Supporting Information

Construction of a highly sensitive electrochemical sensing platform using an Au-RGO-MWCNTs nanocomposite for the synergistic amplification of rutin detection

Ling-Zhi He [a,b], Xiang Li [a], Zhi-Wen Zeng [a], Yang Hong [a], Qiong-Chi Liu [a], Zhong-Hou Liang [a], Wen-An Kuang [c,*]

[a] *School of Medicine, Hunan Environment Biological Polytechnic, Hengyang, Hunan, 421005, China*

[b] *Hunan Key Laboratory of Typical Environmental Pollution and Health Hazards, School of Public Health, Hengyang Medical School, University of South China, Hengyang, Hunan, 421001, China*

[c] *The First Affliated Hospital, Department of Thoracic and Cardiovascular, Hengyang Medical School, University of South China, Hengyang, Hunan, 421001, China*

* Corresponding author.

E-mail address: ksykyn@126.com (W. Kuang)

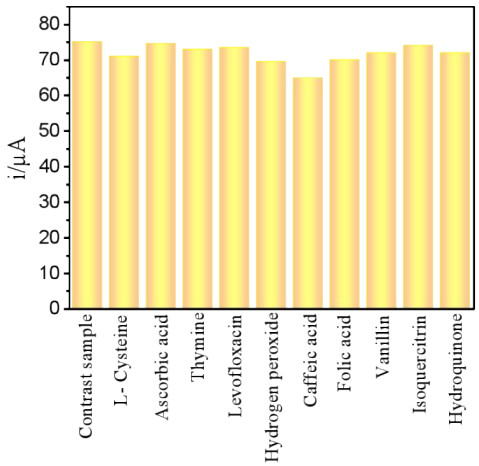

Fig. S1. Anti-interference performance evaluation for 1.0 mmol L^{-1} rutin detection in the presence of 100-fold excess biological/environmental interferents.

Table S1. Comparison of the performance of different electrochemical methods for the determination of rutin.

Methods	Detection range ($\mu mol\ L^{-1}$)	LOD ($\mu mol\ L^{-1}$)	Recovery (%)	Reference
DPV[a]	4.77– 46.2	1.54	96.9–104.6%	[1]
DPV	20–5000	10	–	[2]
sequential injection	3.0–30	2.25	–	[3]
HPLC–UV[b]	16.3–98.27	3.0	–	[4]
FI–CL[c]	–	3.0	–	[5]
HPLC–DAD[d]	98.3-294.8	10.4	98.33–101.12%	[6]
SWV[e]	8–1000	1.30	92.0–102.0%	This work

[a]DPV: differential pulse voltammetry; [b]HPLC–UV:High-performance liquid chromatography-ultraviolet; [c]FI–CL:flow-injection chemiluminescence method; [d]HPLC–DAD:a high-performance liquid chromatography with diode-array detection; [e]SWV: square wave voltammograms.

Table S2. Comparison of rutin detection in real samples using the proposed Au-RGO-MWCNTs/GCE and HPLC method (n = 3).

Sample	Detected by SWV ($\mu mol\ L^{-1}$)	Detected by HPLC ($\mu mol\ L^{-1}$)	Relative Error (%)
Hypericum japonicum Thunb	48.0	49.1	2.24%
Sophora japonica	82.6	79.9	3.38%
Fagopyrum esculentum Moench	68.3	69.5	1.73%

HPLC analysis was conducted using (C18 column , 4.6 × 250 mm, 5 μm) with methanol-0.1% phosphoric acid solution (40:60, v/v) as mobile phase at a flow rate of 1.0 mL $min^{-1}$with UV detection at 254 nm.

Values are expressed as mean ± standard deviation (SD) for three parallel measurements (n = 3). Relative error (%) was calculated as: [(SWV value – HPLC value) / HPLC value] × 100%.

References

1 A. C. Franzoi, P. Migowski, J. Dupont and I. C. Vieira, *Anal. Chim. Acta*, 2009, 639, 90-95.

2 S. Jinchun, Y. Ji, Z. Junfen, T. Juan and Z. Li, *Microchim. Acta*, 2010, 171, 283-287.

3 Z. Legnerová, D. Šatı, x, nský and P. Solich, *Anal. Chim. Acta*, 2003, 497, 165-174.

4 E. A. A.-S. Mohammed khair, V. M. Yuliia, A. D. Tatyana, B. V. Andriy, A. Vasil and R. B. Yaroslav, *J. Pharm. Biomed. Anal.*, 2018, 149, 179-184.

5 Y. Dan, L. Haiyun, L. Ziyuan, H. Zaibin and L. Jianping, *Luminescence*, 2010, 25, 436-444.

6 L. F. Lloyd Earl, T. C.-I. Katherine Ann, P. R. Joel, P. T. Arvin Paul and B. H.-F. Amelia, *Malays. J. Fundam. Appl.*, 2023, 19, 855-864.