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On-line prediction of sodium content in vacuum packed dry-cured ham slices by non-invasive near infrared spectroscopy

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ABSTRACT

In the present study, non-invasive near infrared spectroscopy (NIRS) was evaluated as a potential on-line analytical technique to predict the sodium content in dry-cured ham slices. Samples of 310 packages were scanned by applying a remote fibre-optic probe to the surface of the slices, at different temperatures, with no previous manipulation. The sodium content of the meat samples was determined by a reference method based on Inductively Coupled Plasma Atomic Emission Spectrophotometry (ICP–AES) after chemical digestion. Partial least squares (PLS) regression was used as a chemometrics method to perform the calibrations. The models yielded acceptable results with cross validation correlation coefficients (R^2_{cv}) determined 86.2 - 90.2%. The prediction capacity reached in the external validation was 3.63, with a standard prediction error of 0.12% Na. These results show that NIR measurements could be implemented on the packaging line of dry-cured ham slices to provide accurate and relevant information about the sodium content of each packaged products.

Keywords:

NIR Spectroscopy
On-line prediction
Dry-cured ham
Sodium content

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1. Introduction

Food labelling is one of the most reliable sources of reference information provided to the consumer. The healthiest foods are recommended either, from the standpoint of their characteristics or from the perspectives of its manufacture, hence it is important that the consumer knows as precisely as possible the composition of foodstuffs consumed (Grünert, Wills & Fernández-Celemín, 2010).

Salt content (NaCl) has significant importance in the diet because it represents a risk factor for cardiovascular diseases (WHO, 2012). However, NaCl is also a essential functional ingredient in many cured meat products (Ventanas, Ruiz & Córdoba, 2001). The common curing process has widely been used for stabilizing meat products and for developing various sensory characteristics (Arnau, Guerrero, Gou & Monfort, 2001; Flores, Aristoy, Antequera, Barat & Toldrá, 2009). Consequently, dry-cured meat products have often high salt contents.

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