EFFECTS OF SOUS VIDE COOKING ON PHYSICOCHEMICAL PROPERTIES OF SQUID

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Abstract

Sous vide refers to a cooking method, in which food is placed in a vacuum bag and cooked under a strictly controlled temperature and time condition. Sous vide differs from the traditional cooking in various aspects. The precisely controlled temperature and time not only reduce negative effect of cooking on nutrients (e.g., proteins, lipids, vitamins, etc.), but also increase total phenolic content and antioxidant activity and improve the overall texture and color of foods. Many experts and scholars have been working on sous vide-related research, which involves various research interests, such as: food safety, storage time, quality improvement, effects on nutrients, nutritional bioavailability, and various other technical approaches. Thus, this research was aimed to study the effect of sous-vide cooking of squid at different temperature combinations on different color, textural, pH and cooking loss.

In order to explore the changes of squid and physicochemical properties during sous vide cooking, the squid was vacuum treated and treated in water bath at: 55, 60, 65, 70, 75, 80, and 85 °C. The texture characteristics, color, pH, and cooking loss of each of the sous vide samples were measured and analyzed by heating at a constant temperature for 300 minutes. Texture was measured when the samples were cut into cubes of 2 x 2 x 2 cm by TA.XT Express material analyzer. The fish meat was determined by physical analyzer. Measuring conditions were as follows: SMS P/50 probe, 2 mm/s pre-test speed, 2 mm/s test speed, 10 mm/s post-test speed. The ambient temperature was 20 - 25 °C and was measured three times in parallel. Color was measured by using CR-400 chromatograph, and the L*, a* and b* values of samples were determined after white board calibration. Different cross sections of each sample were selected for three times. pH was measured by pH meter as follows: 10 g of sample was cut it into pieces, 90 mL of distilled water with pH of 7.0 was added, sample was soaked for 30 minutes and stirred continuously, and then tested with pH meter. Number of samples determined is not less than 3. Cooking losses were calculated by difference of weight before and after cooking and moisture content was determined by drying the samples (5 g) at 102 °C. All the control and treatment groups were repeated three times. Gained data were analyzed by SPSS 19.

The results showed that the quality of squid with sous vide cooking was significantly improved. With the increase of cooking heating temperature, the pH, hardness, elasticity, and chewiness of squid increased first and then decreased. The squid under 60 °C heating condition had better texture characteristics. Sous vide cooking had a significant effect on the color and cooking loss of the squid (p < 0.05), and the squid had the least cooking loss under heating at 55 °C.

In conclusion, the increase in heating temperature has a significant effect on the texture, color, pH, cooking loss, etc. of sous vide cooking (p < 0.05) Combining good changes in texture and cooking loss commended 60 °C as a superior sous vide cooking environment.

Key words: Squid, Sous vide cooking, Physicochemical property, Texture.