CHAPTER VII
CONCLUSIONS AND RECOMMENDATIONS

Amphiphilic chitosan nanospheres were succeeded in preparing by grafting of phthalic anhydride as hydrophobic part and polyethylene glycol as hydrophilic part and self-assembly in aqueous solution to form core–shell structure. However, systematic of controllable particle size and charge need to be considered. Here, the first part (Chapter III and IV) based on the systematical formation of chitosan nanospheres and factors that influences to sphere size and shape.

The present work (Chapter III) declared pH-responsive nanospheres to consequently give (i) a controlled colloidal-transparent solution, (ii) a changeable nanosphere size, and (iii) a variable negative surface charge. The fact that the phthaloylation in DMF brings not only N-phthaloyl group but also a certain amount of O-phthaloly group, the simple variation of pH initiated the carboxylic acid of O-phthaloyl group to play an important role in forming hydrogen bond or anionic carboxylate group. The hydrogen bond might be formed as a dimeric system or with water molecules. This led chitosan nanospheres be a self-assemble structure which can be controlled by pH.

The second part (Chapter IV, V and VI) studied about a potential of chitosan nanospheres as drug carriers. The present work reported an incorporation of lidocaine, camptothecin, and protein as model drug. The successful of incorporation of model drug was depended on an appropriate condition between drug molecule and chitosan nanospheres. Lidocaine has specific efficiency to incorporate with chitosan nanospheres obtained from chitosan with deacetylation degree of 85. In the case of camptothecin, incorporation efficiency was decreased as deacetylation degree increased. Protein incorporation with chitosan nanospheres suggested electrostatic interaction played an important role for incorporating OVA, α-lactalbumin, and BSA. Beside catalase and lysozyme were incorporated with nanospheres under van der Waals attraction due to hydrophilic property of R residues and nanosphere surface.

Here, the wok should be extended to the systematic study of drug release and profile of chitosan nanospheres in blood circulation. Thus, the recommendation will provide potential of chitosan nanospheres as drug carrier.