

A novel Japanese-style prosciutto fermented with dried bonito mold

Michio Muguruma ¹, Shinichi Takenoyama ¹, Kumiko Kawakita ¹, Toyoo Nakamura ²

¹ Minami Kyushu University, ² Marunaka Food, Japan

Objectives: Fermentation of meat is a traditional practice worldwide, including in Europe and Asia, and the preparation of several traditional Japanese fermented foods involves the utilization of koji and bran. Naturally occurring molds that play a significant role in protein and lipid degradation and in the formation of specific flavors have been traditionally used in the production of dried bonito (katsuobushi) in Japan. We therefore expect that the umami components produced by the utilization of these molds to ferment prosciutto will synergistically enhance the umami flavor induced by amino acids and peptides that are derived from aging, to yield a product with rich taste and appealing texture. Consequently, a Japanese version of prosciutto with umami taste that possessed a physiologically active function was developed by spraying salted pork with Katsuobushi mold (*Eurotium herbariorum*) as a starter culture.

Materials and Methods: The surface of fresh pork shoulder loin (700 g) was coated with 42 g of salt, 42 g of glucose, 1.4 g of sodium ascorbate, and 0.4 g of yeast extract. Post salting for seven days, Katsuobushi mold was sprayed on the surface of the meat, followed by incubation at 20 °C and 85% humidity for an additional four days. The samples were subsequently fermented at 18 °C and 65% humidity until the yields of 70% (F-70%), 60% (F-60%), and 50% (F-50%) were obtained. Cured meat in the control group was dried to a yield of 50% (UF-50%). The moisture content and water activity (AW) of each sample were subsequently measured. Further, inhibition of Angiotensin-I Converting Enzyme (ACE) by the samples was determined by the method described by Muguruma et al. (2007), and the antioxidant activities of the samples were assessed using a DPPH radical scavenging assay. Additionally, the free amino acid content of each sample was measured by employing an automatic amino acid analyzer, and the breaking strength was measured using a creep meter. Sensory evaluation of the samples was performed by 16 male and female panelists. Data are expressed as mean ± SEM and one factorial analyses of test results were performed by ANOVA, followed by Tukey's method.

Results and Discussion: The development of dried bonito mold was observed on the surface of the salted meat four days post spraying of bonito mold, and the entire surface was covered with mold by 10 days. Product yields of 70, 60, and 50%, were obtained by 14, 32, and 84 days respectively. The moisture content of each product was found to be 25.73% in the control, 53.66% in F-70%, 48.63% in F-60%, and 34.90% in F-50%, and the water activities of each product was 0.687, 0.874, 0.869, and 0.802 for the control, F-70%, F-60%, and F-50%, respectively. All products had a pH of approximately 6 and water activities of 0.89 or less, which conformed to the storage standards for dried meat products. Prosciutto fermented by spraying mold demonstrated higher inhibition of ACE than that seen in the control group. Furthermore, the progression of prosciutto to a dry ham-like product was accompanied by a simultaneous increase in the ability to inhibit ACE activity. The antioxidant activity of the fermented product was found to be approximately 1.3 times higher at F-70%, 1.7 times higher at F-60%, and about 2.3 times higher at F-50% than that of the control. The amounts of various free amino acids in the dry aged unfermented control were higher than that in raw meat, and was found to be significantly increased in F-50%. In particular, a substantial increase in the levels of Glu and Ala that contribute to the development of umami taste was observed, alongside significant increase in the levels of Val, Leu, and Ile as a consequence of mold fermentation. The latter are branched-chain amino acids that are metabolized in muscles, thereby highlighting the possible use of this meat product as a protein source in sports nutrition. The sensory evaluation of this novel type of prosciutto in the context of its aroma, elasticity, sourness, saltiness, and umami flavor had an overall favorable result, which was further augmented by its appealing texture.

Conclusions: The present study successfully developed a novel Japanese version of prosciutto using traditional bonito mold, with appealing texture and high content of umami ingredients, including Glu and Ala. Additionally, the product contains significantly increased amounts of the branched-chain amino acids Val, Leu, and Ile that are metabolized in the muscle. In view of this and the fact that fermented products in general exhibit antihypertensive and antioxidant activities, this product is expected to contribute substantially to the field of sports nutrition as a source of protein.

Reference:

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Key words: Japanese-style prosciutto, Katsuobushi mold fungus, ACE inhibitory activity, DPPH radical scavenging activity, Umami