Extraction of Crude Collagen from *Thunnus albacares* (Yellowfin Tuna) Skin and Determination of Antioxidant and Metal Chelation Activities of Its Hydrolysates

G.P.D.D.S. Thilanja, K.S.M. Dissanayake and E.D.N.S. Abeyrathne

Department of Animal Science, Uva Wellassa University, Badulla, Sri Lanka

Collagen is a dominant protein in connective tissues and highly valuable in food industry. Fish processing byproducts are good alternative source for collagen. The objective of this study was to develop a simple non-toxic method to extract crude collagen from Yellowfin tuna skin and to check functional properties of its hydrolysates. Extraction procedures were conducted using acetic acid and citric acid with 0.5 M concentrations. Based on 8% SDS-PAGE gel, type I collagens were identified. Enzymatic hydrolysis was done with Protease, Trypsin and Pepsin enzymes with different time combinations (0 h, 3 h, 6 h, 9 h, 12 h and 24 h) at 37 $^{\circ}$C after adjusting to its optimum pH level. Best hydrolysate was selected and subjected to antioxidant activity by Diphenyl-1-picryhydrazyl (DPPH) radical scavenging activity and Metal (Fe^{2+}) chelating activity. Proximate analysis was conducted for raw skin to determine moisture, ash, crude protein, crude fat content and 59.44±0.013%, 1.91±0.37%, 28.55±1.19%, 6.83±0.30% values were obtained respectively. Hydrolysates produced after incubating for 0 h at 37 °C followed with heat inactivation was selected as the best. Hydrolyzed produced using citric acid showed lower scavenging activity (63.62%) compared to acetic acid (85.07%) ($p<0.05$). In both acetic and citric extractions Fe^{2+} chelating activity did not show significant difference among the treatments ($p>0.05$). According to the collagen hydrolysates incubated at 0 h at 37 $^{\circ}$C showed good antioxidant activity with acetic acid extraction with Pepsin enzyme. This conclude that collagen hydrolysates produced using acetic acid and Pepsin showed good antioxidant activity comparing with the ascorbic acid as positive control and it could be deserved to use as good alternative source as a natural anti-oxidant in food industry.

Keywords: Fish collagen, Yellowfin tuna, Antioxidant activity, Hydrolysates