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Characterization of lamb flavor using selected ion flow tube mass spectrometry (SIFT-MS)

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Volatile 4-alkyl-branched fatty acids and 3-methylindole are characteristic flavor compounds associated with lamb. The partitioning behavior of these volatile organic compounds (VOCs) between the gas and condensed phase is important for their effective characterization especially during high throughput screening and quantitative analysis. Selected ion flow tube-mass spectrometry (SIFT-MS) was used for the headspace concentration analysis of the compounds associated with lamb flavor. Standard solutions of 4-ethyloctanoic acid, 4-methyloctanoic acid, 4-ethylnonanoic acid and 3-methylindole were prepared in an oil-based matrix, equilibrated for an hour at 4 different temperatures (80, 100, 110 and 125oC), prior to headspace sampling and quantification. Further linear regression analyses and calculations of Henry's law constants were carried out at each specified equilibration temperature. The Henry's law constants of the lamb flavor compounds were calculated with a high degree of confidence ($p<0.05$) based on direct proportionality with a very good fit of linearity ($R2>0.99$) between the headspace and solution concentration of the standard solutions. The detected headspace concentrations increased with elevated equilibration temperature resulting to increased volatility of the compounds. Therefore, the calculated temperature-dependent Henry's law constants for these volatile compounds decreased with increasing temperature. We have established the temperature-dependent Henry's law constants for the volatiles 4-alkyl branched-chain fatty acids and 3-methylindole in air-oil matrixes. As the equilibration temperature is increased, volatility increases and Henry's law constant decreases with increasing molecular weight. The partitioning behavior of the compounds is necessary for their high throughput characterization and approximation of their concentrations in situ.

Biography

Hardy Castada is a post-doctoral food scientist and analytical chemist with research interest in the fundamental and applied volatile compound analysis using SIFT-MS. He studies physico-chemical changes and behavior of volatile, semi-volatile, aroma and flavor volatiles in various matrixes and systems.

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