

## CHAPTER V

### CONCLUSION

Cellulose could be prepared as the water-retaining material which would be more valuable, in particular, cellulose from the weeds, such as Water Hyacinth.

In this research, it was found that microcrystalline cellulose grafted concomitantly with both acrylonitrile and acrylic acid monomers would lead to the better water-retaining material with water retention value of 1056 g water/ g polymer, while the product from cellulose grafted with acrylonitrile reported by other research group had the water retention value of 700 g water/g polymer. It implies that acrylic acid significantly enhances water retaining ability, probably due to the easier alkaline-hydrolyzed carboxylic group of acrylic acid, comparing to the nitrile group of acrylonitrile. Furthermore, the vigorous condition of alkaline hydrolysis, usually used for hydrolysis of nitrile group, could make grafted side chain degrade and resulted in reduction of water retaining ability. Thus it is believed that the addition of acrylic acid monomer in the grafting reaction of acrylonitrile on microcrystalline cellulose is promising for the improvement of cellulose-based water-retaining material.

There were many factors effected the graft copolymerization of acrylonitrile and acrylic acid on microcrystalline cellulose, such as

amount of water, initiator concentration, quantity of monomer, nitric acid concentration, stirring speed, and reaction temperature. At the investigated optimum condition, 87.79 % conversion of monomer to copolymer, 96.85 % grafting efficiency, 88.12 % add-on, 7.42 grafting ratio, and only 2.78 % homopolymer were obtained.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

### Suggestion for future work

In this research, it was found that the alkaline hydrolysis of acrylonitrile did never undergo completely, therefore the carboxylate and amide groups were present in alkaline-hydrolyzed product. The obtained amide groups can not improve the absorbing ability but rather reduce the water retention value of product. In order to solve this problem, it is thus expected that using other easier hydrolyzed monomers, such as methyl acrylate, instead of acrylonitrile will be able to get rid of this problem.

Furthermore, the grafted cellulose can be used for other purposes such as the removal of heavy-metal ions in water. For each application, the vinyl monomer containing a special functional group should be synthesized and grafted on cellulose by the same procedure mentioned in the experimental part.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย