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KEY WORDS : CHITIN/ CHITOSAN/ IRON-BINDING COMPOUND/
β-THALASSAEMIA/ FUNCTIONALIZATION

SUMET KITTIPOOM: A STUDY OF MODIFIED CHITOSAN FOR
BINDING OF IRON(III). THESIS ADVISOR: PRANEE PHINYOCHEEP, Doctorat
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Chitin is one of the most abundant polysaccharides found in nature. Its N-deacetylated form results in higher value added derivative known as chitosan which possesses both hydroxyl and amino groups capable of various further modifications. In this work, preparation of highly deacetylated chitosan is investigated. It was found that by using 50% sodium hydroxide solution at room temperature during 4 days, about 93.5% N-deacetylated chitosan was obtained from FTIR spectroscopy. The number average molecular weight (\bar{M}_n) of the chitosan determined by gel permeable chromatography (GPC) was about 150,000. The cleavage of chitosan chain using sodium nitrite was also studied for preparing water soluble chitosan with molecular weight lower than 20,000. The functionalization of chitosan with different reagents such as phthalic anhydride, salicylic acid, and 5-sulfosalicylic acid was studied under a homogeneous condition. The preparation of phthalimido chitosan could be synthesized by the direct reaction of chitosan with phthalic anhydride but salicyloyl and 5-sulfosalicyloyl chitosans were achieved by using dicyclohexylcarbodiimide (DCC) as an activating agent. The reaction of these reagents with water soluble chitosan could be synthesized better than high molecular weight chitosan. The N-5-sulfosalicyloyl chitosan derivative was characterized by infrared and nuclear magnetic resonance (NMR) spectroscopy. This derivative gave good solubility in hydrochloric acid. The chelation behaviour of N-5-sulfosalicyloyl chitosan-ferric ion was studied in the acid condition of ferric ammonium sulphate by using uv-visible spectrometer with a temperature-controlled cuvette holder of 30°C. The use of a one-site ligand binding model in a non-linear least-squares program, ENZFIT was considered for calculating the formation constant. It was found that the formation constant of N-5-sulfosalicyloyl chitosan was 63.9 ± 10.7 , which is higher than that of 4-sulfophenol (0.0204). The results revealed that ferric ion bound to the N-5-sulfosalicyloyl chitosan as a one-site ligand binding.