Explore the correlation between taste and aroma in aged meat and the differences in meat metabolites between different breeds

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Outline

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Abstract

Postmortem aging is a typical post-harvest process applied in the meat industry, which can enhance the flavor and tenderness of meat. In recent years, metabolomics technology has been widely utilized in aged meat to analyze changes in metabolite composition throughout its processing. However, a deeper understanding of the variations in metabolite composition between different breeds is still needed. Furthermore, research has yet to analyze the correlation between taste-related metabolites and aroma thoroughly. Therefore, the purpose of this study is to utilize metabolomics technology for an in-depth analysis of metabolite changes in aged meat from different breeds of Kochi pedigree of Japanese Brown cattle (JBRT) and Japanese Black beef (JBL), as well as to investigate the potential correlation between taste-related metabolites and meat aroma in aged pork. The study revealed that there were significant differences in the metabolite composition between different varieties. In JBRT muscle, the contents of guanosine monophosphate (GMP), inosine monophosphate (IMP), uridine monophosphate (UMP), and fructose-1,6-diphosphate (F-1,6-diP) were higher than those in JBL. Conversely, the choline, sedoheptulose 7-phosphate (S7P), glycerol 3-phosphate (G3P), glycine, and other amino acids were lower. However, different metabolites may also be responsible for differences in meat flavor during aging. By analyzing metabolites and volatile organic compounds (VOCs) in aged meat, researchers have found that the concentration of taste-related compounds—such as free amino acids, sugars, and fatty acids increases over time, affecting the production of VOCs during the Maillard reaction when meat is cooked, particularly in terms of aromatics. For example, phenylacetaldehyde and 2,5-dimethyl-3-(3-methylbutyl)-pyrazine are compounds responsible for the distinct flavor of roasted meats. Therefore, the metabolite composition of aged meat will also vary among different breeds, and taste-related metabolites will also affect the aroma after roasting.

Reference

Muroya, S., Nomura, R., Nagai, H., Ojima, K., & Matsukawa, K. (2023). Metabolomic profiling of postmortem aged muscle in Japanese Brown beef cattle revealed an interbreed difference from Japanese Black beef. *Animal Bioscience*, *36*(3), 506.

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