Electronic Supplementary Material (ESI) for Analyst.

Supporting Information (SI)

Electrochemical Sensing of Pioglitazone Hydrochloride on N-doped r-GO Modified Commercial Electrodes

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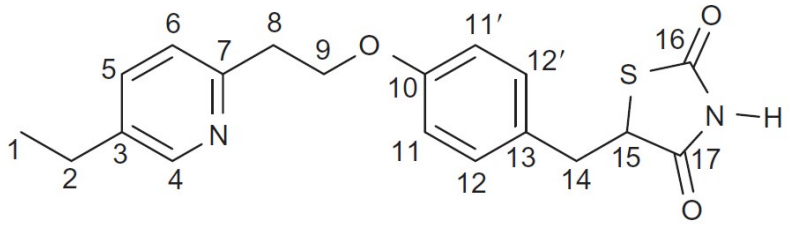
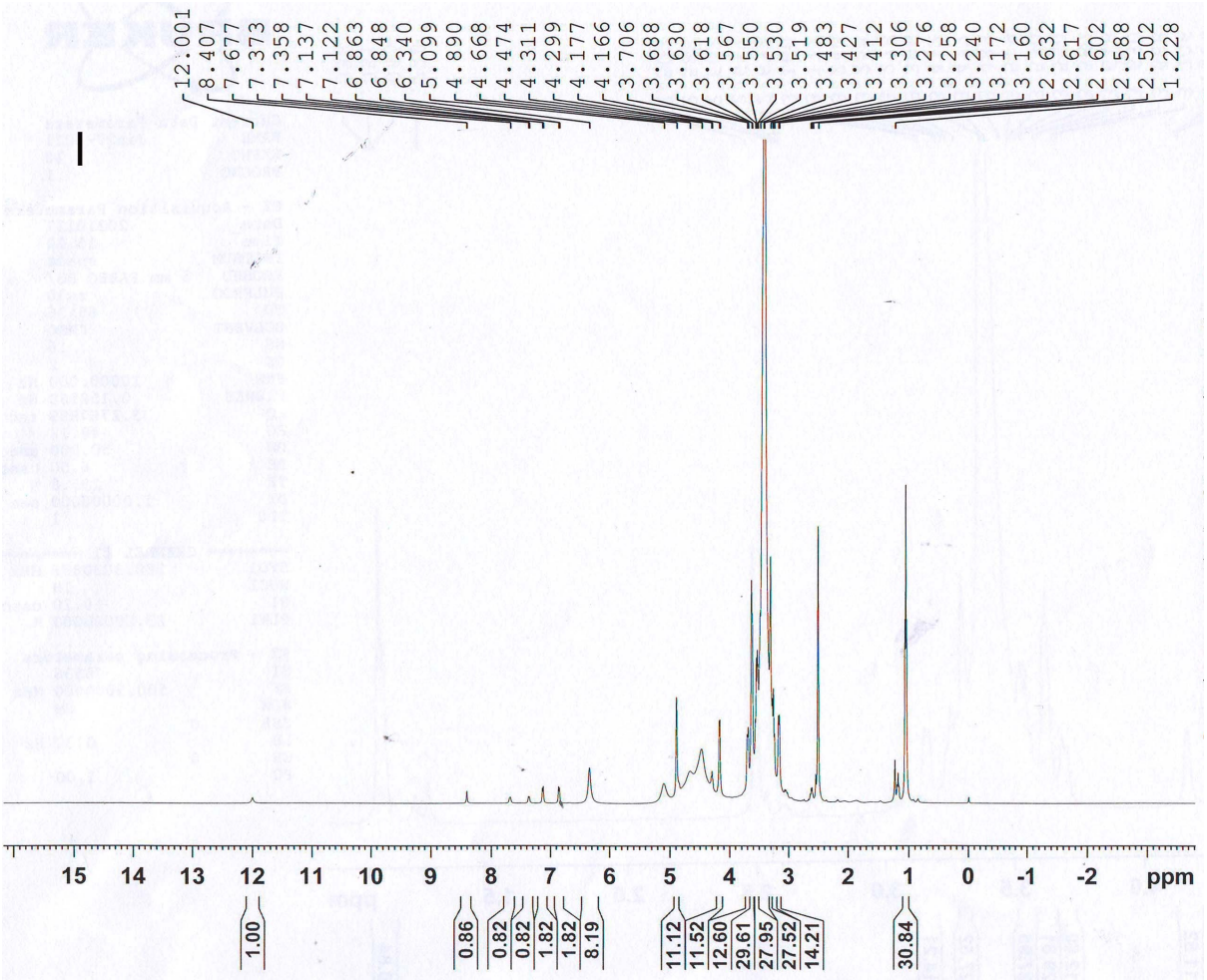


Pioglitazone



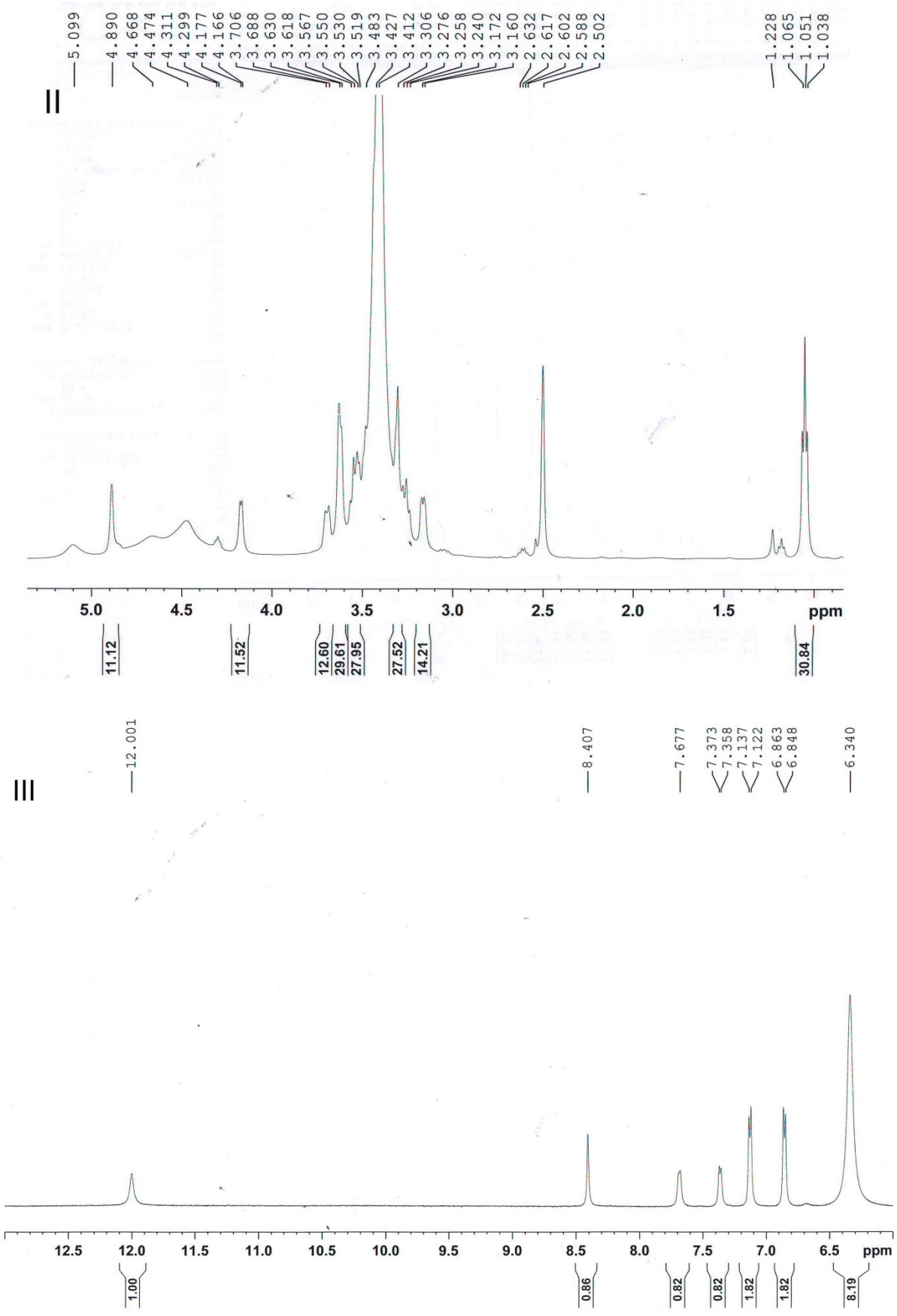


Figure S1: 1HNMR of PIOZ hydrochloride (I) full scan, (II) zoom view from chemical shift, δ=1 to 5.0 and (III) zoom view from δ=6.0 to 13.0 in DMSO.

Table S1: XPS results for different functionalities.

Peak characteristics		C1s					O1s				N1s			
		C-OH	C=C	C-C	C-O-C	COOH	Quinones	C=O	C-O	O-H	Pyridinic N	Pyrrolic N	Quaternary N	Pyridinic oxide N
GO	Peak-position	282.57	284.11	284.89	286.39	288.13	529.91	530.71	531.6	533.57	-	-	-	-
	FWHM	1.58	1.3	1.41	1.85	2.08	1.16	1.2	1.39	2.36	-	-	-	-
	Area	103922.3	36850.2	149139.9	83506.9	39464.9	95859.8	160447.3	81658.1	102579.8	-	-	-	-
	% area	25.18	8.92	36.12	20.22	9.56	21.76	36.42	18.54	23.28				
Nr-GO	Peak-position	-	284.83	285.77 (C-N)	286.88	289.24	530.64	531.43	532.37	533.39	399.27	400.76	401.43	404.94
	FWHM	-	0.79	1.0	0.97	1.71	0.85	1.25	1.07	1.5	1.56	1.39	1.02	1.74
	Area	-	320092.8	74985.5	32360.3	32578.7	20450.8	61022.6	36577.41	100237.1	5272.8	4357.9	2063.1	1406.8
	% area	-	69.58	16.30	7.02	7.10	9.38	27.95	16.75	45.92	40.25	33.26	15.75	10.74
Nr-GO + PIOZ	Peak-position	-	-	-	-	-	-	-	-	-	398.40	399.00	400.14	403.24
	FWHM	-	-	-	-	-	-	-	-	-	1.31	1.02	1.91	2.14
	Area	-	-	-	-	-	-	-	-	-	13705.1	5956.0	5929.6	3494.1
	% area	-	-	-	-	-	-	-	-	-	47.12	20.48	20.38	12.02

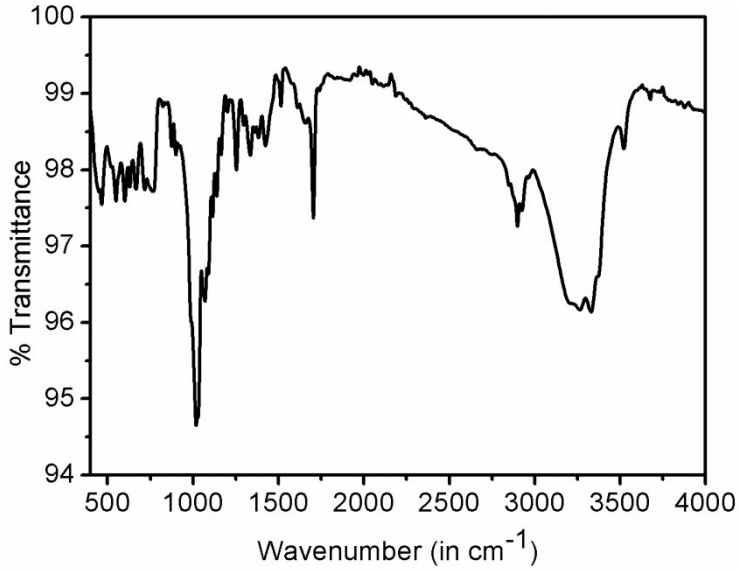


Figure S2: FTIR of PIOZ drug.

Table S2: FTIR band assignments of PIOZ drug.

Wavenumber (in cm^{-1})	**Appearance**	**Assignments**
3529	Sharp	O-H stretching
3329	Medium	N-H (secondary amine)
3263	Weak	O-H stretching (alcohol)
2900	Sharp	C-H stretching (aliphatic group)
1710	Sharp	C=Ostretching (secondary amide)
1518	Sharp	C=N stretching (pyridine moiety)
1429	Medium	$=CH_2$ bending (methylene group)
1260	Strong	C-O stretching (alkyl-aryl ether moiety)
1023	Strong	C-O stretching (primary alcohol)
772	Strong	C-H bending (monosaturated)
671	Strong	C-S stretching
592, 543, 466	Medium	O-M stretching (M=Metal)

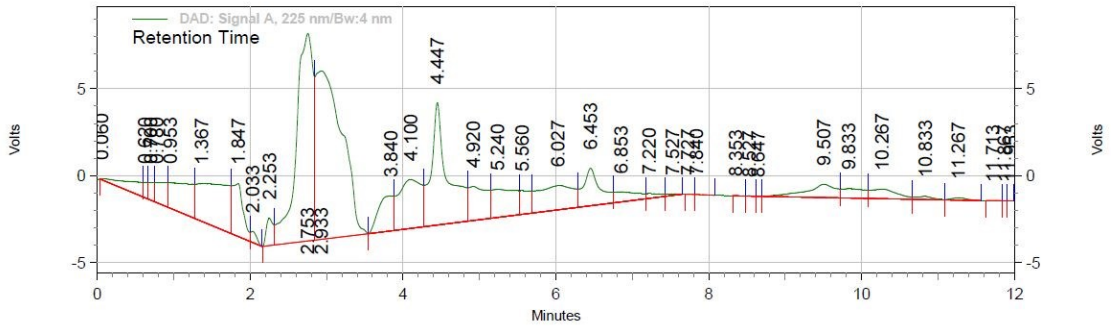


Figure S3: HPLC chromatogram in methanol without PIOZ drug

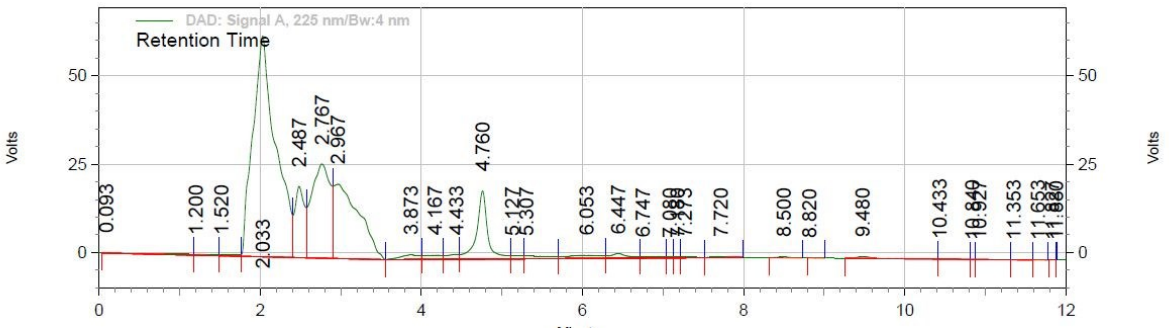


Figure S4: HPLC chromatogram in methanol with10 µM PIOZ drug

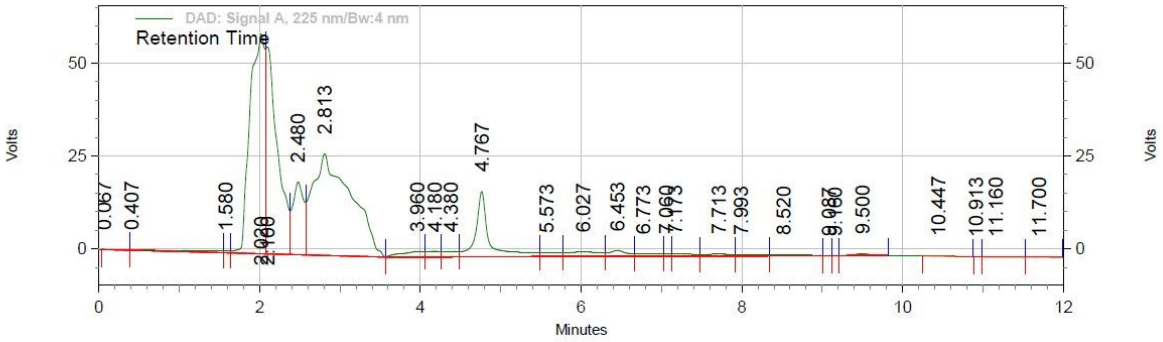


Figure S5: HPLC chromatogram in methanol with 15 µM PIOZ drug

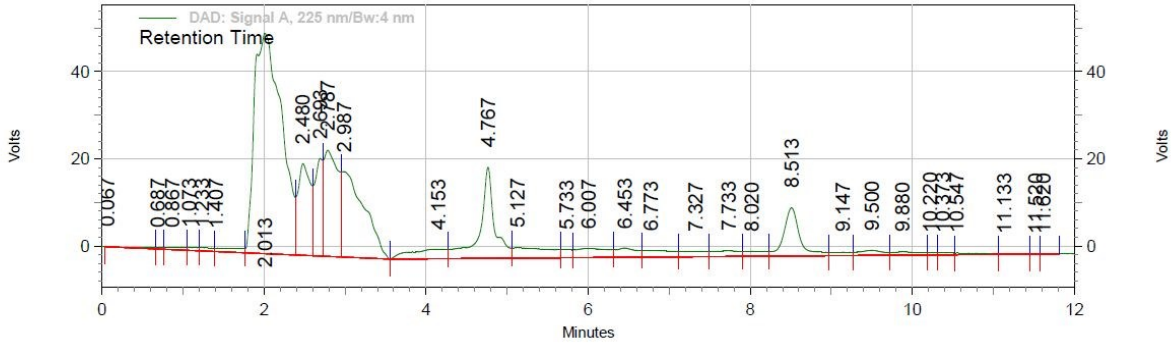


Figure S6: HPLC chromatogram in methanol with 30 µM PIOZ drug

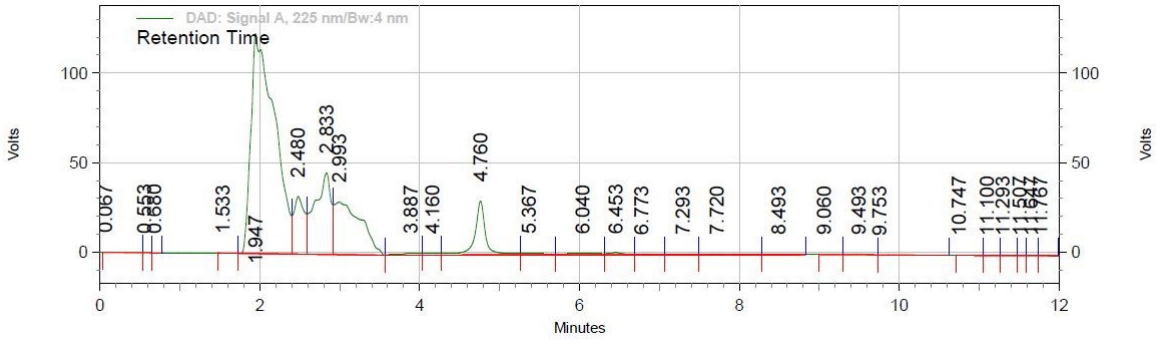


Figure S7: HPLC chromatogram in methanol with 40 µM PIOZ drug

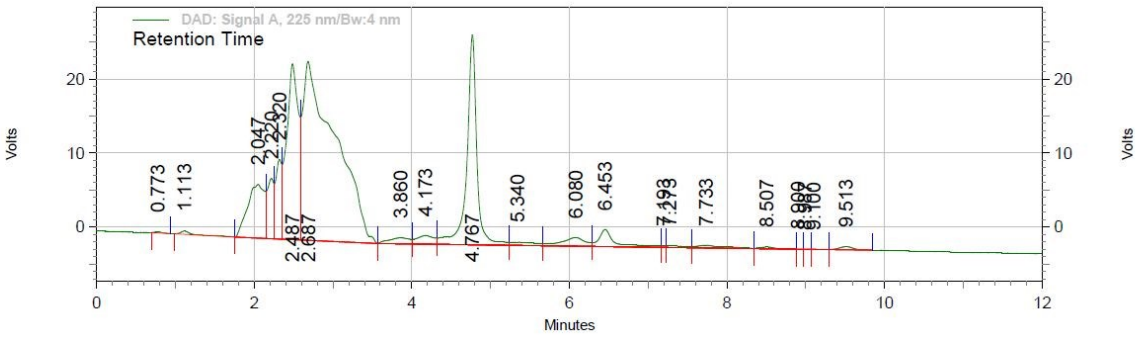


Figure S8: HPLC chromatogram in methanol with unknown sample of PIOZ drug

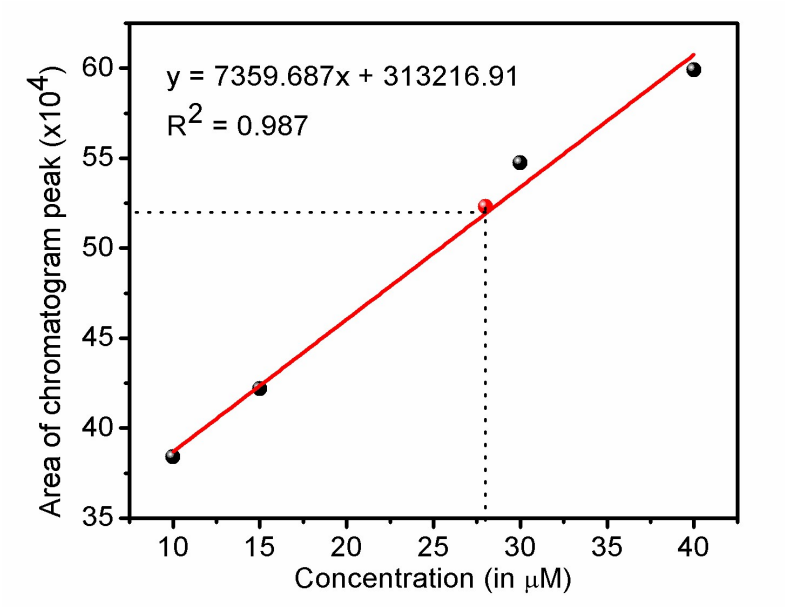


Figure S9: Linear relationship between concentration of PIOZ and Area of chromatogram obtained from HPLC method

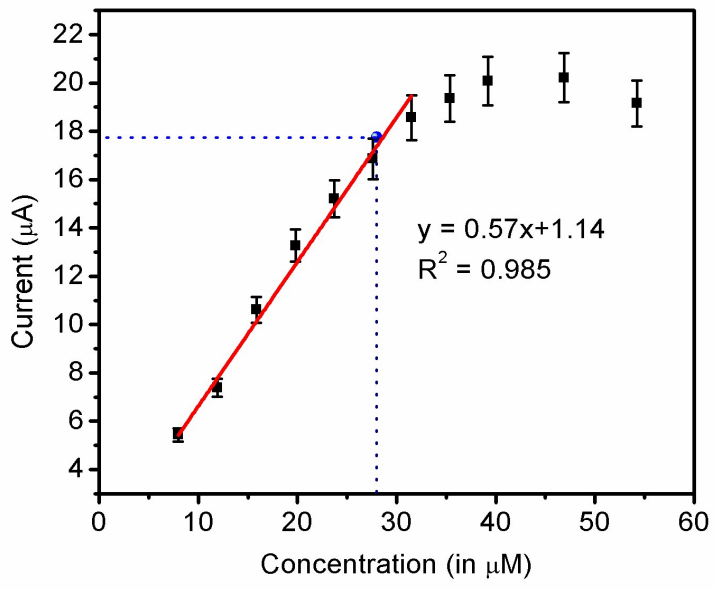


Figure S10: Linear relationship between concentration of PIOZ and oxidation peak current obtained from Electrochemical method on GCE (same calibration shown in Figure 5 Inset)

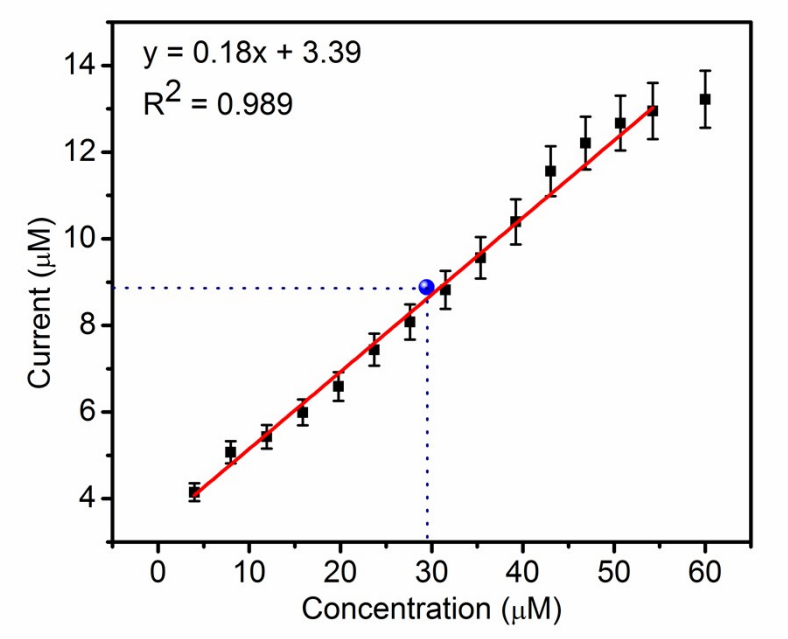


Figure S11: Linear relationship between concentration of PIOZ and oxidation peak current obtained from Electrochemical method on SPGE (same calibration shown in Figure 6B)