

## Supporting Information

### Resolution of Phenolic Antioxidant Mixtures employing a Voltammetric Bio-Electronic Tongue

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This supplementary information gives detailed information of the formulation of the biocomposites of the BioET array and their voltammetric responses towards individual solutions of the phenolic compounds tested (Catechol, Caffeic acid and (±)-Catechin). Also detailed results obtained during the ANN optimization process for the RMSE values and the correlation coefficients and slopes calculated from the comparison graph between expected and found concentrations for the different configurations tested. Residual values were calculated between expected and found concentration values, for each sample (i) and for each of the three analytes (j) considered according to equation 1;

$$RMSE = \sqrt{\frac{\sum_{ij} (c_{ij} - \hat{c}_{ij})^2}{3n - 1}} \quad (1)$$

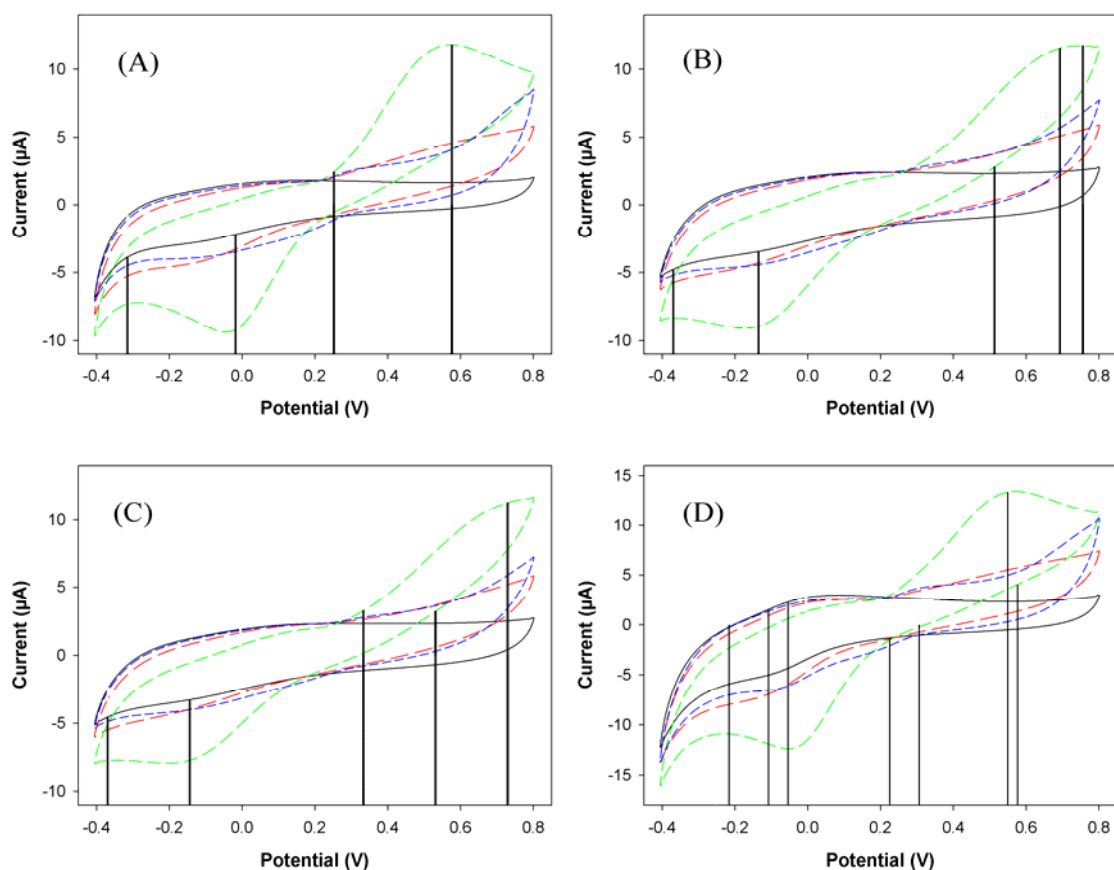
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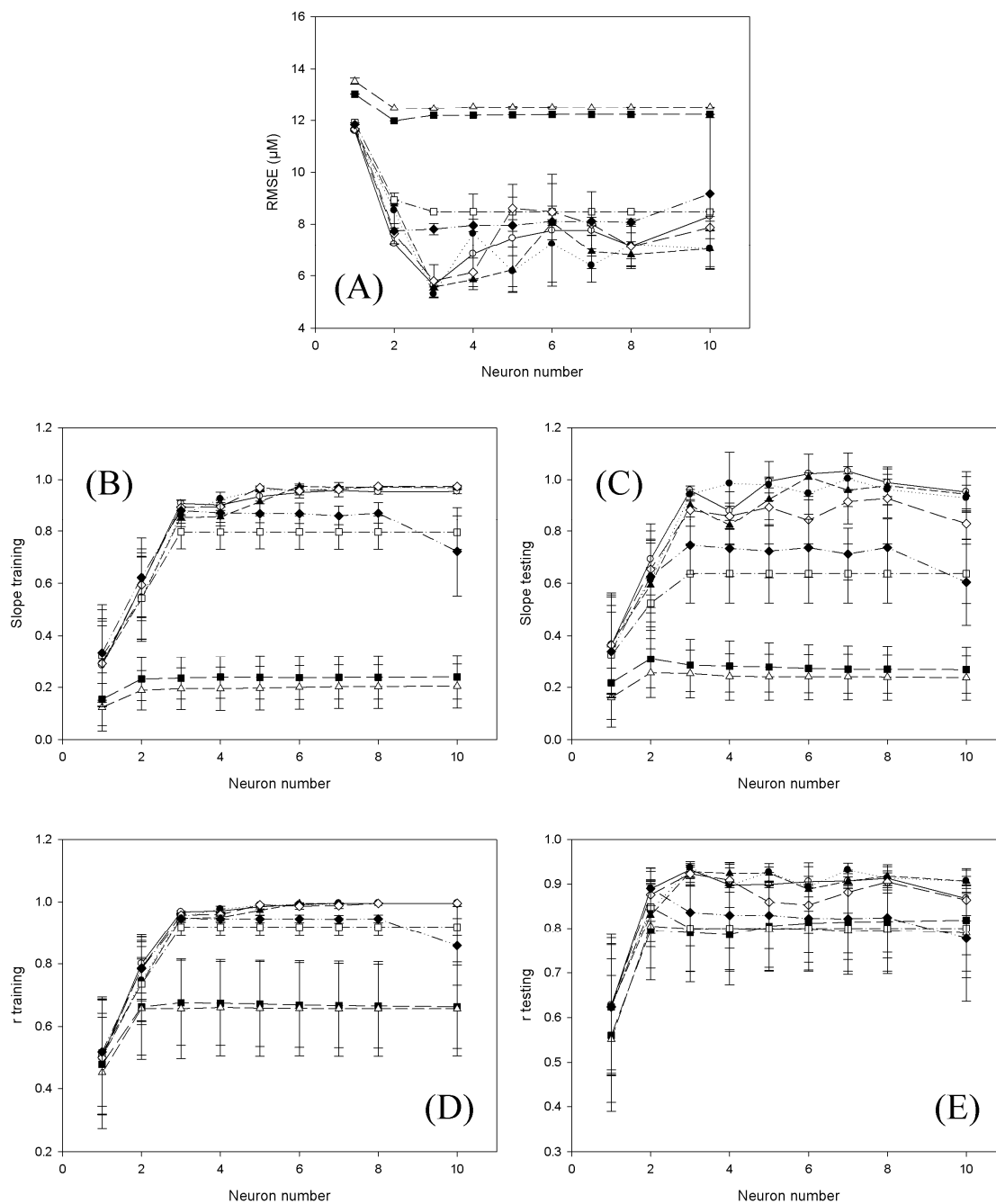
**Table S1.** Formulation of the biocomposites used for preparing the bioelectronic tongue.

Sensor	Epotek H77*	Graphite	Component added
(A) Graphite-epoxy sensor	85%	15%	-
(B) Tyrosinase biosensor	83%	15%	2% Tyrosinase from mushroom (EC 1.14.18.1, 4276 U/mg)
(C) Laccase biosensor	83%	15%	2% Laccase from <i>Trametes versicolor</i> (EC 1.10.3.2, 21 U/mg)
(D) Copper nanoparticles modified sensor	83%	15%	2% Copper nanoparticles (50 nm)

\*Previously mixing the resin (part A) with its corresponding hardener (part B) in a ratio 20:3 (w/w)



**Figure S1.** Example of the voltammograms obtained for the same standard solutions of each of the three phenols and buffer solution with the four sensors used. (—) Buffer solution, (---) 87.7  $\mu\text{M}$  Caffeic acid solution, (---) 151.2  $\mu\text{M}$  Catechol solution and (---) 96.2  $\mu\text{M}$  ( $\pm$ )-Catechin solution. Sensors: (A) Graphite-epoxy sensor, (B) Tyrosinase biosensor, (C) Laccase biosensor and (D) Copper nano-particle modified sensor.



**Figure S2.** Detailed results of the ANN optimization. Obtained RMSEs (A), slopes (B, C) and correlation coefficient values (D, E) of obtained vs expected comparison graphs (both for training and testing sets respectively) are plotted against different transfer function combinations and number of neurons in the hidden layer-output layer. L:logsig, P:purelin, S:satlin and T:tansig; T-T (—○—), T-L (—■—), T-P (---▲---), L-L (---△---), L-P (.....●.....), P-P (---□---), L-S (—◇—), P-S (---◆---).