

CHAPTER IV

CONCLUSIONS

To study the cross linking reaction of sodium carboxymethylcellulose with sodium trimetaphosphate, the factors involved in modification process were evaluated. These factors were the ratio of the mixture of dispersion medium, the time of cross linking reaction and the viscosity grade of sodium carboxymethylcellulose. It was found that the ratio of methanol to water influenced on the appearance of modified sodium carboxymethylcellulose. The ratio of methanol to water equal 70 : 30 gave the good appearance of modified sodium carboxymethylcellulose. The time of cross linking reaction affected to the modification process, the modified sodium carboxymethylcellulose obtained was not significantly difference in the appearance and phosphate content but the viscosity was different. The shortest cross-linking time (3 hours) was chosen because the modified sodium carboxymethylcellulose obtained had the highest phosphate content and the viscosity was not too high. The cross-linked sodium carboxymethylcellulose resulting from the sodium carboxymethylcellulose of various viscosity grade was the same appearance, so the evaluation of chemical properties and physical properties were performed. The result of phosphate content and that of IR spectrophotometry of various modified sodium carboxymethylcellulose were different. And the viscosity of modified sodium carboxymethylcellulose was significantly lower than sodium carboxymethylcellulose used as starting material. And the DSC thermogram of modified sodium carboxymethylcellulose differed from sodium carboxymethylcellulose.

The comparative study of physical properties that related to disintegrating property of modified sodium carboxymethylcellulose, sodium

carboxymethylcellulose and others disintegrants were shown that modified sodium carboxymethylcellulose exhibited water uptake and swelling better than sodium carboxymethylcellulose. Both of volume and rate of water uptake of modified sodium carboxymethylcellulose were observed to be significantly lower than Ac-di-sol[®] and Primojel[®]. These were comparable to Nymcel[®], except M₂ showed higher. In comparison to corn starch, modified sodium carboxymethylcellulose showed higher volume of water uptake but the rate of water uptake was comparable except M₂ showed higher rate.

The study of disintegrating property in soluble and insoluble system was disclosed that modified sodium carboxymethylcellulose to be superior to sodium carboxymethylcellulose. In soluble system, modified sodium carboxymethylcellulose was comparable to Ac-di-sol[®], Nymcel[®] and Primojel[®] but it was less effective in insoluble system. And modified sodium carboxymethylcellulose was more effective than corn starch in insoluble system but it was comparable to corn starch in soluble system. The disintegration time was slightly affected by the concentration of disintegrant and the compressional force.

Among the modified sodium carboxymethylcellulose, M₄ had the highest swelling but water uptake of M₄ was inferior to M₂ and the disintegration time in soluble and insoluble system were comparable to the others modified sodium carboxymethylcellulose.

In paracetamol tablets M₄ promoted the disintegration of tablet more significantly than NaCMC₄ but it was not as effective as Ac-di-sol[®], Nymcel[®], Primojel[®]. And the efficacy of M₄ was less than corn starch. The result of dissolution of paracetamol tablets showed an efficacy of modified sodium carboxymethylcellulose as a disintegrant. It was found that T_{80%} of paracetamol tablet containing modified sodium carboxymethylcellulose, Ac-di-sol[®], Nymcel[®] and Primojel[®] was shorter than corn starch. For NaCMC₄

and the control formulation, the release of paracetamol was less than 80% labeled amount.