Multi-walled carbon nanotube-based magnetic molecularly imprinted polymer as a highly selective sorbent for ultrasonic-assisted dispersive solid-phase microextraction of sotalol in biological fluids

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Figure captions:

Fig. S1. Chemical structures of (A) nadolol, (B) atenolol, (C) propranolol and (D) sotalol.

Fig. S2. Chemical structures of (A) N,N-dimethylformamide (DMF), (B) acrylamide (AM), (C) 2,2'-azoisobutyronitrile (AIBN), (D) acetic acid, and (E) ethylene glycol dimethacrylate (EGDMA).

Fig. S3. Nitrogen adsorption-desorption isotherms and the corresponding pore size distribution of synthesized MWCNT-MMIPs.

Fig. S4. Magnetization curves of (A) Fe_3O_4 and (B) MWCNT-MMIPs at 25°C.

Fig. S5. Effect of elute solvent on the adsorption of SOT using MWCNT-MMIPs and MWCNT-MNIPs.

Fig. S6. Pareto chart of the effects of seven variables on yield of ER%. Variables with t–values higher than the critical value (2.77) are regarded as statistically significant.
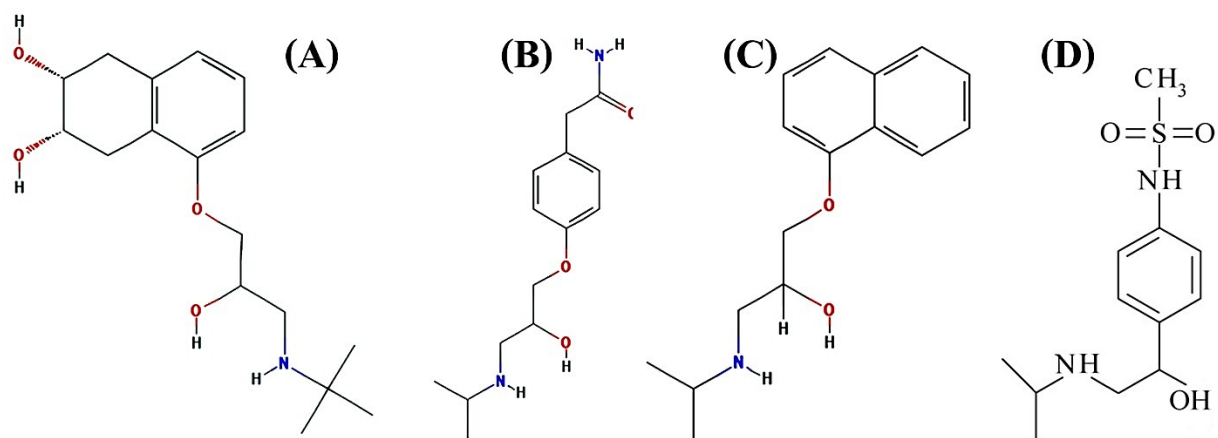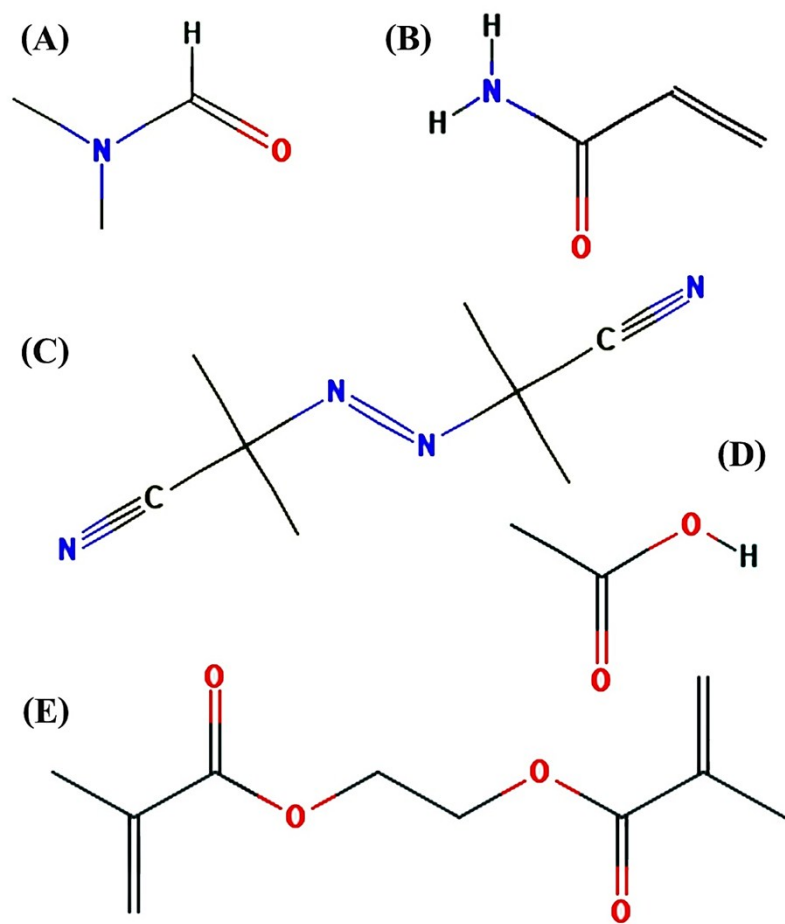
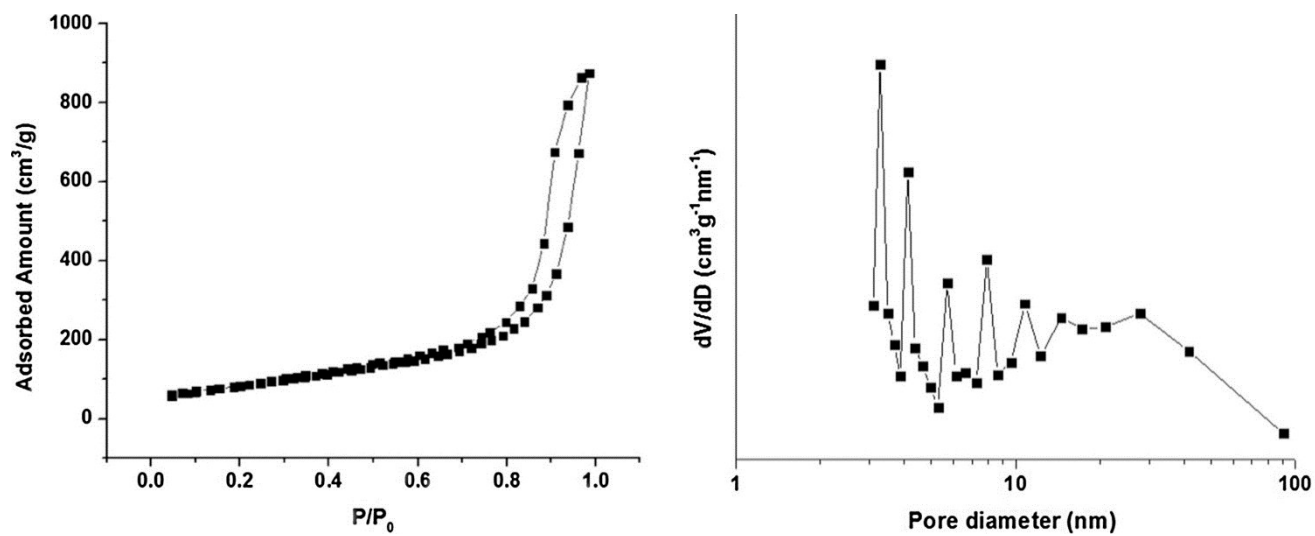**Fig. S7.** Reusability results of MWCNT-MMIPs.

Fig. S1.

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(A)
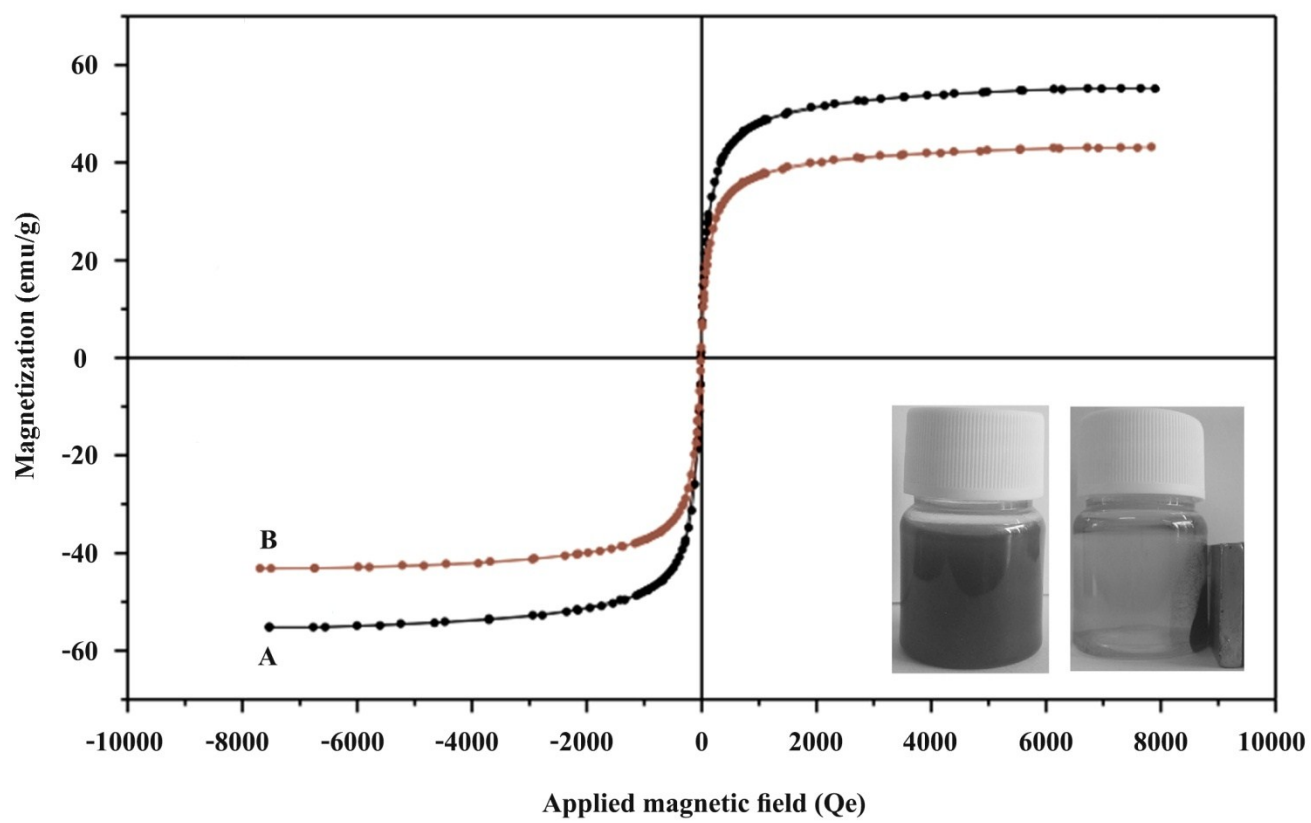
(B)

(C)

(D)

(E)

Fig. S2.

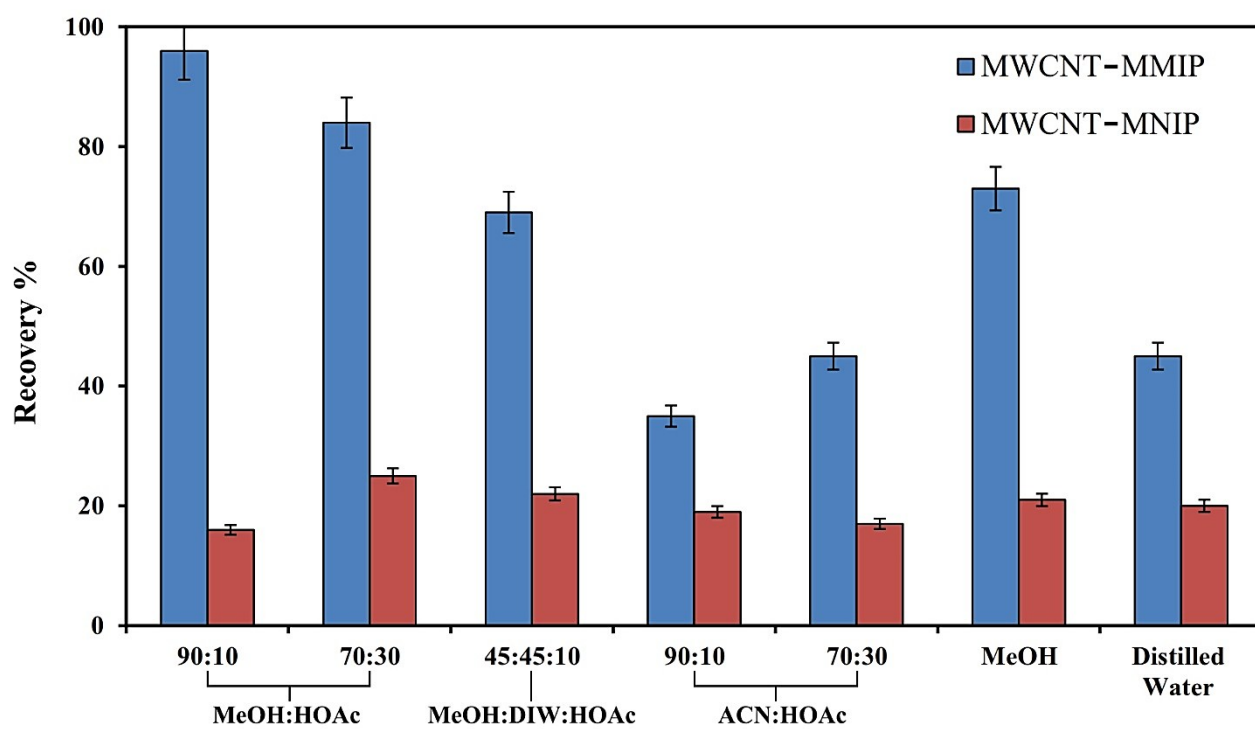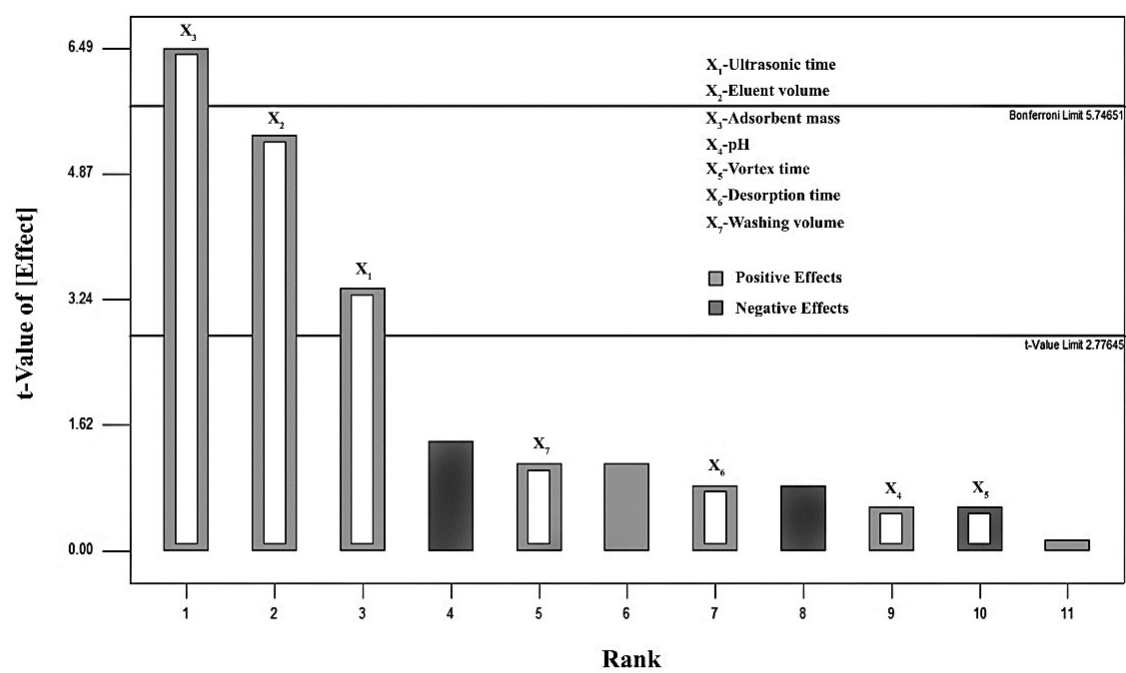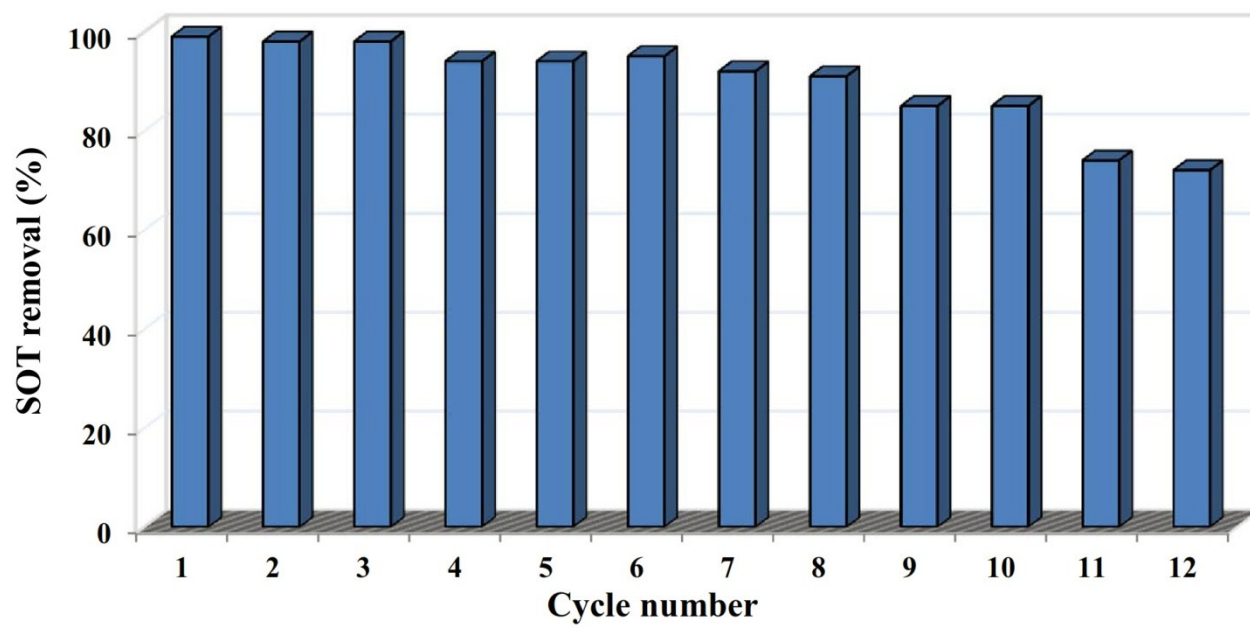**Fig. S3.**

Fig. S4.

Fig. S5.

Fig. S6.

Fig. S7.

Table S1. Plackett–Burman design for evaluating variables influencing determination of SOT by MWCNT-MMIPs with coded values along with the observed result.

Factors	Coded levels	
	Low (–1)	High (+1)
X_1–Ultrasonic time (min)	2	6
X_2–Eluent volume (mL)	5	10
X_3–Adsorbent mass (mg)	10	20
X_4– pH	4	10
X_5–Vortex time (min)	2	4
X_6–Desorption time (min)	10	30
X_7–Washing volume (mL)	10	20

Run	Factors							Response
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	ER%
1	+1	+1	-1	+1	+1	+1	-1	76.12
2	-1	+1	+1	-1	+1	+1	+1	87.50
3	+1	-1	+1	+1	-1	+1	+1	79.45
4	-1	+1	-1	+1	+1	-1	+1	63.33
5	-1	-1	+1	-1	+1	+1	-1	64.75
6	-1	-1	-1	+1	-1	+1	+1	60.10
7	+1	-1	-1	-1	+1	-1	+1	62.45
8	+1	+1	-1	-1	-1	+1	-1	73.50
9	+1	+1	+1	-1	-1	-1	+1	90.10
10	-1	+1	+1	+1	-1	-1	-1	82.30
11	+1	-1	+1	+1	+1	-1	-1	77.55
12	-1	-1	-1	-1	-1	-1	-1	53.05

Table S2. Effect of the molar ratio of the template molecule/functional monomer/cross-linker agent on the performance of the MWCNT-MMIPs and MWCNT-MNIPs.

Polymer	SOT/AM/EGDMA (molar ratio)	$Q_{MWCNT-MMIPs}$ (mg/g)	$Q_{MWCNT-MNIPs}$ (mg/g)	$Q_{MWCNT-MMIPs}/Q_{MWCNT-MNIPs}$
Polymer 1	1/1/5	21.15	10.17	2.07
Polymer 2	1/2/10	24.70	11.38	2.17
Polymer 3	1/3/15	29.08	12.25	2.37
Polymer 4	1/4/20	31.93	12.72	2.51
Polymer 5	1/3/20	27.69	11.86	2.33
Polymer 6	1/4/30	29.51	12.21	2.40

Table S3. The linearity range, calibration curves (six selected concentrations and three replicates), LOD and LOQ in standard, urine and plasma samples by the MWCNT-MMIPs.

Data	External calibration	In urine calibration	In plasma calibration
Liner range (µg/mL)	0.001-2	0.001-2	0.001-2
Regression equation	A=0.0061+0.0187C	A=0.0083+0.0195C	A=0.0105+0.0180C
Correlation coefficient	0.9967	0.9961	0.9950
LOD (ng/mL)	0.31	0.32	0.34
LOQ (ng/mL)	1.03	1.07	1.13