CHAPTER – 6

CONCLUSION AND FUTURE SCOPE OF WORK

A novel polymeric hydrogel IPN bead of chitosan with glycine and glutamic acid, amino acids, crosslinked with glutaraldehyde have been formulated and tested as controlled drug delivery device. To fulfil this objective in the first process, four types of beads which are chitosan, chitosan-glycine, chitosan-glutamic acid and chitosan-glycine-glutamic acid were compared and subjected to carry studies for characterization, swelling behaviour and drug release behaviour and then same experimentations were performed with novel developed chitosan-glycine-glutamic acid beads in detail. The observations of the present study have indicated –

Chitosan-amino acid beads can be prepared more easily than pure chitosan beads under mild conditions.

- Chitosan-glycine-glutamic acid beads have proved as good as chitosan-glycine and chitosan-glutamic acid beads.
- They were able to load an optimum quantity of CPM drug inside polymeric network.
- The beads are round or oval in shape with rough surfaces and having microtubes inside. Their sizes of beads were in micron range.

  The beads showed thermal stability and able to entrap drug safely inside without physical and chemical changes.
- The drug was incorporated with in the polymeric chitosan-amino acid interpenetrating network, crosslinked with glutaraldehyde with mild interaction. No chemical interactions were involved between polymer and drug.

- The amorphous drug was dispressed within the polymeric beads. No crystals of drug were found inside beads.

  The rate of swelling of polymeric beads was dependent of pH of the medium, the degree of crosslinking, weight ratio of chitosan and amino acid. Therefore, by varying the weight ratio of chitosan-amino acid and concentration of glutaraldehyde, the change in rate of swelling of polymeric beads upto desired limit can be achieved.
- The release of drug was also found to be dependent on pH of releasing medium, weight ratio of chitosan and amino acids, concentration of crosslinker, drug loading. It is concluded that desired rate of drug release can be achieved by varying these parameters.
- The formulated beads provide a sustained release of drug for extended periods.

  Drug release mechanism from the crosslinked polymeric microsphere matrix is diffusion controlled.
- Chitosan-amino acid beads especially chitosan-glycine-gutamic acid beads can be used successfully for the formulation of controlled drug delivery devices.

FUTURE SCOPE OF WORK

Chitosan based IPN beads have a wide range of applications and may be used to solve numerous biomedical problems. Chitosan-amino acid beads can be obtained easily and digested by lysozymol enzymes in the digestive tract. Therefore, it can be utilized as a delivery system for a number of drugs, vaccines, hormones and anticancer agents to release them in a controlled manner. This concept of chitosan-amino acid polymeric hydrogel bead systems and macro-molecular drug formulations is expected to be useful for enhancement of efficacy and minimization of toxic side effects. From the studies, it is concluded that chitosan-glycine, glutamic acid, hydrogel beads system are promising material for controlled drug delivery. They can be proved

a system for non viral gene delivery but such approaches will need further studies. However, the present studies concerning drug release, carried out only in-vitro release. There is a need to carry out the studies in-vivo also. Gene therapy and the interaction with living tissues seems to be major topics in the current research on chitosan based beads.