

Development of a Simple and Economical Method for Chitin Extraction from Prawn (*Penaeus monodon*) Shell Waste

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Chitin is the second most important biopolymer on earth and found mainly in invertebrates and several other organisms. It exhibits a wide range of applications in biotechnology, medicine, agriculture, food processing, environmental protection and textile industry. Disposal of shell waste is a major problem in relevant processing plants. Objective of this research was to develop a simple, economical, high yielding, non-toxic and cost effective method for chitin extraction from prawn (*Penaeus monodon*) shell waste. Samples were collected from a local prawn processing plant and crude chitin was obtained through deproteinization, decolourization and demineralization using NaOH, butanol and citric acid respectively. Crude chitin was then converted into chitosan by deacetylation. Purity analysis, yield analysis, physiochemical and functional properties analysis such as moisture content, Water Binding Capacity (WBC), Fat Binding Capacity (FBC) and Cu chelating activity were measured. Control was prepared using 5% (w/v) NaOH, 100% (v/v) Acetone and 1% (v/v) HCl solution. FBC and WBC of the present study showed significantly higher values (539.20 ± 0.40 , 560.00 ± 0.23) than those of control (304.66 ± 0.23 , 285.06 ± 0.40), respectively ($p < 0.05$). However, results of the yield analysis did not show a significant difference between the developed method (32.40 ± 0.01) and the control (24.80 ± 0.08). A low purity value (10%) for crude chitin was showed by the developed method compared to prepared control (25%). However, Cu chelating activity was significantly higher in the developed method (51%) compared to prepared control (16%). Observations obtained in the 3 step extraction process suggested that butanol and citric acid were the most suitable chemicals compared to acetone and HCl. WBC, FBC and chelating activity of chitosan extracted by the present method can be involved in many applications. In contrast to previous studies, the present research showed that the suggested method is a simple way to extract chitin.

Keywords: Chitin, Prawn shell, Demineralization, Decolourization, CuChelating activity