

Thesis Title A Study of Functionalization of Chitosan

Name Thirawan Sitthai

Degree Master of Science (Polymer Science)

Thesis Supervisory Committee

Pranee Phinyocheep, Doctorat de l' Universite du
Maine

Prapin Wilairat, Ph.D.

Krisda Suchiva, Ph.D.

Date of Graduation 4 November B.E. 2537(1994)

ABSTRACT

Chitosan is a natural polymer of great interest because its hydroxyl and amino groups can be easily modified chemically. In this work, chitosan was a starting material for preparing the iron(III) specific chelating polymer.

Chitosan was prepared by treatment of chitin with 47 % sodium hydroxide solution at 110 °C with intermittent washing with water every hour during the course of the reaction. The degree of deacetylation was determined using IR spectroscopy and highly deacetylated chitosan (≈ 90 % deacetylation) was obtained.

The study of functionalization of chitosan was carried out with different reagents such as phthalic anhydride, benzoyl chloride and salicylic acid. It was found that phthalimido chitosan and benzoylated chitosan could be synthesized under heterogeneous reaction. The preparation of N-salicyloyl chitosan has been studied by two methods ; heterogeneous condition and homogeneous condition. It was found

that the product was only obtained from the latter and N-acylation was formed using N,N'-Dicyclohexylcarbodiimide as an activating agent.

Iron-chelating behaviour of chitosan containing salicylate group was carried out by stirring N-salicyloyl chitosan in an aqueous solution of FeCl_3 . The color change of this derivative from pale to violet showed its binding of iron(III).