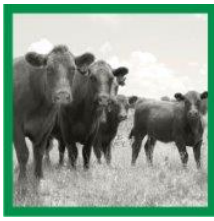

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Volatile Flavor Compounds Vary by Beef Product Type and Degree of Doneness

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Abstract

This study aimed to determine how quality grade and degree of doneness (DOD) influence the development of volatile compounds among beef whole muscle and ground patties. Volatile compounds were quantified via head space solid phase microextraction from samples tempered in refrigerated temperatures (3 to 5 °C), room temperature (24 to 26 °C), or cooked on an electric clamshell-style grill to an endpoint temperature of 55, 60, 71, or 77 °C. Collected samples were subsequently determined by gas chromatography mass spectrometry. Prominent compounds known to be the result of the Maillard reaction or lipid degradation were retained for comparison. Four Strecker aldehydes, 4 pyrazines, and one ester had a 3-way interaction between quality grade, DOD, and product type (each $P < 0.001$). Pyrazine concentrations did not differ ($P > 0.05$) in ground patties and was comparably greater ($P < 0.05$) in steaks; in Prime and Low Choice steaks, pyrazine concentration increased ($P < 0.05$) as DOD increased. A 2-way interaction between quality grade and product type was observed for acetaldehyde, dimethyl disulfide, 1-penten-3-ol, butanoic acid, hexanal, octanal, nonanal, and 2-heptanone. Among which, octanal and nonanal were greater ($P < 0.05$) in Prime steaks compared with ground patties. Another 2 way interaction, quality grade and DOD, was observed in 2 ketones, an alcohol, 2 esters, and 2 aldehydes. For example, 2,3-butanedione was greater ($P < 0.05$) in concentration in Prime 4 °C samples compared with Low Choice and Standard. The final 2-way interaction of DOD and product type was observed in 3 ketones, 2 sulfur compounds, 2 esters, 5 aldehydes, 2 carboxylic acids, and a ketone. For example, 2-heptanone was greater ($P < 0.05$) in concentration in ground patties compared to steaks in all degrees of doneness except 4 °C. Overall, these results indicate that the volatile flavor profile of beef is greatly influenced by product type and DOD. Generally, consumers select beef based on product type and determine their cookery approach. Therefore, consumers may greatly influence final beef flavor profile.

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