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Comunicações em Painel

PC-D: Química alimentar

PC-D47: An electronic tongue as a tool for discriminating canned tuna with different coating oils

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Canned fish is a food highly appreciated in Europe, with a great tradition in European and Mediterranean cuisines. In recent years there has been a growing demand for canned fish (e.g., sardines, tuna), either because of its usefulness and ease of use, but above all due to the health benefits related with this type of food. There has also been a growing trend in the market for providing differentiated products, traditionally called *gourmet*, with the emergence of new recipes, seasonings, and topping liquids. Canned foods are usually commercialized with different coating liquids, including natural preserves (water), with vegetable oils or olive oils with different commercial grades. This latter strategy is quite popular as a way of valuing and differentiating this type of canned food. However, the interaction between the fish and the coating liquid during storage, together with the technological processing of the canned food turns the authenticity assessment a hard analytical task, which is of major relevance considering the high price and the premium market envisaged for commercialization. Thus, this work aimed to evaluate the use of a potentiometric electronic tongue to discriminate canned tuna with different coating oils, namely, olive oil (extra virgin or virgin olive oil), refined olive oil and sunflower oil. Fifteen tuna samples were acquired, including five canned cans from different commercial brands for each studied oil. The samples were drained for 2 min, the tuna was removed from each can, extracted with a methanol-water solution (80:20, v/v) and then analysed with the electronic tongue (E-tongue). In total, for each sample, 40 potentiometric signal profiles were recorded by the 40 lipid sensor membranes comprised in the lab-made E-tongue (Figure 1)[1]. The results clearly showed that the acquired E-tongue profiles together with chemometrics (linear discriminant analysis coupled with the simulated annealing variable selection algorithm, LDA-SA), allowed correctly classifying 100% (Figure 2) of the original grouped data (training). The LDA-SA-E-tongue model was based on the potentiometric signals recorded by 7 of the 40 sensors, leading to a satisfactory predictive performance (internal validation), namely 93% and 86% for leave-one-out cross-validation and repeated K-fold cross-validation (4 folds and 10 random split repeats) procedures. In conclusion, the E-tongue could be foreseen as a practical and accurate tool for guaranteeing the label correctness of tuna canned cans according to the coating oil used, namely allowing a clear recognition of the type of vegetable oil used, i.e., sunflower or olive oil.

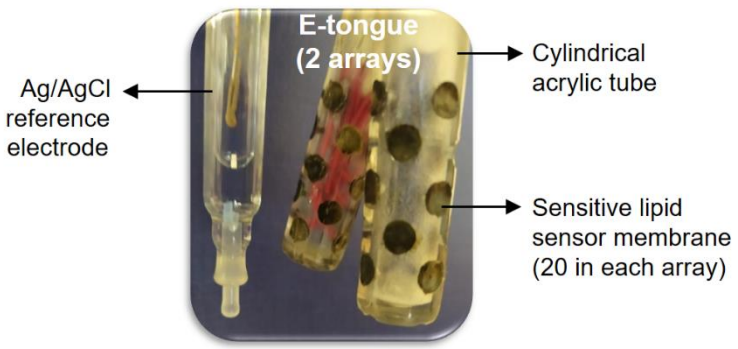

Figure 1: Lab-made E-tongue comprising two cylindrical sensor arrays, each with 20 sensors.

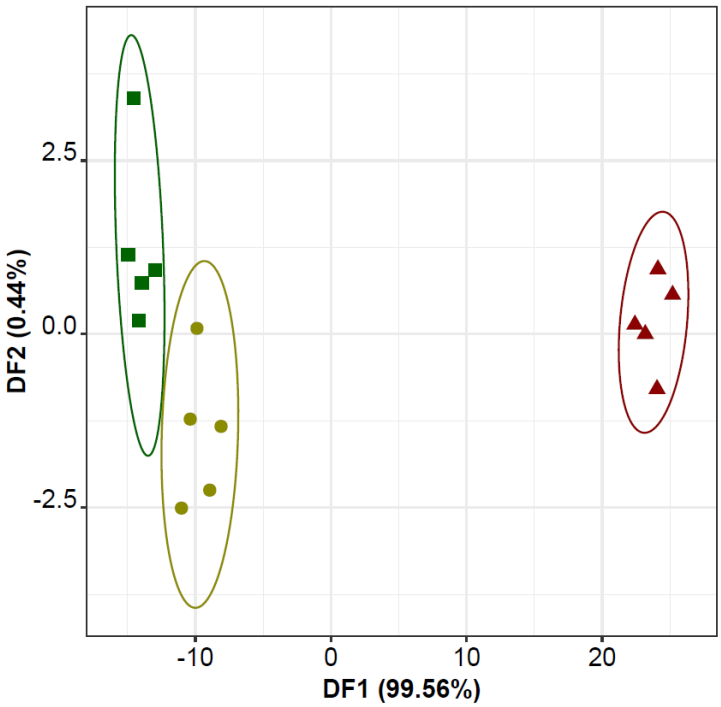

Figure 2: Supervised discrimination of canned tuna with different coating oils (■: Olive oil (virgin or extra virgin olive oil); ●: Refined olive oil; ▲: Sunflower oil) using a LDA-SA-E-tongue model based on potentiometric signals acquired by 7 lipid sensor membranes.

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