Isolation and characterization of collagen from yellowfin tuna (*Thunnus albacares*) waste

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Yellowfin tuna is the most popular fish variety processed for the export market in Sri Lanka and generates a significant amount of discards during processing. These yellowfin tuna discards which are of high quality can be used as a raw material for other valuable products. Use of waste as a source of collagen can impact on fish waste management with high economic returns. The aim of the study was to use yellowfin tuna skin, fin and bones for the extraction of collagen. Acid soluble collagen (ASC) and pepsin soluble collagen (PSC) was extracted from yellowfin tuna fish skin, bones and fins using the methods of Nagai and Suzuki (2000) with slight modifications. The yields of collagens from skin, bones and the fin of yellowfin tuna were 21%, 0.89% and 1.22%, respectively. Extracted collagen was characterized using amino acid analysis, SDS-PAGE analysis and fourier transform infrared spectroscopy (FTIR). Amino acid composition of the extracted collagen confirms the purity of collagen. Glycine was the most abundant amino acid identified in the skin, bone and fins of yellowfin tuna. Relatively high amount of glutamic acid, arginine, alanine and lysine was observed where as cystine was not detected. Similar band patterns were recorded for both extracted collagen and human collagen type-1 which composed of α1, α2 and β chain indicating the higher quality of extracted collagen. Fourier transform infrared spectroscopy proved that ASC and PSC are integrated and native. The infrared spectra of ASC, PSC and the major peaks with their corresponding results confirmed the helical structure of the collagen which is reserved in good condition. High grade collagen with high yield could be extracted using yellowfin tuna skin generated from export fish processing industry successfully in Sri Lanka.

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