

Study of the feasibility of using Near Infrared Spectroscopy and neural networks for predicting Iberico dry cured ham sensory attributes

Revilla I., Hernández-Ramos, P., González-Martín, I., Vivar-Quintana, A.M., Martínez-Martín, I.

Spanish Iberico dry-cured ham is a very popular meat product owing to its sensory profile, its nutritional quality and long shelf life. Ibérico ham represent a large part of the meat products hosted under Quality Distinctions in Spanish market and stands out among them as a high-quality product of increasing economic relevance. To assure the quality of these products their sensory analysis according to the ISO 17025 norm is compulsory. However, sensory analysis is expensive and time-consuming. Then, some instrumental technique such as NIRS technology has been studied to predict sensory attributes but it has hardly been used for meat products. The aim of this study was the quantification of sensory attributes of Spanish Iberian dry-cured ham using NIR technology and Artificial Neural Networks. In order to do so, 91 dry-cured hams from "Ibérico" pigs elaborated according to traditional technology and matured for 24 to 36 months were selected. The sensory attributes (28 descriptors) were generated by a panel of 10 expert tasters trained by means of QDA and assessed on a scale of 10 points. Recording of the NIR spectra was accomplished by direct application of the fiber optic probe to the samples. NIRS data were analysed using a Feedforward Neural Network with one hidden layer. The selected training algorithm was Levenberg-Marquard with a variable number of neurons in the hidden layer (1 to 30). Each network was trained 30 times for each architecture. Results showed that the number of neurons in the hidden layer were between 4 and 27, the regression coefficient (R) was between 0.7 and 0.9 and the R^2 varied from 0.5 to 0.8 depending on the sensory parameter. The prediction of sensory parameters using NIRS and ANN were very good for descriptors such as sweating, cured odour, cured taste, taste intensity, sweet or after taste.

Keywords: Neural Networks Spanish dry-cured ham, NIR technology, Prediction capacity