

A Study on the Production of Gelatin from Sturgeon Fish Skin

A. Koochekian Sabour ; G. Zareh Gashti ; H. Sababi
and S. Moeini

Dept. of Fish Processing Technology, International Sturgeon Research Institute,
P.O.Box: 41635-3464, Rasht, Iran

E-mail: koochekian@yahoo.com

Abstract: Gelatin was extracted from hydrolyses of collagen muscle bonds. Gelatin was of two types. Type A was obtained from acidic and type B from alkaline procedures. In the present study we used sturgeon fish skin to produce 25 samples of gelatin. Microbiological and chemical examinations were conducted on the gelatin samples. Based on the results obtained from the chemical examination, gelatin type A and B were composed of 15.40% and 15.30% total nitrogen, 0.30% and 0.25% CaO, 6.48% and 7.26% moisture, 1.59% and 2.89% ash, and 1.51% and 1.2% fat, respectively. The pH of gelatin A was 4.23 and that of B type was 7.00. Total count obtained from microbiological examinations was 10-70 cfu/g. The quality of gelatine prepared from sturgeon skin met the requirements of standard gelatin. Time required for production of gelatin using acidic procedure was one week whereas the production of gelatin using the alkaline procedure lasted 3 weeks. The yield of gelatin obtained from alkaline procedures (4.52%) was less than that of acidic gelatin (6.33%).

Key Words: Fish gelatin, Collagen, Sturgeon Skin

Gelatin is made of collagen in fishes. It is obtained from skin, meat and fish head. Collagen is the major protein of connective tissues. Production of gelatin started in the United States in 1850 and after 20-30 years in Europe which is the biggest producer of gelatin in the present time (Bracho *et al.*, 1990). The amount of collagen in bony fishes is 2-5% and in sturgeon fishes is 11% (Shahidi, 1990). A good amount of collagen is obtained from the skin and tail of fish (Montero,

1989) with a molecular weight of 10000 to 62000 Dalton. There are two types of gelatin, one produced from acid processing (type A) and the other from alkaline processing (type B). Gelatin is an amphoter and has an increased proportion of glycine with a colorific value of 3.5 kcal/g. Gelatin is used in food, pharmaceutical and photographic products.

The melting point of fish gelatin is lower than other gelatin. This is due to variation in the amount of the amino acid proline in its structure (Bremmer, 1992).

The skin of sturgeon collected from catch stations was washed, cut into pieces, weighed and frozen. For the production of type A gelatin the pieces of raw fish skin was soaked in dilute hydrochloric acid (7 %) for 24 hours. The samples were then neutralized with running water and heated to 80-90 °C to extract gelatin. 10 % Ca(OH)₂ was used for the production of alkaline type of gelatin (type B) (Shah Hosseini, 1996). After neutralization, samples were heated to extract gelatin.

Samples were filtered hot for purification. After filtration samples were dried at 50 to 55 °C for 48 hours.

The proximate chemical composition of gelatin was comprised of 15.4% total nitrogen, 7 % moisture, 2.5 % ash and 1.2 % fat. pH varied from 4.2-7 and jelly strength test was positive. The amino acid constitution was mostly glycine, prolin, and hydroxyprolin. Hydrolization of protein collagen resulted in the formation of gelatin. Alkaline processing took 3 weeks and the amount of gelatin obtained from this process (4.52 %) was less than that obtained from the acid process (6.33 %).

Both types of gelatin were in accordance with the Iranian standards. Microbial load of gelatin showed a very low total count (10-70 cfu/g).

Physical properties of the product were also determined through viscosity test and jelly strength.

Based on the obtained results; it can be stated that gelatin produced from fish is differ in jelling property compare to terrestrial animal gelatin (in lower temperature). The quality and quantity of type A gelatin was mostly studied in the present study.

Gelatin produced in this study had a good jelly strength in lower temperature and possessed very faint fish odor.

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