Poster

Validation of an analytical method for determining nitrites in meat samples

Leticia Fernández Gutiérrez (1), Menta Ballesteros Martín (2), Raquel Rojas Rodríguez (2)

(1) Laboratorios Vital, S.L., Pol. Ind. La Negrilla Calle Imprenta 28

(2) Departamento de Biología Molecular e Ingeniería Bioquímica. Ctra Utrera Km. 1. Universidad Pablo de Olavide, Sevilla

Keywords: nitrite; meat; validated.

ABSTRACT

According to FAO, global food demand is increasing as a consequence of population, economic and urbanization growth, particularly in developing countries. Therefore, food industry must develop conservation methods that allow the food to last longer and in better conditions. In the case of meat, sodium nitrite (nitrite) is used in preservation processes. This is because nitrites have the ability to inhibit the anaerobic development of microorganisms. In addition, it is usually used because of its ability to fix the color in red meats and to improve the organoleptic characteristics of the food, making its texture, flavor and color are more attractive to the consumer. However, its use is regulated by the Commission Regulation (EU) No 1129/2011 of 11 November 2011 amending Annex II to Regulation (EC) No 1333/2008 of the European Parliament and of the Council which establish a list of food additives with relevance. Nitrites are included among these additives because they are important precursors of the formation of the N-nitrosamines, which are carcinogenic and mutagenic compounds. These additives, when consumed in processed food, has been linked to the risk of gastric cancer in humans. Therefore, it is essential to develop analytical methods that help to determine adequately nitrites concentration in foods at levels required by legislation.

The analytical method selected was based on the reaction of the nitrite present in foods with a sulfanilic acid reagent (α-naphthylamine). This results in a colorimetric reaction that forms a pink compound that can be measured spectrophotometrically. We prepared the sample to homogenization with an electric mixer to get a better extraction of de nitrite. Later, the sample was added with a known concentration of a reference material.

Several assays were done for determine the reproducibility, replicability and accuracy of the method. Recovery results (70-80%) show that the selected method is adequate to carry out nitrite determination in meats. Moreover, during the startup of the method it was observed that this methodology is influenced by the homogenization of the sample and the conservation time of the reagents, revealing the importance to control and standardized the procedure.

REFERENCES

Analytical methods in food. Official methods of analysis: Meat and meat products. Panreac.

Song, P., Wu, L. and Guan, W. (2015). Dietary Nitrates, Nitrites, and Nitrosamines Intake and the Risk of Gastric Cancer: A Meta-Analysis. Nutrients, 7 (12), 9872-9895.

Ventanas, S., Martín, D., Estévez, M. and Ruíz, J. (2004). Nitrates, nitrites and nitrosamines in meat products I. Eurocarne, 129.