CHAPTER VI
FUTURE ASPECTS

Although the application of chitin/chitosan as a material for controlled release system in this research work may probably be possible to apply in real situations, many points of interest need further studies.

In the physical insertion type of controlled release system, the morphological characterization of prepared chitosan beads should be done in order to evaluate their size, size distribution, shape and porosity. In addition, the release mechanism may be precisely determined based on the structural characterization. Since the prepared beads are of a hydrogel type, an advanced technique of low vacuum scanning electron microscope should be applied for the characterization studies.

For the chemical conjugation between chitosan and chloramphenicol, especially the reaction of chitosan acetate with *N*,*N*'-carbonyl diimidazole (CDI), a highly reactive coupling agent for peptide synthesis, which is proven to be a new approach, should be studied in details. The reaction conditions such as temperature, the amount of CDI, the type and amount of catalyst should be studied for the optimum condition. The obtained product should also be quantitatively analyzed for the degree of substitution by FTIR.

In this work, chitosan having a carboxylic acid at C-6 position, was synthesized. The derivative is expected for the coupling with chloramphenicol via esterification. However, the salt formation and the adsorption of chromium ion limit the introduction of model drug. Further purification should be concerned in order to achieve drug conjugation.

The synthesized products in the present work, not only the chitosan-chloramphenicol conjugates but also the 6-*O*-carboxyl chitosan, need further techniques for structural characterization such as ^{1}H and ^{13}C-NMR (solid state NMR), elemental anlysis, mass spectrometer.

In the release studies, besides the effect of pH, there may be other factors that effect to the release; for example, temperature, enzymes, etc. Those factors should be applied and varied, which will be a guide line for in vivo studies.