Supporting Information

Manuscript title

Glutathione-S-Transferase catalyzed reaction of glutathione for electrochemical biosensing of Temephos, Fenobucarb and Dimethoate

Authors

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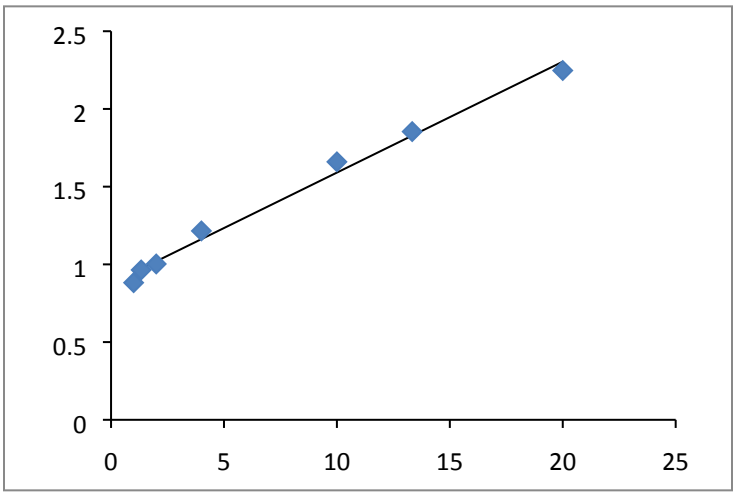
K_m and V_{max} for GSH-CDNB-GST (without inhibitor):



K_m = slope/intercept= 0.071/0.876 = 0.08

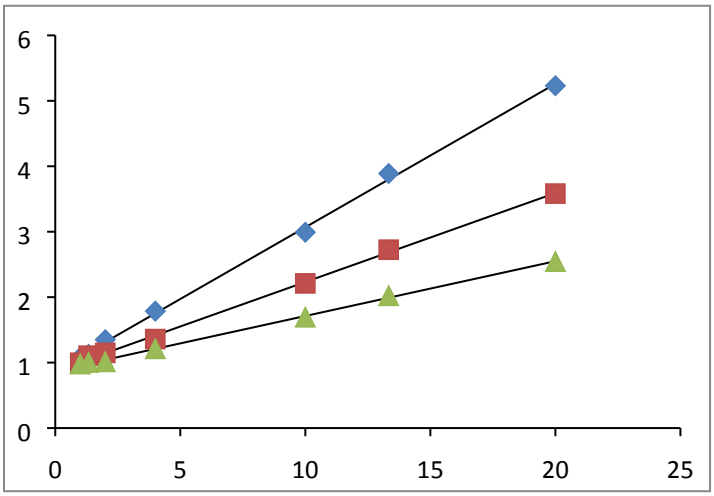
V_{max} = K_m/slope = 0.08/0.071 =1.14

K_i calculation for Fenobucarb:

K_m 60 ppb= 0.219/0.875 = 0.2502 V_{max} = 0.2502/0.219 = 1.14

K_m 50 ppb= 0.135/0.872 = 0.1548 V_{max} = 0.1548/0.135= 1.14

K_m 40ppb = 0.083/0.875= 0.0948 V_{max} = 0.0948/0.083= 1.14



K_m (inhibitor) / K_m (without inhibitor) vs [I] = Slope = $1/K_i$

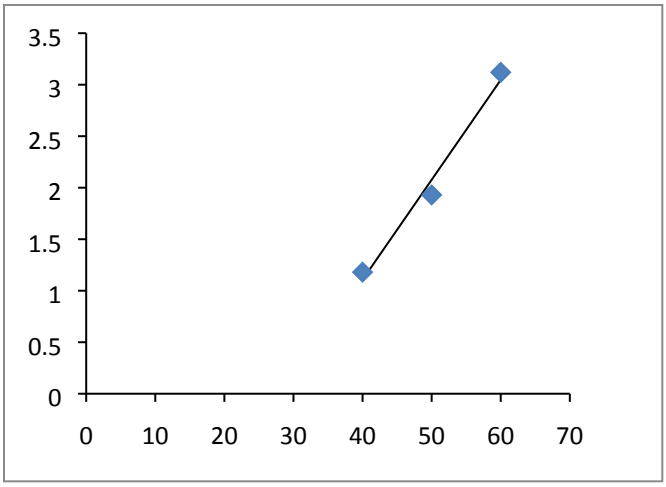
K_m (without inhibitor) = 0.08

$K_{60\ ppb}/K_m$= 0.2502/0.08 = 3.12

$K_{50\ ppb}/K_m$ = 0.1548/0.08= 1.93

K_{40ppb}/K_m = 0.0948/ 0.08= 1.18

Concentration of fenobucarb	K_m value for each concentration
60 ppb	3.12
50 ppb	1.93
40 ppb	1.18



Slope = $1/K_i = 0.097$

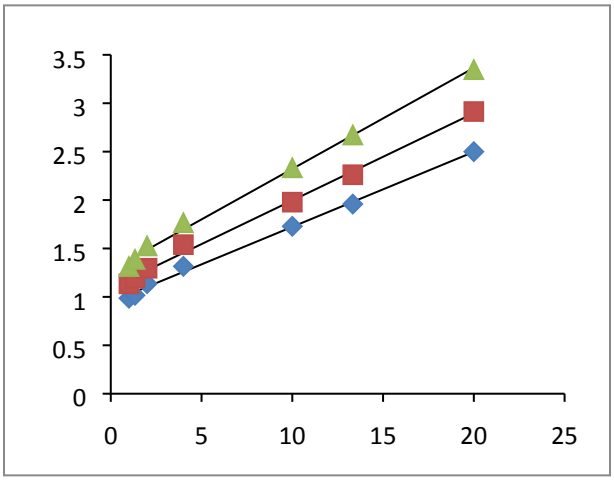
Therefore, $K_i = 1/0.097 = 10.30$

K_i calculation for Temephos:

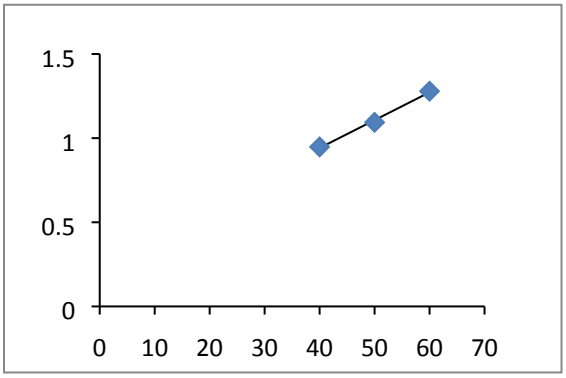
K_m 60 ppb= 0.104/ 1.278 = 0.0813 V_{max}= 0.0813/0.104= 0.7817

K_m 50ppb = 0.090/1.094 = 0.0822 V_{max} = 0.0822/0.090 = 0.9133

K_m 40 ppb= 0.077/0.948 = 0.0812 V_{max} = 0.0812/0.077 = 1.054



Concentration of temephos	1/ V_{max} value for each concentration
60 ppb	1.279
50 ppb	1.094
40 ppb	0.948



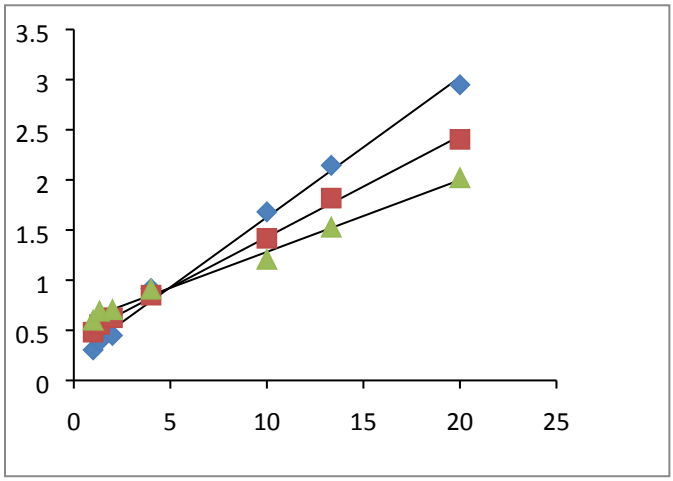
K_i = 1/(slope x V_{max}) = 1/(0.016 x 1.14) = 54.82
[V_{max} (without inhibitor) = 1.14]

K_i calculation for Dimethoate:

K_m 60 ppb = 0.139/0.231= 0.6017 Vmax 60 ppb= 0.6017/0.139 = 4.32

K_m 50 ppb= 0.1/0.42 = 0.2380 Vmax 50 ppb = 0.2380/0.1 = 2.38

K_m 40 ppb = 0.071/0.564 = 0.1258 Vmax 40 ppb = 0.1258/0.071 = 1.77



Comparison of the method with other methods

Table S1 shows a comparison of our method with the other methods available in literature. The table reveals that the detection limits of all the four pesticides obtained by our method is within the range of those reported methods. It is evident from the table that for the two pesticides fenobucarb and temephos no reliable biosensing method other than our one available in literature. It is the most promising aspect of the present method.

Table T_1: Comparison of the present method with other methods

Sl. No.	Pesticide	Method of detection	Limit of detection	Linear range	Reference
1.	Fenobucarb	Flow Amperometry	2 ppb	-	54
2.	–do-	Liquid chromatography–tandem mass spectrometry	1.5 ppb	-	55
3.	–do-	Gas chromatography/Mass spectrometry	4 ppb	-	56
4.	-do-	GST biosensor	2 ppb	2-50 ppb	This work
5.	Temephos	Liquid Chromatography/Diode Array	9 ppb	-	57
6.	–do-	-do-	0.02-0.2 ppb	-	58
7.	–do-	Liquid chromatography–ion trap-mass spectrometry		-	59
8.	–do-	Thermospray liquid chromatography-mass spectrometry	0.038 ppb	-	60
9.	-do-	GST biosensor	4 ppb	4-30 ppb	This work
10.	Dimethoate	Acetylcholinesterase biosensor	0.4 ppb	2.29 -5.5x10^2 ppb	61
11.	–do-	-do-	2.29 ppb	11.45 -22 ppb	62
12.	-do-	-do-	389 ppb		63
13.	-do-	GST biosensor	5 ppb	5-25 ppb	This work
14.	* Cypermethrin	Surface plasmon resonance	0.5 ppb	-	64
15.	–do-	Nucleic acid sensor	2.5 ppb	2.5–2x10^3 ppb	65
16.	–do-	Enzyme-linked immunosorbent assay	0.5 ppb	-	66
17.	–do-	DNA biosensor	2.5 ppb	-	67
18.	-do-	*GST biosensor	2 ppb	2-25 ppb	53

*Cypermethrin was analyzed by the same method in our previous work (Reference 53)