Electronic Supplementary Material (ESI) for Analytical Methods

Supplementary Materials

Simultaneous determination of hydroquinone and catechol in compost bioremediation using a tyrosinase biosensor and artificial neural networks

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Fig. S1 Examples of the differential pulse voltammetry for the mixtures of two phenols. Concentrations for each phenol are: (a) 0.35μM (HQ), 0.11μM (CC).

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Table S1 Detailed results obtained for the spiked compost extract samples against added concentrations of the catechol considered. Error was also expressed for each compost extract sample.

Compost extract sample	CC concentration /μM			Error (τ_1)		Error (τ_2)		(RSD)	
	Added	^{L}predicted	^{B}predicted	$^{L}\tau_1$	$^{B}\tau_1$	$^{L}\tau_2$	$^{B}\tau_2$	^{L}RSD	^{B}RSD
1	1.3	1.1±0.37	1.5±0.33	-15.385%	15.3846%	15.385%	15.385%	11.7851%	10.1015%
2	4.6	5.3±0.41	5.0±0.18	15.2174%	8.6957%	15.217%	8.6957%	9.9995%	5.8926%
3	17.8	17.4±0.23	17.9±0.11	-2.247%	0.5618%	2.247%	0.5618%	1.6071%	0.3961%
4	25.6	27.5±0.44	28.0±0.17	7.4219%	9.375%	7.4219%	9.375%	5.0603%	6.3323%
5	32.3	30.5±0.39	31±0.29	-5.573%	-4.025%	5.573%	4.025%	4.0535%	2.9044%
6	39.5	37.7±0.35	40.3±0.30	-4.557%	2.0253%	4.557%	2.0253%	3.2974%	1.4178%
7	59.3	63.5±0.42	60.2±0.15	7.0826%	1.5177%	7.0826%	1.5177%	4.8369%	1.0651%
8	95.5	70.6±0.47	98.4±0.26	-26.073%	3.0366%	26.073%	3.0366%	21.2004%	2.1151%
average	—	—	—	-3.014%	4.5715%	10.445%	5.578%	7.73%	3.7781%

^{B}BP-ANN model; ^{L}linear model

$\tau_1 = \frac{x_1 - x_0}{x_0} \times 100\%$ $\tau_2 = \frac{|x_1 - x_0|}{x_0} \times 100\%$

Table S2 Detailed results obtained for the spiked compost extract samples against added concentrations of the hydroquinone considered. Error was also expressed for each compost extract sample.

Compost extract sample	HQ concentration /μM			Error (τ_1)		Error (τ_2)		(RSD)	
	Added	^{L}predicted	^{B}predicted	$^{L}\tau_1$	$^{B}\tau_1$	$^{L}\tau_2$	$^{B}\tau_2$	^{L}RSD	^{B}RSD
1	2.5	2.0±0.46	2.8±0.36	-20%	12%	20%	12%	15.7135%	8.005%
2	15.5	14.3±0.39	14.9±0.28	-7.742%	-3.871%	7.742%	3.871%	5.6948%	2.7912%
3	20.5	20.0±0.44	20.6±0.37	-2.439%	0.4878%	2.439%	0.4878%	1.7459%	0.3441%
4	36.3	31.2±0.40	32.0±0.16	-14.05%	-11.846%	14.05%	11.846%	10.6852%	8.9035%
5	10.5	12.5±0.29	8.9±0.19	19.0476%	-15.238%	19.0476%	15.238%	12.2975%	11.6636%
6	60.5	57.1±0.36	58.6±0.23	-5.62%	-3.14%	5.62%	3.14%	4.0887%	2.2561%
7	83.6	65.8±0.32	85.9±0.29	-21.292%	2.7512%	21.292%	2.7512%	16.8494%	1.919%
8	105.4	78.6±0.38	109.8±0.21	-25.427%	4.1746%	25.427%	4.1746%	20.5983%	2.8915%
average	—	—	—	-9.69%	-1.835%	14.45%	7%	10.9592%	4.8468%

^{B}BP-ANN model; ^{L}linear model

$\tau_1 = \frac{x_1 - x_0}{x_0} \times 100\%$ $\tau_2 = \frac{|x_1 - x_0|}{x_0} \times 100\%$

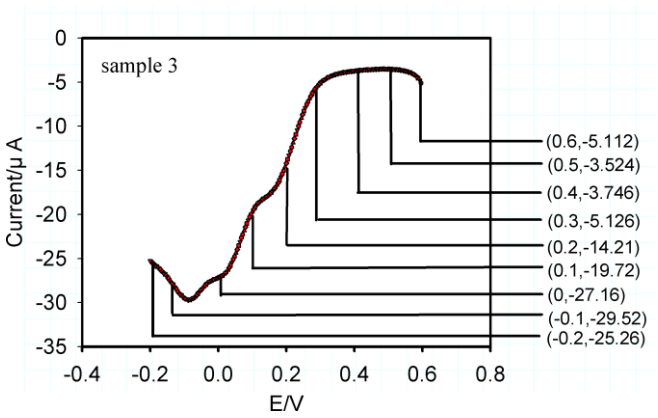
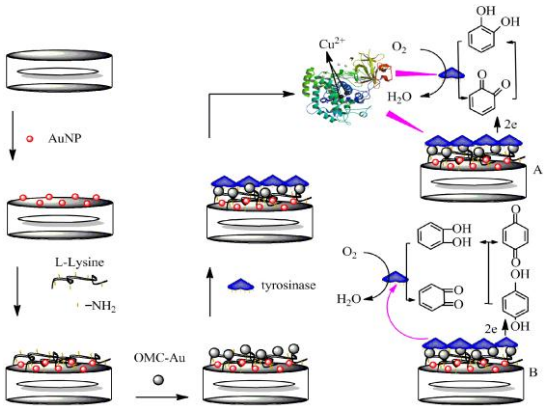


Fig. S1 Examples of the differential pulse voltammetry for the mixtures of two phenols. Concentrations for each phenol are: (a) 0.35μM (HQ), 0.11μM (CC).



Scheme S1. Schematic diagram of the tyrosinase biosensor preparation and schematic diagram of the tyrosinase biosensor proposed mechanism for the HQ (B) and CC (A) electrocatalytic detection[1].

References

(1) T. Lin, Y. Y. Zhou, G. M. Zeng, Z. Li. Y. Y. Liu, Y. Zhang, G. Q. Chen, G. D. Yang, X. X. Lei and M. S. Wu, *Analyst*, 2013, **138**, 3552-3560.