Identification of volatile sulphur compounds of cooked ham by GCxGC-TOFMS, GC-MS/8O AND GC-GC-MS/O

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The role of sulfur compounds in the aroma of cooked meat is well-known, yet volatile sulfur compounds (VSC) in cooked ham are poorly described in the literature. These compounds are difficult to analyze, especially in this complex matrix where they are present at trace levels. Furthermore, VSC are very difficult to extract and to detect due to a strong retention by the matrix and a high chemical reactivity during all analytical steps. Hams were investigated using different types of extraction and detection methods in order to achieve the most exhaustive identification of VSC. These methods were: solid phase micro-extraction coupled to the comprehensive bidimensional gas chromatography-time of flight mass spectrometry (SPME-GCxGC-TOFMS), dynamic headspace coupled to gas chromatography-mass spectrometry (DH-GC-MS) or a specific extraction of thiols with mercury salts prior to GCxGC-TOFMS analysis. The different analytical approaches have led to a reliable identification of 39 VSC [1]. The most efficient method of detection and identification was SPME-GCxGC-TOFMS. In addition, olfactometry analyses [2] were performed using an eight way olfactometer (GC-8O/MS) and a home-made heart-cut GC-GC-O/MS device was used to resolve the co-eluting odor zones. These analyses revealed that 7 out of 39 VSC identified by mass spectrometry were perceived during olfactometry. The study demonstrated the key role of VSC in cooked ham aroma, especially 2-methyl-3-furanthiol and methyl 2-methyl-3-furyl disulfide that possess a strong “meaty” odor similar to the odor of cooked ham.

References

[1]. Thomas, C.; Mercier, F.; Tournayre, P.; Martin, JL.; Berdagué, JL. Food Chemistry 155 (2014) 207-213.

[2]. Thomas, C.; Mercier, F.; Tournayre, P.; Martin, JL.; Berdagué, JL. Food Chemistry 139 (2013) 1-4.