Some Physico-Chemical Properties of Surimi-Like Material from Beef Meat as Affected by Sucrose Level

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ABSTRACT

Recently, study of surimi-like material appeal to be studied. Surimi is a Japanese term for intermediate product made from ground meat fish deboned mechanically and washed by using chiling water repeatedly. One of the procedures of surimi processing is supplementation of cryoprotectant such as sucrose, sorbitol and phosphate to prevent from protein denaturation during processing and frozen storage of surimi. This study was evaluated the effect of sucrose level on the physico-chemical properties of beef surimi. The muscle tissue of round meat of beef was separated from fat and connective tissue manually and then was cut into 3 cm size of meat for mincing by using meat mincer. Then, the minced meat was washed three times by using chilling water (5-10^{o}C). The final wash used chilling 0.5% NaCl solution. The ratio of water to minced meat in washing was 3:1. The final step was dewatering by pressing washed minced meat in the screen of linen mesh manually. Finally, raw surimi was stirred with sucrose 3% (P1), 4% (P2) and 5% (P3) and added sodium tripolyphosphate 0.2% for each treatment. Both pH and WHC were significantly decrease from P2 to P3 ($P<0.05$), whereas the gel strength was no different. The decline of WHC was followed by the decrease of water and crude protein content ($P<0.05$). However, sucrose could not affect ash and fat content as well as salt-soluble protein . Sucrose supplementation at 3% in beef surimi is better than other level added.

Key words: surimi, physico-chemical properties, sucrose

INTRODUCTION

Surimi is a Japanese term for intermediate product made from ground meat fish deboned mechanically and washed by using chilling water repeatedly. Washing procedure is to remove fat and undesirable matters, such as blood, pigments, and odorous substances, and to increase the concentration of myofibrillar, thereby improving gel strength and elasticity, essential properties for surimi-based products (Lee, 1984). This product is light in color, bland in odor, low in fat, high in myofibrillar protein, and extremely functional due to the unique gelling properties of the myofibrillar protein (Jin *et al*., 2008).

Frozen surimi is used as a starting material in the factory due to the advantages of it rather than whole fish (Suzuki, 1981). Unfortunately, frozen storage decreases the functional properties, mainly gel-forming ability of surimi (Lee, 1984). The loss of this property is due to the denaturation of protein. The freezing increases solute concentration and favors dehydration, both of which contribute to protein denaturation (McDonald and Lanier, 1991). To prevent protein from denaturation during frozen storage, utilization of cryoprotectant, such as sucrose, sorbitol and phosphate is applied (Nowsad et al., 2000). At first, cryoprotectant applied was sucrose 8%, but it caused the surimi taste too sweet and turned the finished product a brownish color. To reduce the sweetness of surimi, cryoprotectant used was sucrose 4% and sorbitol 4%. The effectiveness of this sugar effect was markedly enhanced by adding phosphate 0.2% (Lee, 1984). Even though the formulation of cryoprotectant could not protect the gel strength, deformation was slightly improved, and water retention properties, elasticity and cohesiveness of gel were protected (Nowsad et al., 2000). Moreover, sorbitol utilization cause the surimi-based product texture is harder than the one with sucrose (Suzuki, 1981).

The characteristics mentioned above are affected by meat protein, mainly myofibril. The ability of meat protein (myofibril) binds water is important to evaluate the characteristics of meat and meat product (Aberle *et al*., 2001). The damage of meat protein will decrease some