

Supplementary Materials

Synthesis of Surface Dual-template molecularly imprinted silica nanoparticles for extraction of Ciprofloxacin and Norfloxacin

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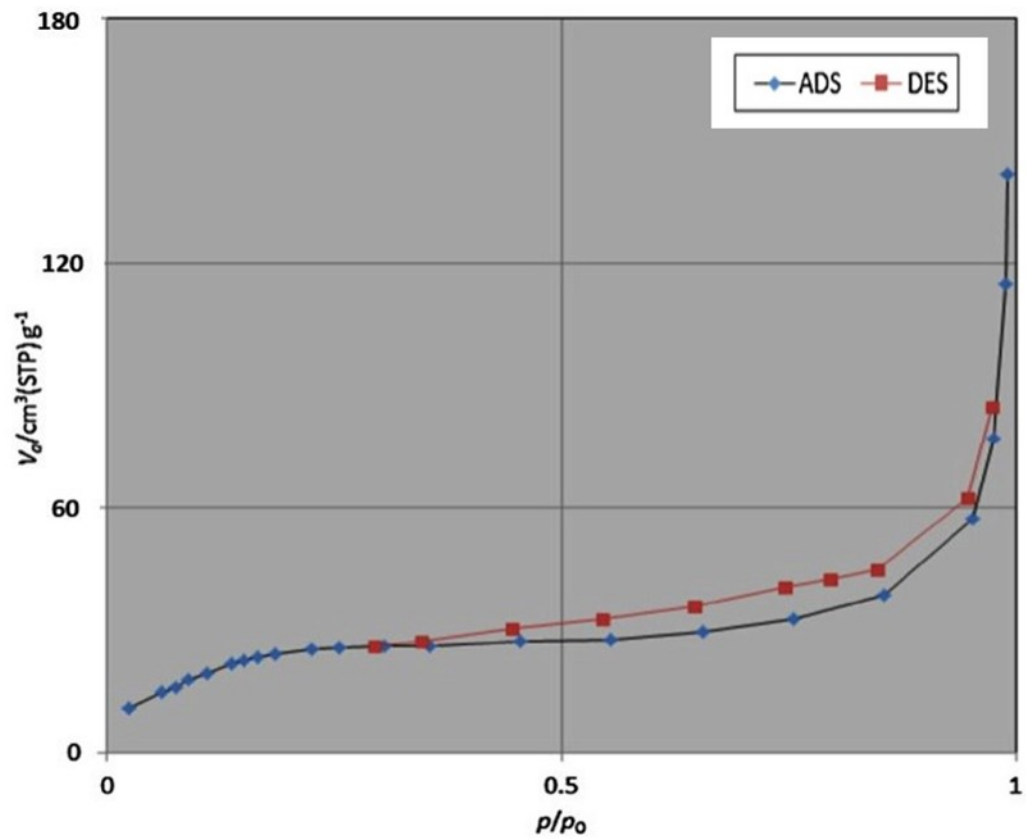


Figure (S1) N_2 adsorption/desorption isotherm of GQDs@MI-SiNPs.

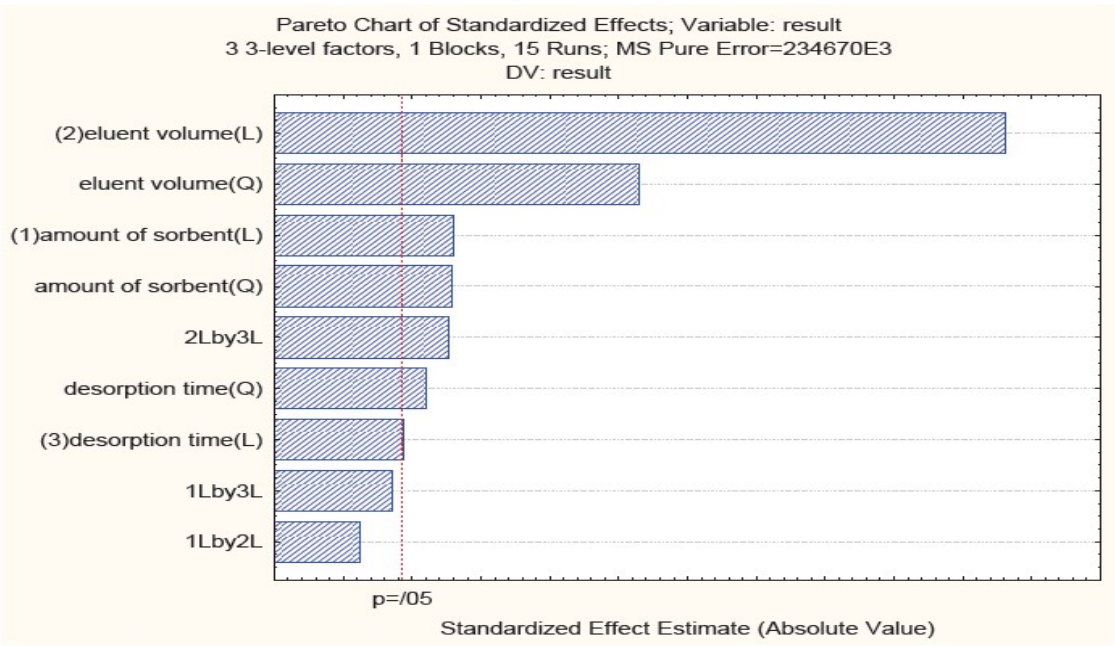


Figure (S2) Pareto chart of the main effects

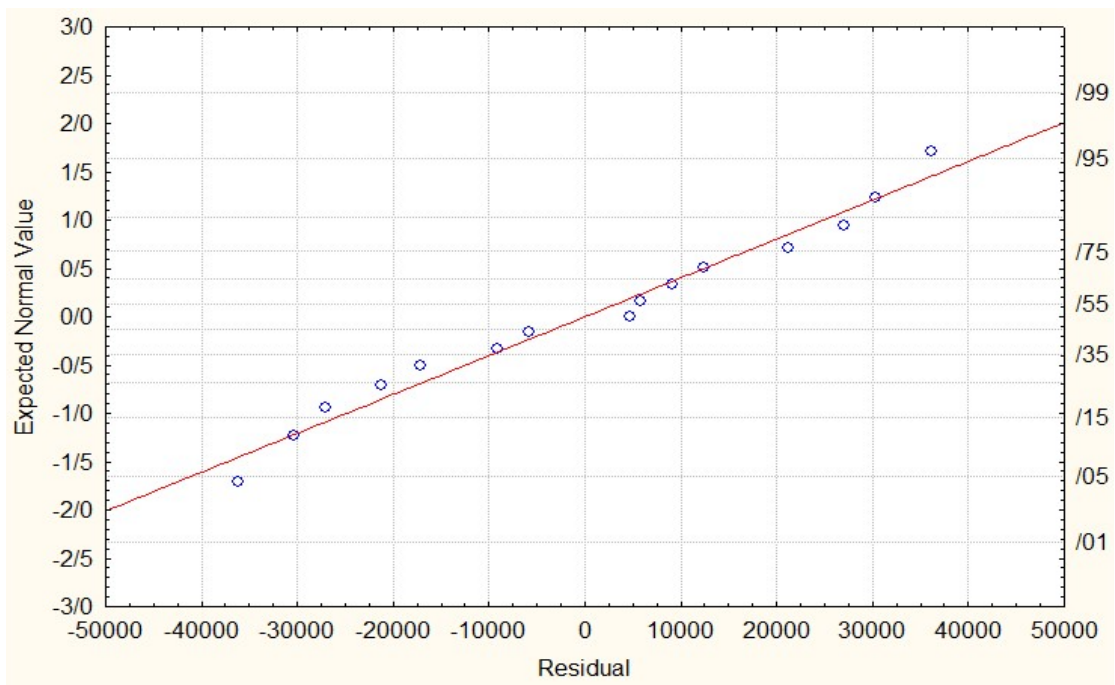


Figure (S3) Normal probability plot of residuals for the extraction of target analytes

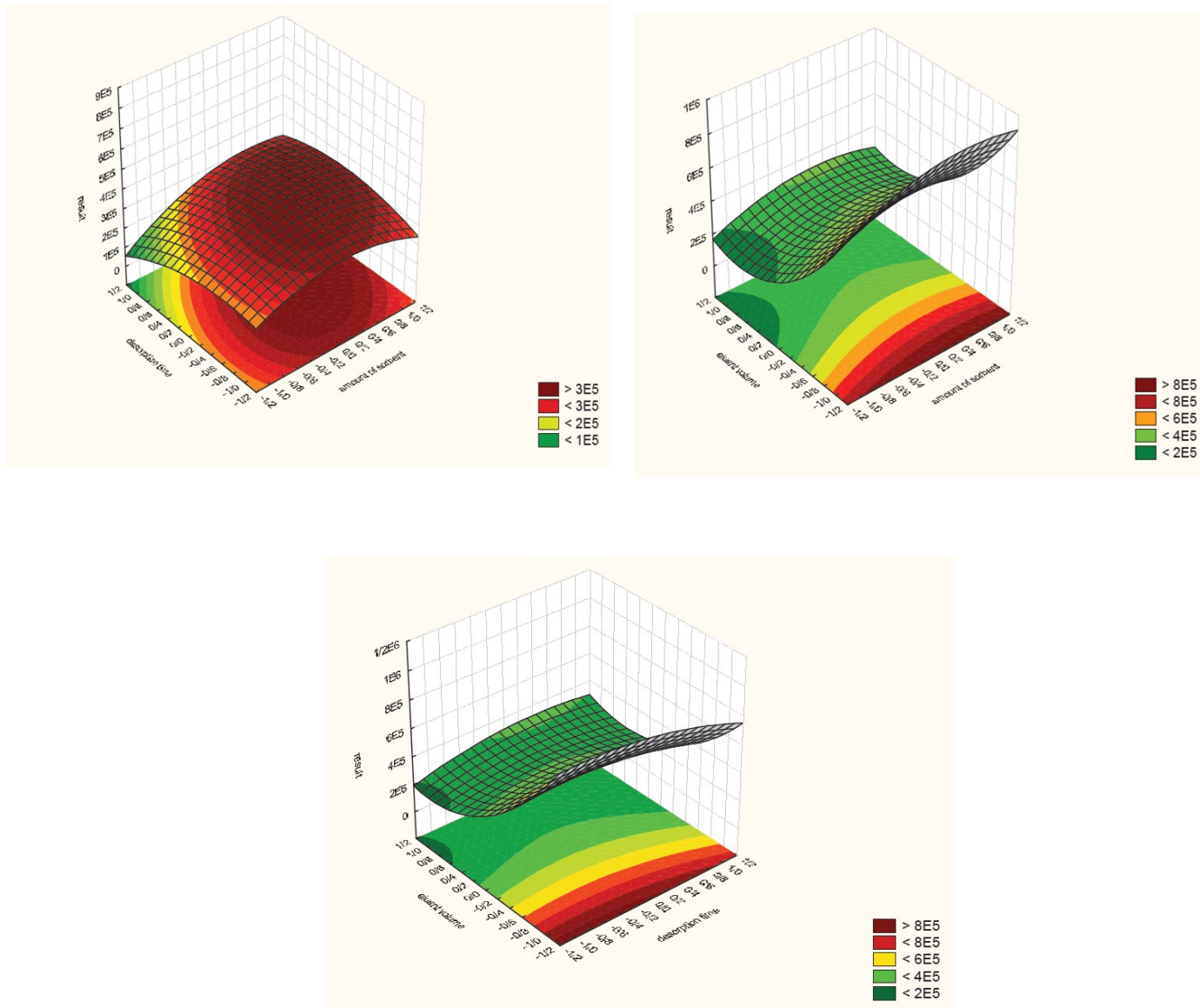


Figure (S4) 3D plots of significant factors (X₁: amount of sorbent (mg), X₂: eluent volume (μL), and X₃: desorption time (min)).

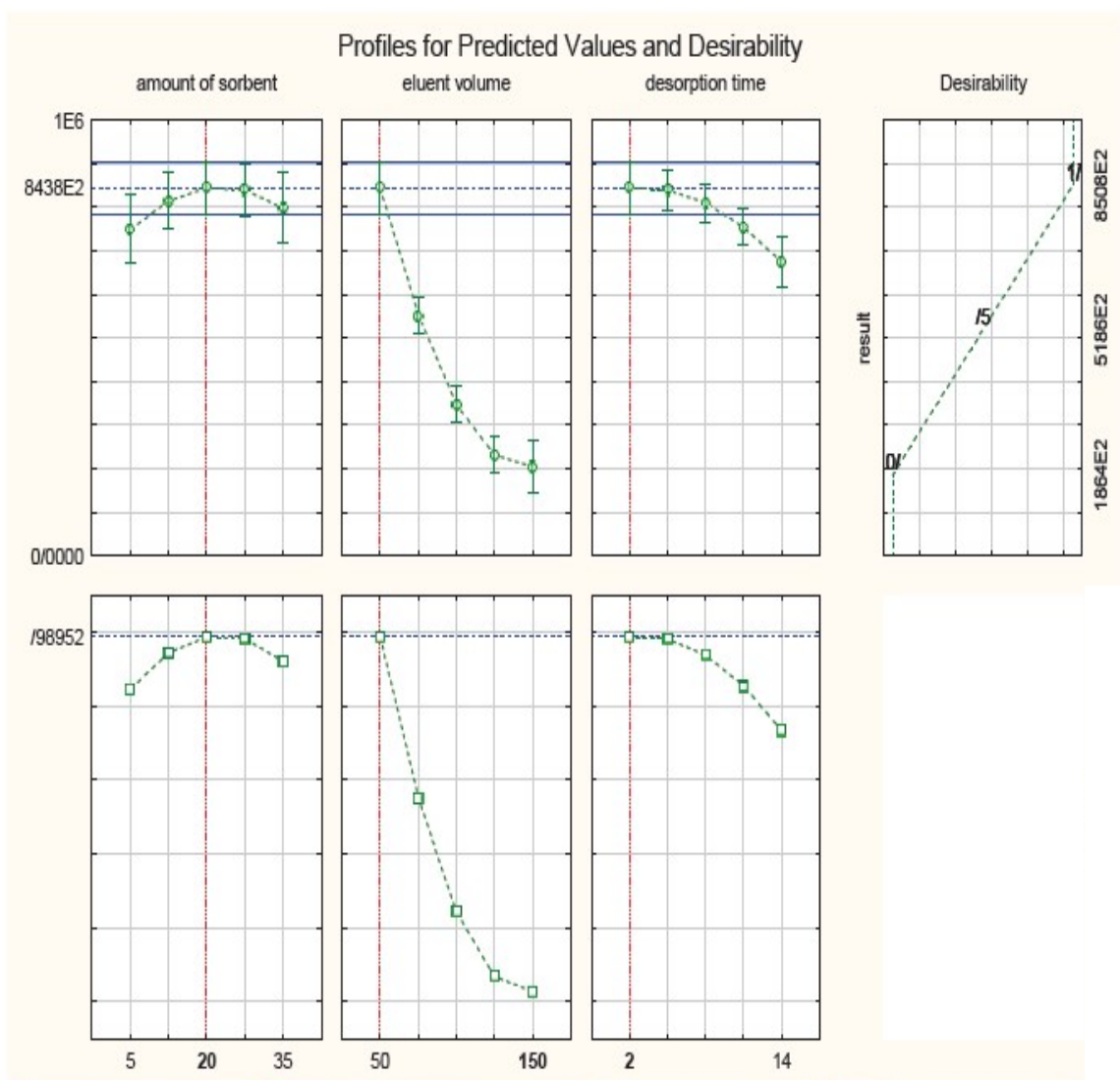


Figure (S5) Profiles for predicted values and desirability function.

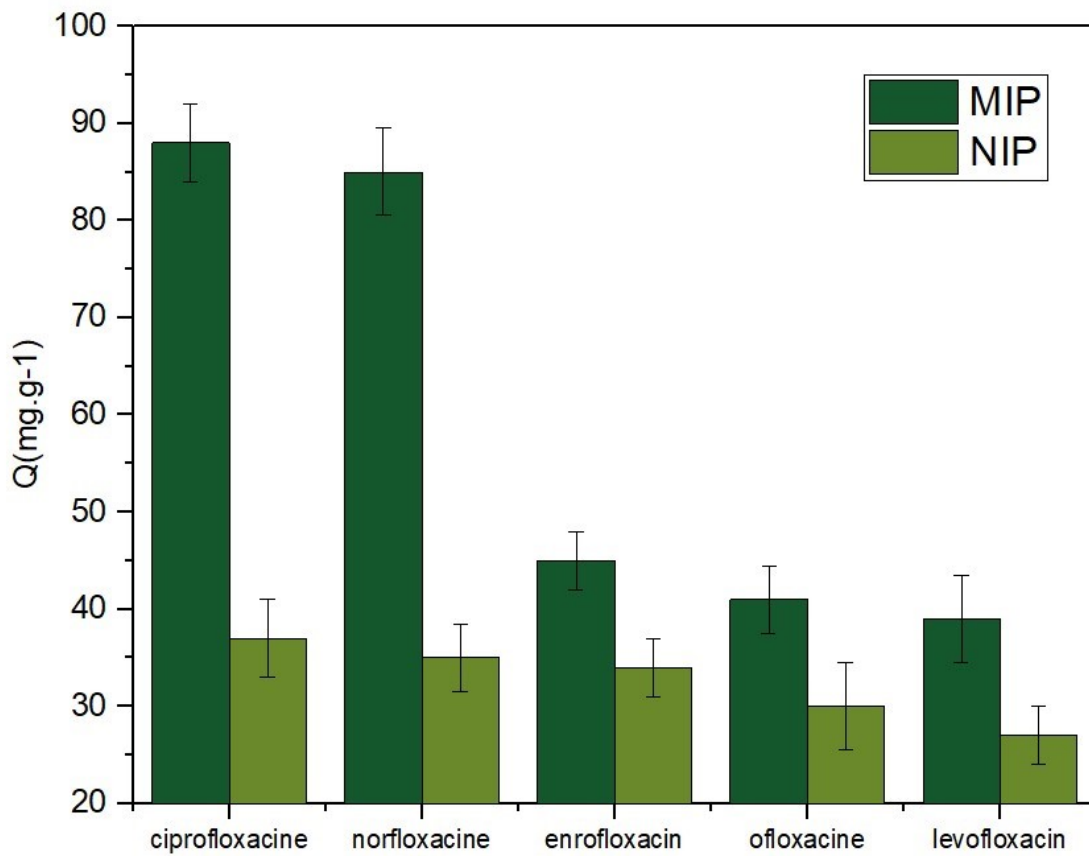


Figure (S6) Selectivity of GQDs@MI-SiNPs and GQDs@NI-SiNPs

Table S1 Factors, actual and coded levels, and design matrix used in BBD for the extraction of CIP and NOR.

Factors	Levels			
	Low (-1)	Central (0)	High (+1)	
(X ₁) amount of sorbent (mg)	5	20	35	
(X ₂) eluent volume (μL)	50	100	150	
(X ₃) desorption time (min)	2	8	14	
Run	X ₁	X ₂	X ₃	Average peak area
1(CP) ^a	0	0	0	388748
2	1	-1	0	787790
3	-1	1	0	186418
4	-1	0	-1	231744
5	1	0	-1	298420
6	0	0	1	278023
7	1	0	1	351817
8	1	1	0	235044
9	0	1	-1	225205
10	0	-1	1	659422
11	-1	-1	0	700420
12(CP) ^a	0	0	0	380953
13(CP) ^a	0	0	0	359191
14	0	1	1	269429
15	0	-1	-1	850762

^aCentral point

Table S2 ANOVA results obtained by BBD.

Factors	Sum of Square (SS)	Degree of Freedom (DF)	Mean Square (MS)	F-value	p-value
X ₁ (L+Q)	2.984156E+10	2	2.984156E+10	127.164	0.030743
X ₂ (L+Q)	6.497235 E+11	2	6.497235 E+11	2768.672	0.002604
X ₃ (L+Q)	12.959636 E+09	2	12.959636 E+09	55.225	0.075489
X ₁ ×X ₂	5.049595 E+09	1	5.049595 E+09	1.599	0.333431
X ₁ ×X ₃	4.035426 E+07	1	4.035426 E+07	12.455	0.71755
X ₂ ×X ₃	1.163054 E+08	1	1.163054 E+08	59.115	0.016499
Lack of Fit	2.500669 E+09	3	1.616652 E+09	6.889	0.129386
Pure Error	6.627224 E+07	2	2.346698 E+08		
Total SS	5.06710 E+10	14			
R-squared	0.9922				
R-adjusted	0.9783				

^aL (linear); Q (quadratic)

Table (S3) Results from the determination of intra- and inter-day RSDs and accuracy.

Analyte	Linearity			Precision (RSD%, n=3)					
	Linear range (µg. L ⁻¹)	R ²	LOD (µg. L ⁻¹)	Intra-day			Inter-day		
				Spiking level (µg. L ⁻¹)					
				10	50	200	10	50	200
Recovery% (RSD%)									
CIP	0.5-300	0.994	0.13	97.8 (3.6)	97.4 (4.1)	101.1 (3.8)	99.3 (2.1)	97.3 (3.3)	102.6 (2.4)
NOR	0.5-300	0.998	0.38	98.1 (2.7)	103.4 (3.9)	96.5 (2.9)	98.7 (3.0)	98.9 (2.8)	97.8 (3.9)