Supporting Information

Electroanalytical characterization of clozapine at the electrified liquid-liquid interface and its detection in soft and hard drinks.

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1. Results and discussion

1.1. Interfacial properties of CZ at different scan rates

The interfacial ion transfer of clozapine (CZ) species (CZ^+ and CZ^{2+}) across the aqueous and the organic phases was studied with respect to its dependency on the scan rates. The CVs of 100 µM CZ in pH 2.0 recorded at different scan rates ranging from 10-35 mV s^{-1} are calibrated to the standard Galvani potential scale and presented in Fig S1. The ion transfer currents of both CZ^+ (a, and a'), and CZ^{2+}(b, and b') are sequentially increased with increasing scan rates. A plot of peak-to-peak separation (ΔE_p) plotted in a function of scan rate shows a linear relationship with intercepts at 0.053 and 0.035 V corresponding to the interfacial ion transfer of mono and dicationic CZ species, respectively (Fig. S1 B). A dependency between the ionic current and the square root of scan rates shows liner relationships with R^2 values in the range of 0.99 to 0.98. These findings have emphasised that the transfer of CZ species across the formulated eLLI is a diffusion-controlled process. The $\Delta^{aq}_{org}\phi^{'}_{CZ}$ of the mono and dicationic CZ species and other physiochemical paraments are tabulated as Table S1.

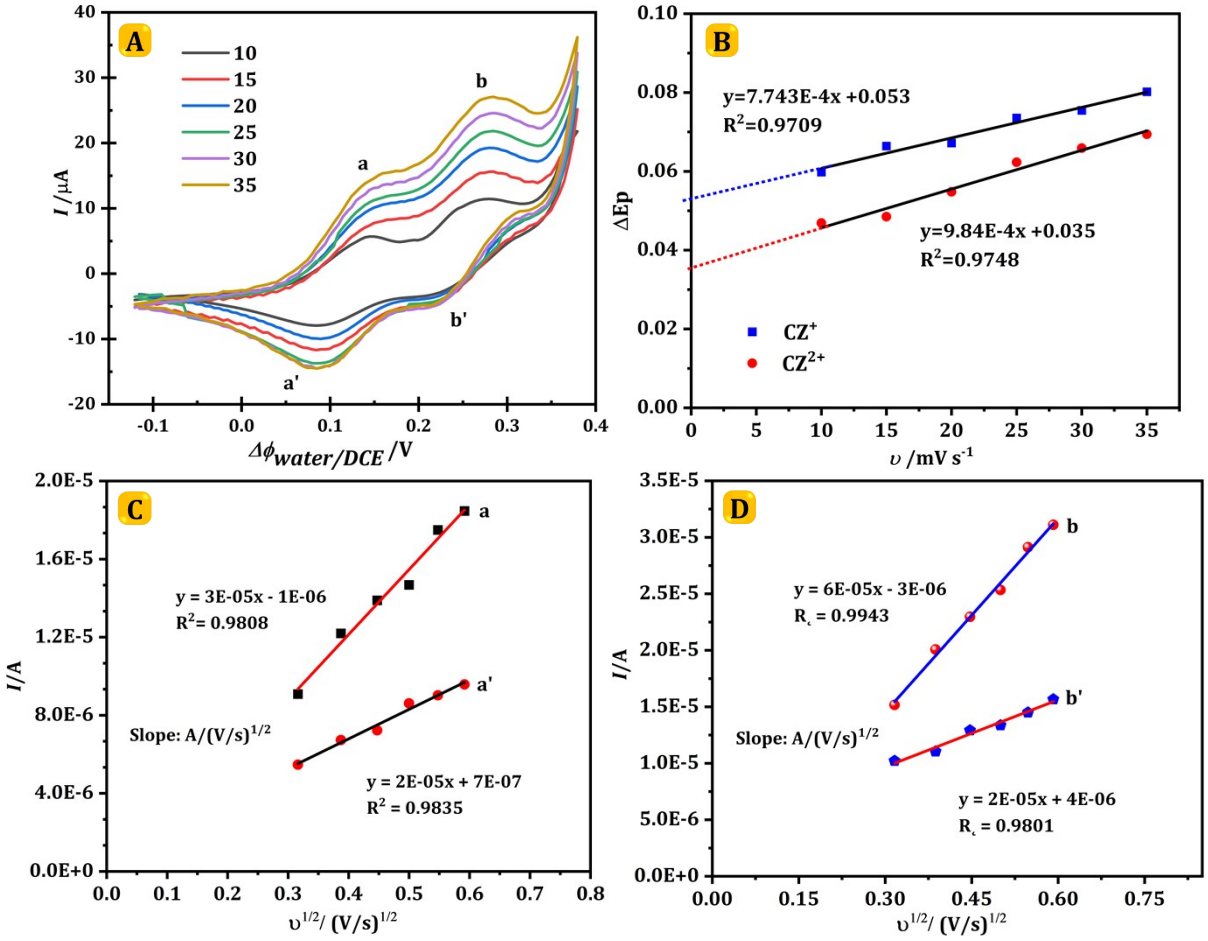

Figure S1: Ion transfer voltammograms of 100 μM CZ in pH 2.0 at variable scan rates of 10 to 35 mV s^{-1}(A), A plot of peak-to-peak separation (ΔE_p) against scan rates (B), and ionic current plotted in function of the square root from scan rate for CZ^{+} (C), and CZ^{2+} (D) species.

Table S1: Physiochemical properties of CZ species at formulated eLLI.

S. No	Species	$\Delta_{org}^{aq}\phi_{CZ}^{'}$(mV)	Slope (A/(v/s)$^{1/2}$)	R^2
1	CZ^{+}	124	$3x10^{-5}$, and $2x10^{-5}$	0.9808, and 0.9835
2	CZ^{2+}	275	$6x10^{-5}$, and $2x10^{-5}$	0.9943, and 0.9801

1.2. Screening of CZ spiked in hard and soft drinks

The analytical parameters of the eLLI systems made of different real samples are assessed by recording the CVs of the system with increasing concentrations of CZ. Typically, CVs are recorded for an increasing concentration of CZ (60-180 μM) at eLLI formulated with beverage samples replacing the aqueous phase of the system and acidified to pH 2.0, at a scan rate of 20 mV s^{-1}. In the case of apple juice formulated eLLI the CVs are recorded at preoptimized conditions of pH 6.0 with scan rates remaining at 20 mV s^{-1}. The CVs obtained at each beverage formulated eLLI systems with increasing CZ concentrations and their corresponding calibration plots are presented in Fig S2. The analytical parameters such as LDR, LOD, LOQ, and sensitivity of each real sample formulated eLLI systems are calculated and presented in Table S2.

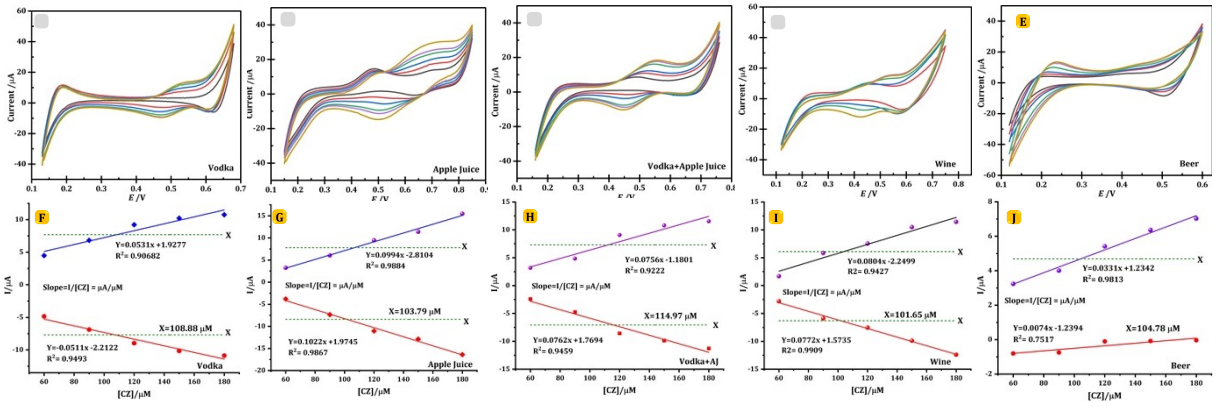

Figure S2: Ion transfer voltammograms recorded for vodka (A) apple juice (B) vodka with apple juice (C), Wine (D), and Beer (E) formulated eLLI with increasing concentration of CZ in the range of 60-180 μM. Calibration plots for vodka (F) apple juice (G), vodka with apple juice (H), Wine (I), and Beer (J) are given below the corresponding set of CVs. All the CVs are recorded at a scan rate of 20 mV s^{-1}. The pH of vodka (A), vodka with apple juice (C), Wine (D), and Beer (E) formulated eLLI samples was set to pH 2.0. Meanwhile, the CVs of apple juice(B) formulated eLLI are recorded at pH 6.0.

Table S2: Analytical parameters of CZ sensor obtained at eLLI made of soft and hard drink samples.

S. No	Parameter	Vodka	Apple Juice	Vodka +AJ	Wine	Beer
1	LDR (μM)	60-180	60-180	60-180	60-180	60-180
2	LOD (μM)	18	14	17	21	26
3	LOQ (μM)	32	27	29	36	44
4	Sensitivity (A/M)	0.053	0.099	0.075	0.080	0.033

The CVs recorded in the absence and presence of 100 μM CZ at eLLI made of wine and beer are presented in Fig S3.

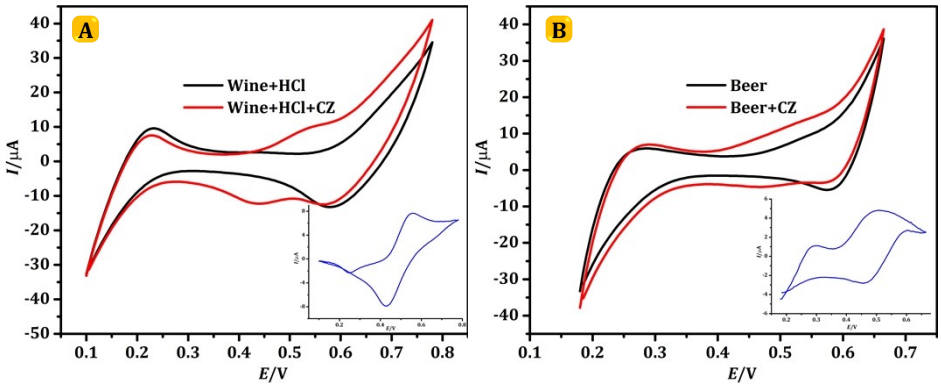

Figure S3: CVs recoded in the absence and presence of 100 μM CZ at eLLI made of wine and beer samples at pH 2.0.(Insets: voltammograms after background or capacitive current subtraction).

The analytical performance of the eLLI-formulated CZ sensor is compared with that of other rapid screening platforms and the analytical parameters are presented in Table S3.

The CVs recorded at various pH (2.0 to 9.0) calibrated to $\Delta_{org}^{aq}\phi_{CZ}^{'}$ is presented as Fig S4.

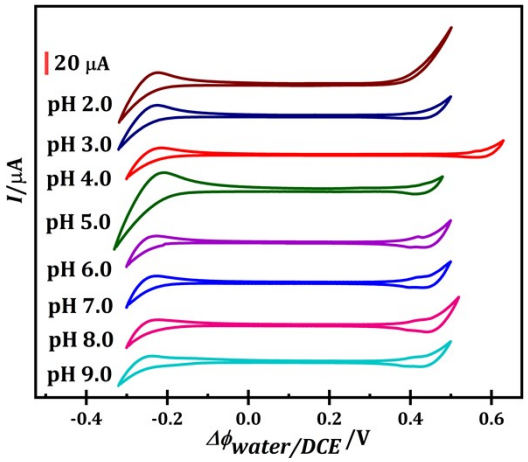

Figure S4: The CVs recorded at BRB with variable pH from 2.0 to pH 9.0 at the scan rate of 20 mV s^{-1}.

Table S3: Comparing the analytical performance of eLLI-based CZ sensors with other rapid sensing platforms.

S. No	Probe	LDR	LOD	LOQ	REF
1	μFSE	0.5- 10 μM	24 nM	-	[1]
2	Fe_3O_4/ β-alanine/Pd/GCE	3-70 nM	1.53 nM	-	[2]
3	CRE-SERS	2-20 μM	0.4 μM	-	[3]
4	PANI/GCE	18 μM -10mM	2 μM	-	[4]
5	PPy/SDS/CF	5-50 μM	6 μM	-	[5]
6	Ru-TiO_2	0.9-40 μM	43 nM	-	[6]
7	PVC-MSE	10 μM -10mM	3.7 μM	-	[7]
8	eLLI (10 % EtOH aq.)	15-150 μM	1 μM	18 μM	This work

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