

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this work, the blend fibers with antimicrobial property were successfully prepared from *O*-CM chitosan and alginate in aqueous solution by wet spinning. The blends were miscible in the range of 0.5-1.5% *O*-CM chitosan, due to strong electrostatic force and hydrogen bonding between the two polymers. The tensile strength and elongation at break of the blend fibers were slightly lower than that of pure alginate due to the addition of chitosan derivatives, which slightly hamper the crystallization of alginate molecules during the spinning process. However, the blend fibers had antimicrobial properties against *E. coli*, *P. aureginosa*, *S. aureus*, *S. mutans* and *S. cerevisiae*.

N-(carboxyacyl) chitosan /alginate blend fibers were successfully prepared by the same method. The blends were miscible in the range of 0.25-0.75% *N*-(carboxyacyl) chitosan. The tensile strength and elongation at break of the blend fibers were remarkably lower than that of pure alginate. Nevertheless, the blend fibers had antimicrobial properties against *E. coli*, *P. aureginosa*, *S. aureus*, *S. mutans* and *S. cerevisiae* similar to *O*-CM chitosan/alginate blend fibers, and the clear zones were larger than those of *O*-CM chitosan /alginate blend fibers at the same chitosan derivative content. Thus, the blend fibers used as a wound dressing could prevent wound from infection and suitable to be as a wound dressing with antimicrobial properties. Moreover, it is interesting that *N*-(carboxyacyl) chitosan is one of the new chitosan derivatives having antimicrobial activities similar to *O*-CM chitosan.

5.2 Recommendations

The result indicated that *O*-CM chitosan/alginate and *N*-(carboxyacyl) chitosan/alginate blend fibers had antimicrobial properties against *E. coli*,

P. auruginosa, *S. aureus*, *S. mutans* and *S. cerevisiae*. However, further study on the variation in other spinning conditions, like the size of nozzle, bath length, take-up speed, etc. should be conducted in order to obtain the optimal spinning condition that would give antibacterial fiber with the best properties.