

Characterization of acid-soluble collagen from refiner discharge, Alaska pollock surimi processing byproducts

Jin-Soo Kim^{*}, Hye Suk Kim, Kyung Tae Kang, Chan Ho Park,
Min Soo Heu and Jae W. Park¹

Division of Marine Life Science, Gyeongsang National University
/Institute of Marine Industry

¹Seafood Lab, Dept. of Food Sci. and Tech., Oregon State Univ., USA

Introduction

Refiner discharge, which is a solid by-product from surimi manufacturing, has received increased attention as a potential gelatin and collagen resource. Refiner discharge is about 4-8% of whole fish and contains a significant amount of collagen. Based on the U.S. annual surimi production (220,000 to 240,000 metric tons), 10,000 to 20,000 metric tons of crude collagen can be generated as refiner discharge (Kim and Park, 2005). Conventionally, most refiner discharge is used to produce fish meal and fertilizer or is directly discharged into estuaries, resulting in environmental pollution. However, Kim and Park (2004) reported that refiner discharge is composed of a large quantity of collagen.

Refiner discharge is mainly composed of tendon separated while concentrating myofibrillar proteins from thoroughly washed mince (Kim and Park, 2005). For the reason, consumers recognize that refiner discharge is separated from edible muscle tissue, not from inedible waste like fish skins or frame mixed with guts and blood. Therefore, it may be used for the production of consumer-friendly collagen and gelatin.

The objective of this study was to examine Alaska pollock surimi processing byproducts, such as skin and refiner discharge) as a collagen resource by characterizing biochemical and functional properties of collagen.

Materials and Methods

Alaska pollock (*Theragra chalcogramma*) was caught off the coast of Alaska by trawl. Frozen refiner discharge from Alaska pollack, surimi processing solid byproducts, was obtained from a commercial surimi processing plant and transferred to the Gyeongsang National University (Tongyeong, South Korea) in March 2004. The frozen refiner discharge was kept frozen at -30°C until used.

The characterization of refiner discharge as a collagen resource was examined by measuring biochemical properties (proximate composition, pH, salinity, and heavy metal content).

Collagen was extracted from Alaska pollock surimi byproduct (refiner discharge) with 0.5N acetic acid and its characterization was examined by measuring amino acid composition, SDS-PAGE and thermal denaturation temperature. The functional properties of the collagen were also investigated by measuring water holding capacity, oil binding capacity, emulsifying activity, and stability.

Results

Refiner discharge, Alaska pollock surimi processing byproduct, revealed a good resource for collagen extraction according to the total protein content and the other chemical properties. Denaturation temperature of acid-soluble showed 20.7°C, which was low compared to collagen extracted from land-animal skins and other warm fish skins. Collagen from refiner discharge of Alaska pollock was high in functional properties, such as oil absorption capacity, emulsion stability and cooking stability when compared to other food proteins.

Based on the functional properties, acid-soluble collagen from refiner discharge was a good and showed potential as an ingredient in processed food manufacturing.

Reference

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