A new approach for nitrite determination from synthetic and natural origin in cured meat

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Nitrites are widely used as curing agents in the production of cooked meat derivatives. The characteristic pink-red color, texture and flavor of cured meat are provided by nitrite, and it also has antimicrobial and antioxidant properties [1]. However, nitrites and their metabolic compounds are linked to potential adverse health effects, being classified as "probably carcinogenic to humans" under conditions favoring the endogenous nitrosation by the International Agency for Research on Cancer (IARC) [2]. The curing process is usually carried out by adding synthetic nitrite to meat, but the addition of vegetables which are a natural source of nitrite is a currently alternative. These products are labeled as "made without nitrite", which can confuse the consumer. The aim of this study was to detect and quantify nitrite from the two different origins in cooked ham using headspace-gas chromatography-mass spectrometry (HS-GC-MS). Cooked hams at different concentrations of synthetic nitrite (from 0.5 to 150 μg g^{-1}) and hams prepared from polyphenols extracts (at 1 and 2%) were analyzed. The analytical procedure consisted on the determination of nitrous oxide as a targeted compound, formed after two reduction steps: from nitrite to nitric oxide and then to nitrous oxide under acidic conditions. An aliquot of the headspace was injected into the GC-MS after the incubation of the sample at 30 ºC during 45 minutes. As a result, a good correlation was obtained between nitrous oxide detected and nitrite added to meat, and good values of limits of detection and quantification (2.7 and 9 μg g^{-1}, respectively) were achieved. Furthermore, samples of commercial cooked ham were analyzed and studies about intermediate precision and repeatability were carried out demonstrating the applicability and reproducibility of the proposed method. Therefore, the HS-GC-MS method is presented as an efficient approach to ensure the quality and safety of these products.

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Acknowledgements

The authors acknowledge the financial support of the Comunidad Autónoma de la Región de Murcia (CARM, Fundación Séneca, Project 19888/GERM/15), the Spanish MICINN (PGC2018-098363-B-100), and PROSUR.