Towards fish processing by-products utilization: Recovery of high-value molecule collagen and their characterization

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Abstract:

The aim of this study is to explore the potential of the fish processing by-products for the recovery of bioactive high-value molecule collagen and their characterization. The fish processing industry produces considerable quantities of by-products every year. The swim bladder is abundant of collagen and considered one of the major by-products from the fish processing industry. Acid and pepsin soluble collagen were extracted from the Indian major carp (*Catla catla*) swim bladder. The extracted collagens were characterized by sodium dodecyl sulfate polyacrylamide gel electrophoresis, ultraviolet spectroscopy, fourier transform infrared spectroscopy, differential scanning calorimetry, and scanning electron microscopy (SEM). Furthermore, the fibril forming capacities of the extracted collagen were evaluated, and their ultrastructures were also clarified using SEM. The present results highlight that thermostable carp swim bladder collagens were successfully extracted with a yield of 22-61% (dry weight basis). The extracted collagens were characterized as type I collagen with well-maintained triple helical structure and fibril-forming capacity. The possible utilization of fish processing by-products for the extraction of high-value molecule collagen is proposed as a viable and eco-friendly waste management approach. Thus, extracted collagen could serve as realistic alternative of mammalian collagen for the potential applications in food, beverage, cosmetic, and biomedical industries.

Keywords: Fish processing by-products; collagen; swim bladder; characterization; waste utilization