guar seeds (cyamposistetragonolobus). It has excellent biodegradability and biocompatibility. Guar gum and its derivatives have been find many application in industries such as food, animal feed, textile, pharmaceutical, personal care, health care, nutrition, cosmetics and paper. Guar gum or its derivatives are used in pharmaceutical industries as gelling /viscosifying / thickening, suspension, stabilization, emulsification, preservation, water retention / water phase control, binding, clouding/bodying, process aid, pour control for suspensions, anti-acid formulations.

Guar gum having better biodegradability and biocompatibility as compare to other polysaccharide and easy availability encourage most scientists to focus their work on it. Due to its high viscosity and swelling index it cannot be used in its virgin form in the pharmaceutical industry. To overcome this problem guar gum should be chemically modified to improve its properties. It can be done by number of chemical reaction.

There, so in the present study carboxymethylation of guar gum was carried out by 3 different methods to improve its properties.

In one study carboxymethylation of guar gum was carried by heterogeneous and homogeneous solvent method. Iso propyl alcohol and water were used as solvent for heterogeneous and homogeneous method respectively. Optimum value of 1.14 for DS and product in granular form were obtained by heterogeneous method.

In second study carboxymethylation of guar gum was carried out by Friedel craft acylation method. Reaction was carried out in heterogeneous
method. Acetyl chloride was used as acetylating agent. AlCl₃ and FeCl₃ were used as catalyst. Optimum value of 0.7 for DS was obtained by using AlCl₃ as catalyst. Advantage of this method over conventional method was that the reaction was carried out at room temperature. So less energy was required compared to conventional method.

In third study solvent free acetylation of guar gum was carried out by using iodine as catalyst. No solvent was used in this method. The optimum DS of 0.6 was obtained.

Carboxymethylation of guar gum improved its properties. Thermal stability of polymer was also improved by modification. To incorporate properties which are useful for drug binder, second modification of CGMM was carried out by grafting, blending and preparation of composite material.

In another study cross-linking of CMGG with borax was carried out. Cross-linking swelling index was decreased but due to cross-linking its viscosity was increased. This prepared derivative was used in tablet formulation. Thermal stability of borax cross-linked CMGG was improved as compared to CMGG.

In another study CMGG was graft copolymerized with maleic anhydride by thermal grafting process. Grafting improves viscosity and swelling index. Grafting reaction was initiated by benzoyl peroxide catalyst. The reaction was carried out by using 4 different monomer ratio (1wt%, 2wt%, 3wt%, 4wt%). Best results were obtained by using monomer concentration of 3 wt%. Grafting also improves its thermal stability.

All prepared derivatives were also confirmed by various instrumental analysis such as FTIR, SEM, TGA.

Prepared derivative were used as binder in pharmaceutical formulation. CMGG and borax cross-linked CMGG were used in the formulation of paracetamol and ibuprofen. In-vitro release study showed that tablets in which CMGG was used as binder retarding the drug release for more time as compared to borax cross-linked CMGG.

MA-g-CMGG was used in the formulation of ibuprofen and paracetamol. Prepared tablets were shown slow release of drug from the matrix. % drug release was increased by increasing % concentration of
MA-g-CMGG to 2% from 1%. Further increased in % concentration of MA-g-CMGG result into lower % drug release.

The results for flow properties, hardness, friability for the both cases are comparatives with standard paracetamol and ibubrufen tablets available in the market also it fulfills the Indian pharmacopieal requirements.