EXTRACTION OF CRUDE COLLAGEN FROM *Pterygoplichthys pardalis* SKIN AND DETERMINE THE FUNCTIONAL PROPERTIES OF IT'S HYDROLYSATES

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By

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ABSTRACT

Collagens have a great demand in the food industry and fish skin is a safe alternative source of collagen. *Pterygoplichthys pardalis* is a freshwater fish which has threatened to endemic fish and inland aquaculture with no economic benefit. Objective of this study was to extract crude collagen from *P. pardalis* skin with simple and non-toxic method followed by identifying the functional properties of its hydrolysates. Proximate composition was determined in raw fish skins with and without bony plates separately. Acid and Pepsin soluble collagens were extracted from *P. pardalis* skin. As with the pretreatment process of Citric acid (CA) and EDTA were tested to decalcify the fish skin. Three different concentrations were used with CA as 1.2, 2.2 and 3.2 kg m^{-3} and for EDTA as 0.1, 0.2 and 0.3 M. Selected crude collagens were subjected to the hydrolysis using Pepsin, Protease and Trypsin enzyme after adjusting to its optimum pH with different time combinations (0, 3, 6, 9, 12 and 24 hours) at 37°C followed by heat inactivation at 100°C for 15 min. Extracted crude collagens and best hydrolysates were selected by 8% and 15% SDS-PAGE respectively. Extracted crude collagen were lyophilized and observed for antioxidant activities by TBARS and DPPH scavenging assay, metal chelation activity by Fe (II) chelating activity and antibacterial activities by agar well diffusion method. All treatments were replicated (n=3). Raw fish skins with and without bony plates contained 44.29±3.69%, 58.79±1.05% moisture, 16.40±0.93%, 5.38±1.61% ash, 26.75±8.93%, 26.89±3.25% crude protein and 8.07±0.56%, 4.74±0.88% respectively. The Extracted collagens with CA treatment showed higher yield compared to EDTA treatment ($p<0.05$). Both treatments showed similar band patterns with 8% SDS-PAGE gel electrophoresis confirming the extracted collagen are same. The Antioxidant properties were not significantly different ($p>0.05$) but metal chelation activities of selected best hydrolysates were higher in CA than EDTA treatment ($p<0.05$). There was no significance difference among collagen hydrolysates produced for antibacterial activities ($p>0.05$). These results conclude that collagen hydrolysates produced from *P. pardalis* with all three enzymes with 0 hr at 37°C followed by heat inactivation have good antioxidant, metal chelating and antibacterial properties which can be used for food industry.

Keywords: Fish collagen, Enzyme hydrolysis, Antioxidant, Metal chelating, Antibacterial