Cod skin collagen extraction and characterization

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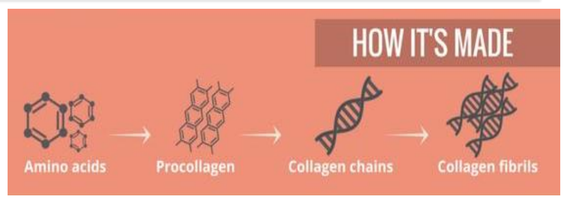
Introduction/Resume

Collagen is the most abundant protein in human body. By dry weight collagen makes up:



COLLAGEN

Atlantic cod
Gadus morhua

Fish residues may account for an average of 60% of the total fish weight; of this material, up to 30% may be skin and bone. Fish skin has more than 80% of its total protein content as collagen.

Objectives

To **EXTRACT** the Acid Soluble Collagen (ASC) from discarded salted cod skin.

To **CHARACTERIZE** collagen structure to provide information and to define future applications such as food, cosmetics, or biomedical.

Methods and Results

Collagen extraction

Wash with tap water (20 min, 4 ºC, 3 times) → Grind → Non-collagenic proteins extract (1:10 (w/v) 0.1 M NaOH, 24 h, 4 °C) → Centrifuge (8000g, 30 min, 4 °C)

Solid residue → Wash with distilled water (4 ° C, until pH 7) → Centrifuge (8000g, 15 min, 4 °C)

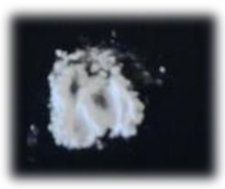
Supernatant → pH-shift: **NCP**

Solid residue → Centrifuge (8000g, 15 min, 4 °C)

Extraction (0.5 M AcH, 1:30 (w/v), 24 h, 4 °C) → Centrifuge (8000g, 15 min, 4 °C)

Supernatant (ASC) → Salting-out (0.9 M NaCl (final concentration), ON, 4 °C)

Solid residue → Centrifuge (8000g, 30 min, 4 °C) → Redissolve ASC (0.5 M AcH, 10 vol) → Dialysis (0.1 M AcH, 8000 Da cut-off, 24 h, 4 ° C) → Dialysis (distilled water, 8000 Da cut-off, 48 h, 4 ° C) → Lyophilization: **ASC**



Collagen characterization

SDS-PAGE

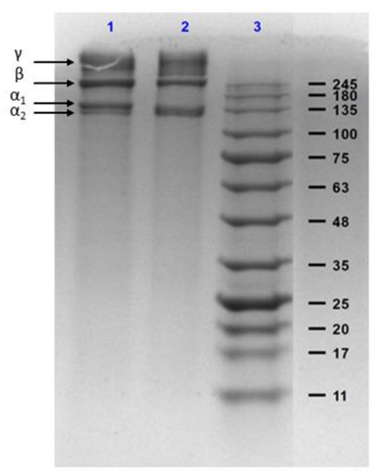


Figure 1. SDS-PAGE: Calf skin type I collagen (lane 1), collagen purified from cod skin by acid methodology (lane 2); molecular weight marker (lane 3).

UV SPECTRA

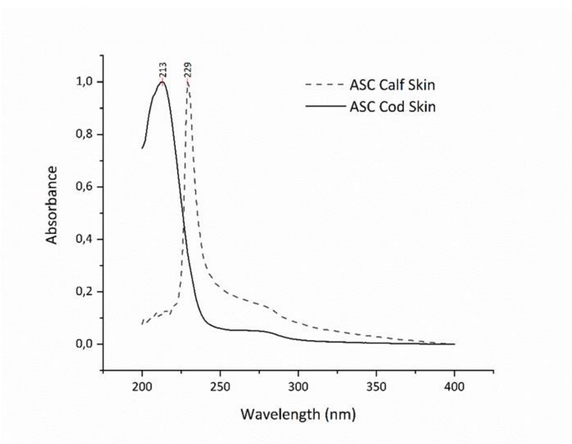


Figure 2. UV spectra of Calf skin type I collagen and collagen purified from cod skin by acid methodology.

FTIR SPECTRA

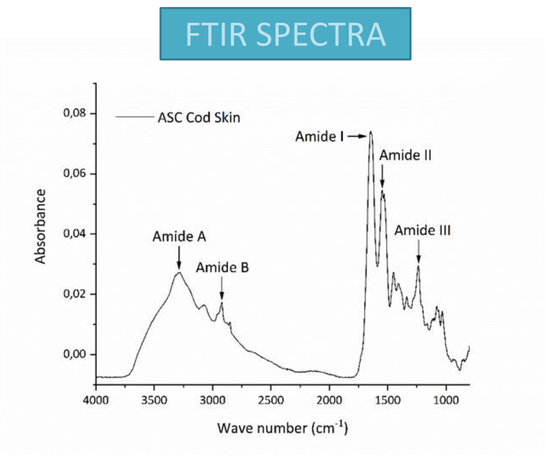


Figure 3. FTIR spectra of collagen purified from cod skin by acid methodology.

SEM

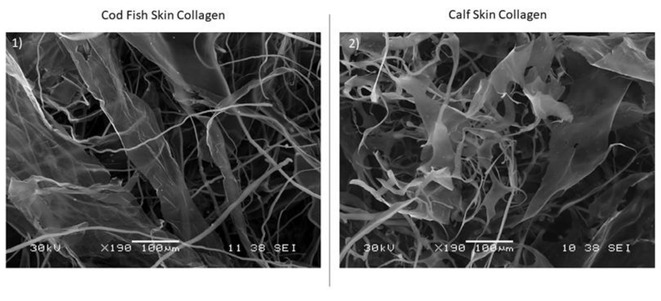


Figure 4. SEM images: 1) collagen purified from cod skin by acid methodology. 2) Calf skin type I collagen.

Conclusions

The Acid Soluble Collagen (ASC) was successfully extracted from salted cod skin. The yield of ASC from salted codfish skin was about 2.0% based on lyophilized dry weight. The characterization methodologies showed the purity of the collagen type I. Cod skin collagen may be an alternative to terrestrial mammalian collagen and may enhance the added value of this fish species.

Acknowledgements

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