**Supplementary Material for the Paper**

**Flow injection analysis system with electrochemical detection for the simultaneous determination of nanomolar levels of acetaminophen and codeine**

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**Fig. S1.** Plot of peak current values in function of the **(a)** flow rate (range: 1.0 – 5.5 mL min–1) and **(b)** sample volume (range: 50 – 500 μL).

**Table S1.** Effect of possible interferents on the amperometric determination of a 10 µmol L–1 ACP and COD in 0.05 mol L1 H2SO4 using a CPBDD electrode and the FIA system coupling with MPA.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interferent** | | **Average deviation (%)a** | | |
| **ACPb** |  | **CODb** |
| 0 | White | – |  | – |
| 1 | Starch | 0 |  | 0.17 |
| 2 | Magnesium stearate | 0.11 |  | 2.6 |
| 3 | Silicon dioxide | –1.7 |  | 0 |
| 4 | Docusate sodium | –0.13 |  | 2.1 |
| 5 | Cellulose | 0.23 |  | 2.5 |
| 6 | Sodium benzoate | –2.5 |  | 0.92 |
| 7 | Sodium bisulfite | 2.5 |  | 5.7 |
| 8 | Benzoic acid | –1.7 |  | –0.91 |

a *n* = 3; b concentration ratio: 1 : 10 (ACP and COD : interferent).

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**Fig. S2.** FIAMPA amperogramms obtained for successive injections of supporting electrolyte solutions containing ACP (9.0; 40 or 100 μmol L1) and COD (0.40; 1.0 or 10 μmol L1). Supporting electrolyte: 0.05 mol L1 H2SO4; injected volume 350.0 μL and flow rate: 3.8 mL min1.

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**Fig. S3.** FIAMPA amperogramms obtained for successive injections of supporting electrolyte solutions containing 10 µmol L–1 ACP and COD in the absence **(0)** and presence of possible interferents **(1)** starch, **(2)** magnesium stearate, **(3)** silicon dioxide, **(4)** sodium docusate, **(5)** cellulose, **(6)** sodium benzoate, **(7)** sodium bisulfite and **(8)** benzoic acid. Supporting electrolyte: 0.05 mol L1 H2SO4; injected volume 350.0 μL and flow rate: 3.8 mL min1.

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**Fig. S4. (a)** FIAMPA amperogramms obtained after injections of supporting electrolyte solutions containing ACP (AI: 0.080, 0.50, 3.0, 9.0, 20, 40, 60, 80 e 100 μmol L1) and COD (AI: 0.050, 0.080, 0.20, 0.40, 0.80, 1.0, 4.0, 8.0 e 10 μmol L1) simultaneously or four appropriately diluted synthetic biological fluid samples of urine and human serum (KN). **(b)** Analytical curve for ACP (linear regression equation: Δ*I*p (μA) = 0.039 + 1.1 × 105 *C*ACP (mol L−1) with a correlation coefficient of r = 0.999) and **(c)** COD (linear regression equation: Δ*I*p (μA) = 27 + 3.4 × 105 *C*COD (mol L−1) with a correlation coefficient of r = 0.999). Supporting electrolyte: 0.05 mol L1 H2SO4; injected volume 350.0 μL and flow rate: 3.8 mL min1.