

Abstract

In recent years, maintaining high quality lifestyle through healthy dietary habits as well as preventing ailments has become a major concern among the elderly in Japan. As one of the dietary habits, “eating behavior” is considered essential for maintaining a healthy body. However, the elderly has poor eating behaviors due to their weakened sense of taste, and poor chewing and swallowing abilities, which can cause serious health issues such as protein deficiency. In this study, the taste sensation functions in elderly were surveyed, and optimal tastes for consumption were then verified. Furthermore, the quality improvement of chicken and fish (sea bream) meats by a proteolytic enzyme (papain) for the elderly with chewing and swallowing difficulties were examined.

First, an identification test for the 5 basic tastes (sweet, sour, salty, bitter tastes and umami) was conducted in working-age and young-old participants. It was observed that young-old people have considerably lower sense of sour taste than working-age people. Thus, sour taste was considered as an important factor in determining the taste perception in young-old people.

A sensory evaluation was then performed using minced chicken meat (MCM) treated with a proteolytic enzyme (0°C for 24 h). The results revealed that the meat texture (toughness, ease of crushing by tongue, and ease of swallowing) was improved with increasing enzyme concentration up to 0.5%, but it might lower the meat palatability. Furthermore, significantly improved meat texture ($P < 0.05$) with little changes on palatability was observed at the 0.2% enzyme-treated MCM, comparing to

that of non-treated MCM. As for the minced fish meat (MFM), the texture was improved with increasing enzyme concentration, while the palatability was decreased, similar to that in MFM. The content of contributing umami and bitter tasting substances such as nucleic acids in MFM with different enzyme concentration treatments was evaluated. The content of umami taste-related substances was found to significantly decrease in MFM with 0.3% enzyme treatment compared with those on 0.1% and 0.2% enzyme treatments ($P < 0.01$). On the other hand, the content of bitter taste-related substances significantly increased ($P < 0.01$) than in non-treated MFM. Thus, the changes in nucleic acid-related substances by enzyme treatments were considered to be an important factor responsible for the palatability of MFM.

Structural changes in the muscular tissues of MCM and MFM were examined histologically. The proteolytic enzyme induced the progression of collagen fiber and connective tissue degradations. In addition, complete disappearance of connective tissues was observed in the meat with 0.3% enzyme treatment. These findings indicated that the extent of degradation of the muscle and connective tissues greatly contributes to the toughness and palatability of MCM and MFM.