CRUSTACEAN WASTE FOR MICROBIAL FOOD SAFETY IN SHRIMP PROCESSING

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Crustacean processing industry generates substantial revenue both in national and international markets. However, two major concerns seeming to hinder the developments i.e. excessive use of chlorine for food washing during processing, and non-degradable shell waste accumulation. Our aim here is to solve both, by extracting chitin from shrimp shell-waste, then converting it into biodegradable bio-polymer "chitosan" and use it as an antimicrobial bio-compound for reducing microbial hazards in shrimp processing industry to replace excessive use of chlorine. Deproteinization, demineralization, and deacetylation protocols were followed for extraction of chitin from shrimp shell-waste and converting them into chitosan. Chitosan recovery efficiency was 21.94%. For characterization of extracted chitosan, Fourier Transform infrared spectroscopy (FTIR) was performed to identify chemical bonding and scanning electron microscopy (SEM) was carried out to characterize the morphology. Antimicrobial properties of chitosan were tested using different concentration of chitosan (500 ppm, 1000 ppm and 2000 ppm) as washing solutions. Antimicrobial activity was studied using total plate count method, and it was found that chitosan was capable of reducing the growth of microorganisms even better than hypochloride. Chitosan solutions showed significantly lower Total Plate Count (TPC) compared to controls. TPC was reduced with the increment of concentration of chitosan solution and 2000 ppm chitosan had the best antimicrobial properties. When tested the washed shrimps for organoleptic properties, 1000 ppm chitosan solution obtained the maximum score for sensory properties. In conclusion, chitosan can be extracted from shrimp wastes at an efficiency of 21.9% and it can be used as a washing agent to reduce microbial counts in shrimp processing without affecting organoleptic properties of the product. Therefore, chitosan can be used as an effective alternative for replacing NaOCl in shrimp processing.

Keywords: *Chitosan, Shrimp, Antimicrobial Properties*