EXTRACTION OF CRUDE BONE COLLAGEN FROM YELLOWFIN TUNA (*Thunnus albacares*) AND DETERMINATION OF ACTIVITIES OF ITS HYDROLYSATES

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by

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ABSTRACT

Fish bones are significant part of fish processing by-product and rich source of collagen proteins. Utilization of yellowfin tuna bones are important economically as well as environmentally. Objective of this research was to extract crude collagen from yellowfin tuna bones and to identify the activities of its hydrolysates which can be used in food industry. Acid-pepsin soluble collagens were extracted from fresh yellowfin tuna bones. As with the pre-treatment process EDTA and citric acid were tested to decalcify. Extracted collagens from two treatments were subjected to the hydrolysis using protease enzyme with different time combinations (0, 3, 6, 9, 12, 24 h) at 37 °C followed with heat inactivation at 100 °C for 15 minutes. Antioxidant activity of the best hydrolysates were evaluated using thiobarbituric acid reactive substances (TBARS) assay and 2, 2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging activity methods. Metal chelating activity was evaluated using ferroizen method. Antibacterial activity was evaluated using well diffusion method with two gram negative bacteria as *E. coli* and *Salmonella* sp. All treatments were replicated (n=3). Resulting extracts with citric acid treatment (1.23±0.05%) showed higher yield compared to the EDTA treatment (0.62±0.18%) ($P<0.05$). Both treatments showed similar band patterns with 08% SDS-PAGE gel electrophoresis confirming the extracted collagen are same. Hydrolysates produced after incubating for 3 hours at 37 °C followed with heat inactivation was selected as the best ($P<0.05$). The results showed that collagen hydrolysate of yellowfin tuna bones control free radicals (DPPH). TBARS results of EDTA treatment showed no significance difference with the control ($P>0.05$). EDTA (86.14±1.88%) and citric acid (87.92±7.72%) treatments showed DPPH free radical scavenging activity compared with ascorbic acid (89.10±0.64%). EDTA treatment and citric acid treatment showed nearly 10% of metal chelating activity. There were no any significance difference between two treatments ($P > 0.05$). There were antibacterial activity in hydrolysates of yellowfin tuna bone collagen when compared with the positive control. These results suggest that hydrolysates produced from yellowfin tuna bones with citric acid can be used as an effective free radical scavenger, Metal chelator and Antibacterial agent in food industry.

Keywords: Fish bone, Collagen, Hydrolysates, Functional properties, Pepsin