かまぼこの足とたん白の高次構造

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Short Paper

Differences in Protein Structure between Elastic Kamaboko and Brittle One*1

In the manufacturing process of kamaboko, more elastic gel can be obtained by preheating fish sol at the temperature below 40° prior to normal heat treatment. On the contrary, the resulting gel is extremely brittle compared to that obtained by normal procedure, if the preheating temperature is higher, especially near 60°. Former phenomenon is called suwari and the latter modori.

This paper describes difference in protein structure between different types of those gels. The kamaboko examined in this study was prepared from jack mackerel, *Trachurus japonicus*, as follows: 300 g of fish flesh flesh was washed with running water, minched, ground for 10 min and further ground with 9 g of sodium chloride for 15 min. Thus obtained sol was divided to equal three parts and packed into tube from polyvinylidene chloride (diameter 3 cm, length 20 cm). One of the packed sols was heated at 90° for 30 min without preheating, whereas other two were preheated at 30° and 60° respectively, for 120 min, followed by heat treatment at 90° for 30 min. The products were chilled with running water and left overnight. Then the measurement of jelly strength[1] and X-ray analysis[2] were carried out. In Figure 1, the jelly strengthes and X-ray diffraction patterns of three types of kamaboko are shown, which are (A) obtained without preheating, (B) obtained by preheating at 30° and (C) obtained by preheating at 60°C.

The jelly strength is high in the order of the second, the first and the third, as predicted. And this order is the same as that of the intensity at diffraction angle ranging from 5° to 35° (2θ) in the X-ray diffraction pattern. Further in the pattern of the third, the intensity at near 20° is significantly low, which is calculated to be about 4.5 Å as lattice As well known, the intensity is directly proportional to the crystallinity of high polymers and the latice distance 4.5 Å is thought to be the characteristics of β-structure as reported previously[3].

Based on these spectral data, it is postulated that the regular arrangement of muscle protein presents more abundantly in the elastic kamaboko than in the brittle and β-structure content is significantly minor in the latter.

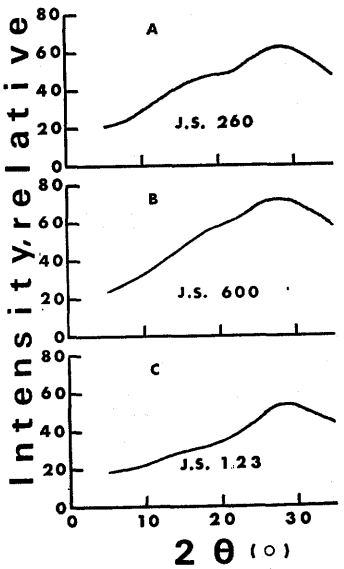

Fig. 1. Jelly strength and X-ray diffraction pattern of kamaboko, (A) obtained without preheating, (B) obtained by preheating at 30° and (C) obtained by preheating at 60°. θ shows diffraction angle and the unit of jelly strength is gram.

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