

Preparation and physicochemical characterization of films prepared with salmon skin gelatin extracted by a trypsin-aided process

ABSTRACT

The recovery of gelatins from Atlantic salmon (*Salmo salar*) skin for film formation and characterization was studied. Fish skins pre-treated with trypsin (250 U/g) produced the highest hydroxyproline content (7.41 ± 0.49 mg hydroxyproline/g treated skin) and yield ($53.05 \pm 4.38\%$) of gelatin, as compared to the use of saline solution. Pre-treatment with a lower concentration of trypsin (1 U/g) at a shorter pre-treatment time successfully reduced the degradation of gelatin with co-production of high molecular weight α -chains. Gelatin was further extracted by a trypsin-aided process for film formation and characterization. Films with increasing protein concentration (from 1 to 5%, w/v) exhibited higher thickness, tensile strength, and elongation at break (EAB), but a marked decrease in EAB for films with 6 and 7% (w/v). Films with 5% proteins showed higher thickness, lower tensile strength and higher EAB with increasing concentrations of glycerol (from 10 to 50% of proteins, w/w). All films exhibited high water uptake, decrease in light transmission and an increase in opacity as the protein and glycerol contents increased. Electrophoretic studies showed that the increase in the mechanical properties of the films was correlated with the increase in protein concentration, owing to the increased content of high molecular weight chain fractions. Furthermore, Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) revealed the interaction between the proteins and glycerol for all films. This study demonstrated the viability of the trypsin supplementation process to obtain salmon skin gelatin for film formation.