

Chapter 4

Conclusions

Cassava starch was modified into starch-g-PAN by a graft copolymerization of acrylonitrile onto the polysaccharide via a redox initiation mechanism with Mn(III) as the initiator. Two types of high water-absorbing polymers were obtained by using two gelatinization temperatures of 65°C and 80°C.

Starch-g-PAN was characterized in terms of the grafting efficiency and frequency, the % add-on, and the viscosity average molecular weight, \overline{M}_v . Finally, the water absorption as a function of the amount of acrylonitrile grafted onto starch, was determined with deionized water and salt solutions at different concentrations of NaCl, CaCl₂, and MgCl₂. The results indicated that water absorption increased with increasing % add-on and \overline{M}_v , but decreased as the concentration of salt increased. Water retention in sand was also determined and showed that the increase in the water holding capacity of sand was proportional with the amount of absorbent used.

The novel material is a biodegradable high water absorbing polymer. The results obtained are very significant in terms of the variety of applications the

product has either in agriculture and horticulture or in the medical and textile industry. Our results match well similar materials manufactured already in industrial nations, and effort should now be made it on an industrial scale in Thailand.