P336. Discrimination of three bacteria species using a potentiometric electronic tongue

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The detection, monitoring and/or prevention of microorganism growing is of utmost relevance in several research fields, from food to environmental areas, being an important topic either from an academic or an industrial point of view. Conventional methods like plating techniques are the most widely used, being needed novel and faster screening methodologies like electronic noses, electronic tongues (E-tongues) and impedance based methods. In the present work, a potentiometric E-tongue (Fig. 1), comprising 40 lipid polymeric sensor membranes with cross-sensitivity, was used to identify and discriminate three bacteria (*Enterococcus faecalis* ATCC29212; *Staphylococcus aureus* ATCC653 and *Escherichia coli* ATCC29998) at two concentration levels (low and high). Brain Heart Infusion Broth medium was used for cultivating each of the three microorganisms, which were then individually inoculated into 1 L Erlenmeyer flasks (working volume of 600 mL) and incubated overnight (batch mode) at 35°C, on a rotary shaker (90 rpm). After incubation, the biomass was spectrophotometrically determined, being measured the optical density at 550 nm. The cultures were split in volumes of 50 mL. The cells of each sample were harvested (centrifugation at 9000 rpm for 10 min), after discarding the supernatant, washed with distilled water and re-centrifuged (9000 rpm for 10 min) and stored (20 ºC). The obtained biomass was dried overnight at 30°C, and stored at 20 ºC. Before E-tongue analysis, the cells were rehydrated with 20 ml of deionized water for 30 minutes at room temperature and aqueous sample solutions with different cells concentrations were obtained. Each E-tongue analysis took five minutes, enabling establishing a pseudo-equilibrium between the samples and the sensors' membranes, being the signals potentiometric profiles recorded. The classification performance of the E- tongue was assessed by applying a linear discriminant analysis (LDA) coupled with the meta-heuristic simulated annealing (SA) variable selection algorithm. The preliminary results showed that an E- tongue-LDA-SA predicting model could be established, based on the information gathered by a sub-set of 15 sensors, allowing to correctly classify 100% (Fig. 2) and 85% (original and leave-one-out cross- validation procedure, respectively) of the samples according to the microorganism and respective concentration level.