

Analysis of sensory characteristics of chicken broths with different chicken oil content using the check-all-that-apply (CATA) questions

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Objectives: Fat is a strong factor that influences the sensory characteristics of meat. It is widely known that meat with high intramuscular fat content ranks highly in terms of tenderness and juiciness and is more palatable to consumers (Font-i-Furnols et al., 2012). In addition, it has also been demonstrated that the fat content in meat affects not only texture but also flavor (Frank et al., 2016). On the other hand, the relationship between fat content and sensory characteristics of meat has been studied mainly between high- fat and low-fat meats, and the effect of differences in fat content at the level of the discrimination threshold on the sensory characteristics of meat has not been studied. To understand the relationship between fat content and meat quality, it is useful to identify qualitative changes in meat sensory characteristics caused by small differences in fat content. Thus, in this study, sensory evaluations were conducted on chicken broths with chicken oil-free broth and three levels of chicken oil concentration close to the discrimination threshold chicken broth.

Materials and Methods: The ground chicken thigh meat prepared from 3 broiler chicken carcasses (600 g) was simmered at 90°C for 2 h with 2.6-L ultrapure water in a cylindrical stainless-steel pot. The broth was filtered, and the broth volume was adjusted to 2 L using ultrapure water. An emulsifier and sodium chloride were added to a final concentration of 0.1% and 0.3% (w/v) of chicken broth, respectively. This broth without oil supplementation was used as a control. Then, 0.116%, 0.0387%, and 0.0129% chicken oil-supplemented broth was prepared. The 0.116% correspond to “concentrations at which almost all panelists can discriminate the presence of supplemented chicken oil,” 0.0387% correspond to “discrimination threshold for chicken oil,” and 0.0129% correspond to “concentrations at which it is impossible to discriminate the presence of supplemented chicken oil,” respectively (Watanabe et al., 2022). Twelve staff members from the Institute of Livestock and Grassland Science, NARO (Ibaraki, Japan) were selected and trained as sensory panel. The panel members evaluate control broth and each oil-supplemented chicken broth by check- all-that-apply (CATA) questions. Briefly, the entire list of 24 sensory terms were presented for the trained panel, and for each of the four broths, the panelists were asked to select all applicable sensory terms to describe their sensory characteristics. In each broth, the number of panelists which selected each sensory term was aggregated, and this data was analyzed by correspondence analysis.

Results and Discussion: In the correspondence analysis, each sample was plotted in a different quadrant. Briefly, the control was located in the first quadrant and "plane taste" was plotted in its vicinity; the 0.0129% broth was located in the fourth quadrant and "butter odor" was plotted in its vicinity; the 0.0387% broth in the third quadrant and "mild taste" was plotted in its vicinity; the 0.116% broth was located in the second quadrant and "too heavy" was plotted in its vicinity. Thus, we found that even small amounts of fat before and after the discrimination threshold can produce differences in perceived sensory characteristics. We also suggested that sensory terms such as "plane taste," "butter odor," "mild taste," and "too heavy" are useful for describing flavor differences due to differences in fat content.

References:

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