Short Term Research Report R & D

on

Synthesis , purification ,and Characterization of New Chitosan Derivatives

No. Kod Geran
P 2597 - 001 - 012

By

Muslim A.Mohammed

Industrial Chemistry Program
School of Science &Technology
Universiti Malaysia Sabah

1998

Abstract :

Nearly 10 percent of the global landings of aquatic products consist of species rich in chitinous material. These include species such as shrimps, crabs,squids,cuttlefishes,oysters,clams,...etc.

Chitin and chitosan are polysaccharides and attracted much attention in biomedical, pharmacological, agriculture and biotechnological fields.

Chitin and chitosan were prepared in this project from crab shells by treating the clean shells first with 1M NaOH (at 100° C) for one hour, in a process called deproteinization,secondly the product was then treated with 1M HCl for 30 min. in a process called demineralization. The yield is chitin which can be converted into chitosan by treating it with 50% NaOH at 100°C for 30 min.

The composition of solid chitosan was studied qualitatively,and found that amino acid (glycine) was binded to the biopolymer,chitosan. A ninhydrin test was used for such purpose.

Investigation was carried out to assess the ability of chitosan in cleaning contaminated water with various metals,such as copper,nickel,cobalt,iron and chromium. This study shows that chitosan ability of metal removal can be express as : Co > Cu > Ni .The technique used for investigating metal removal was UV - Visible spectrophotometry. Through our study,it is found that the use of such technique alone in all determination of the amounts of metals removed from contaminated water by chitosan has proved to be inadequate,and it is suggested that other techniques have to be applied ,like for example Atomic Absorption technique.

Chitosan (and its derivatives) membranes were obtained by pouring the chitosan viscous solution into a clean glass plate in a dust - free atmosphere and left to dry in the oven at 40°C .

The FTIR spectra of chitosan (and its derivatives) films were recorded on Bio - Rad -FTIR spectrometer (lacated at UKM).

Furthermore, these films were found to be effective in separating ionic solutions in electrochemical cells,and allow ions to move freely towards the appropriate electrode. The gas permeability of some of these films were also recorded.

Further study is needed to find out more useful applications for the products (i.e.films,gellys,and solids) prepared during this project in various fields,e.g. medical and separation technology.