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Characterisation of collagaen isolated from brown backed toadfish (*Lagocephalus gloveri*) skin

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Introduction

Since collagen is an important biomaterial, many different industries have been using it abundantly. For industrial purposes, collagen is extracted mainly from skin and bones of cattle and pigs. Highly infectious diseases and religious barriers have limited the use of collagen derived from cattle and pigs. Therefore, there is an up coming trend to identify alternative sources of collagen. Current study was focused to determine the possibility of using brown backed toadfish (BBT) skin as a source of collagen.

Methods and Materials

Extraction of collagen

Processing discards of BBT were collected from the local fish-processing factory. Non-collagenous and fat were removed from the skin. Collagen was extracted with 0.5 M acetic acid with 10% pepsine, salted out and precipitated by centrifugation. Then, the precipitate was dialyzed and lyophilized respectively.

Characterization of collagen

SDS-PAGE was performed by using discontinuous Tri/HCl/glycine buffer system at 6.5% separation gel. Subunit composition of BBTcollagen was determined by using cation exchange chromatography with a CM-Toyopearl 650M column. Then the fractions collected were examined by using SDS-PAGE at 6.5% gel. BBT skin collagen digested by lysyl endopeptidase was examined by SDS-PAGE at 12.5%gel to easily compare the pattern of peptide fragments with porcine skin collagen. Amino acid composition of BBT skin collagen was analyzed with amino acid auto analyzer (Biochrom 20, Pharmacia Biotech, U.K). Denaturation temperature was determined by using the Ostwald's viscometer with 0.1% (w/v) collagen solution dissolved in 0.1 M acetic acid.

Specific Viscosity measurements were taken from 10C to 50C. The fractional viscosities were calculated and the denaturation temperature was taken as the temperature at which fractional viscosity was 0.5 by using the thermal denaturation curve.

Results and Discussion

The total collagen yield extracted was 54.3% on the basis of lyophilized dry weight. According to the electrophoretic pattern, BBT skin collagen consisted of heterotrimer 123. Moreover, the denaturation temperature of BBT skin collagen was 28C, which was about 9C lower than that of collagen from porcine skin. Peptide mapping of skin collagen with lysyl endopeptidase was similar to that of peptide mapping pattern of porcine skin collagen digested by the same enzyme.

Since the *Lagocephalus gloveri* does not contain the non-protein neurotoxin called Tetrodotoxin TTX ($C_{11}H_{17}N_3O_8$) in its skin and muscles as similar as other fish belongs to the family Tetraodontidae, there is a possibility to use their skin collagen as an alternative source of collagen for industrial purposes and subsequently it may maximize the economical value of the fish and reduce the waste accumulation issue in the fish processing industry.

References

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