Electronic Supplementary Material (ESI) for Analyst

Determination of morphine at gold nanoparticles/Nafion® carbon paste modified sensor electrode

Nada F. Atta*, Ahmed Galal, Shereen M. Azab

Department of Chemistry, Faculty of Science, Cairo University, Giza 12613, Egypt
nada_fah1@yahoo.com, Tel.: +20 02 35676561; fax: +20 02 35727556

Supplementary Information

Fig. S1 Structure of morphine

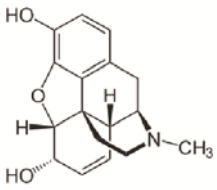

Fig. S2 Structure of Nafion

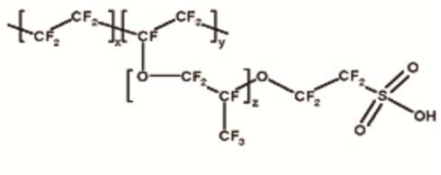

Table S1 Table of Robustness

Parameters	Modification	Recovery %
pH	6.7	98.9
	7	100.6
	7.4	100.1
	8	97.4
Scan rate (mV)	80	98.2
	90	99.8
	100	100.3
	110	101.2
Lab. Temperature (^{o}C)	20	100.4
	25	99.6
	30	100.5

Table S2 Table of comparison in real samples and references

Method	Real sample	RSD %	References
Spectrophotometric	urine	0.26 -1.06	[1]
Flow injection system	urine	2.2	[2]
Biosensor-based immunoassay	urine	0.48-18.38	[3]
Anodic adsorptive stripping differential pulse voltammetry	plasma	0.81-3.79	[4]
Capillary electrophoretic method	urine	1.7-5	[5]
Differential pulse voltammetry	urine	0.14-0.93	This work

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3] P. P. Dillona, B. M. Manninga, S. J. Dalya, A. J. Killard ,R. O'Kennedya, Production of a recombinant anti-morphine-3-glucuronide single-chain variable fragment (scFv) antibody for the development of a ''real-time'' biosensor-based immunoassay, Journal of Immunological Methods, 276 (2003) 151– 161

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5] L. Yi-Hui, L. Jih-Heng, K. Wei-Kung, W. Shou-Mei, Direct and sensitive analysis of methamphetamine, ketamine, morphine and codeine in human urine by cation-selective exhaustive injection and sweeping micellar electrokinetic chromatography, Journal of Chromatography A, 1130 (2006) 281–286