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## Correction: Mesoporous titania thin films as efficient enzyme carriers for paraoxon determination/detoxification: effects of enzyme binding and pore hierarchy on the biocatalyst activity and reusability

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Correction for 'Mesoporous titania thin films as efficient enzyme carriers for paraoxon determination/detoxification: effects of enzyme binding and pore hierarchy on the biocatalyst activity and reusability' by N. Frančič *et al.*, *Analyst*, 2014, **139**, 3127–3136.

The original manuscript contained errors in the data of Tables 2 and 3 and in the subsequent discussion of Table 3. The necessary changes are detailed below.

The third column of Table 2 is replaced; the complete table is as follows:

**Table 2** His<sub>6</sub>-OPH immobilization efficiency and activities

Sample/type of immobilization	Immobilization efficiency (%)	Activity (U per carrier)
TiF-9 cov.	44.1 ± 2.3	0.05 ± 0.01
TiF-13/38 cov.	65.5 ± 2.0	0.11 ± 0.03
TiF-9 ads.	15.2 ± 1.0	0.09 ± 0.02
TiF-13/38 ads.	18.4 ± 2.1	0.04 ± 0.01

Amendments are required to some of the data in column 2 of Table 3. Additionally, columns 4 and 5 of the original table are to be removed and replaced by the new column 4 given below, and footnotes a and b are added to the table. The complete table is as follows:

**Table 3** Kinetic constants for POX hydrolysis by free and immobilized His<sub>6</sub>-OPH

Sample	$V_{\max}$ ( $10^{-3}$ mM s <sup>-1</sup> )	$K_M$ (mM)	Specific activity <sup>b</sup> (U mg <sub>OPH</sub> <sup>-1</sup> )
Free enzyme – His <sub>6</sub> -OPH <sup>15 a</sup>	2.5 ± 0.1	$(10 \pm 0.5) \times 10^{-3}$	6250 ± 500
Covalent attachment (TiF-9)	0.43 ± 0.2	0.48 ± 0.02	13 ± 1.45
Covalent attachment (TiF-13/38)	0.98 ± 0.1	0.98 ± 0.07	17 ± 2.2
Physical adsorption (TiF-9)	0.78 ± 0.2	0.23 ± 0.02	61 ± 6.5

<sup>a</sup> Literature data (ref. 15) where specific activity (SA) is given for the freshly expressed enzyme before lyophilisation. <sup>b</sup> Lyophilised enzyme contained only approx. 10–20% of His<sub>6</sub>-OPH, thus the quantity of immobilized His<sub>6</sub>-OPH is accordingly lower than the determined value, giving approx. 4, 6 and 2 µg of immobilized His<sub>6</sub>-OPH. These quantities were further used to gain SA (U mg<sub>OPH</sub><sup>-1</sup>) values. SA was calculated from the  $V_{\max}$  divided by the mass of immobilized enzyme, where we also took into account volume of the reaction mixture and factor 60 to obtain results in correct units, namely U mg<sub>OPH</sub><sup>-1</sup>. One unit of enzymatic activity (U) was considered as an enzyme concentration hydrolysing 1 µmol of the substrate (paraoxon) per minute at 25 °C.

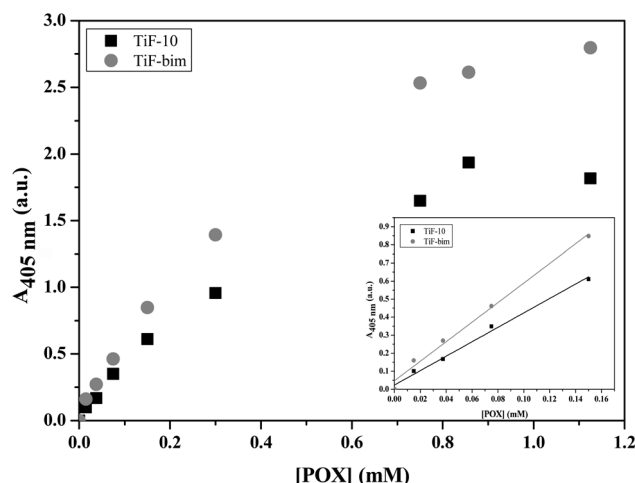
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To reflect the changes to Table 3, amendments are required to the text and one figure within the section 'Performance, stability and reuse of synthesised biocatalyst films'. These corrections are detailed below.

Fig. 3 and its caption should be replaced to correct the wavelength at which absorbance was measured, as follows:



**Fig. 3** Hydrolysis of paraoxon with covalently attached His<sub>6</sub>-OPH biocatalyst films TiF-10 and TiF-bim measured at  $\lambda = 405$  nm after 5 min. Inset, biocatalyst films detection linear range. Measurements were performed with selected 50 mm<sup>2</sup> bio-functionalized mesoporous titania thin-films with covalently attached His<sub>6</sub>-OPH at 20 °C, pH 10.5 (CB, 50 mM), and different substrate concentrations.

In the second paragraph of the section 'Performance, stability and reuse of synthesised biocatalyst films', the first two sentences should be amended as follows:

'Determination of the kinetic parameters for paraoxon hydrolysis by free and immobilized His<sub>6</sub>-OPH demonstrated that depending on the immobilization method (covalent attachment vs. physical adsorption) and mesoporosity (TiF-9 and TiF-13/38) the specific activity (SA) was between 13–17 U mg<sup>-1</sup> for covalently bound enzyme, and approx. 60 U mg<sup>-1</sup> for adsorbed His<sub>6</sub>-OPH (Table 3). When an enzyme was immobilized, regardless of immobilization type or porosity, the  $K_M$  of immobilized enzyme increased (approx. 20–100 times) while the  $V_{max}$  decreased (approx. 2.5–5 times); meaning that the affinity of the enzyme for its substrate and the velocity of the enzymatic reaction decreased.'

In the third paragraph of the section 'Performance, stability and reuse of synthesised biocatalyst films', the final sentence should be amended as follows:

'As expected,  $K_M$  of immobilized enzyme is higher than that of the enzyme in solution (Table 3), where  $K_M$  and  $V_{max}$  were found to be  $(0.48 \pm 0.02)$  mM and  $(0.43 \pm 0.02) \times 10^{-3}$  mM s<sup>-1</sup> for TiF-9, and  $0.98 \pm 0.07$  mM and  $(0.98 \pm 0.1) \times 10^{-3}$  mM s<sup>-1</sup> for TiF-13/38, respectively.'

In the fourth paragraph of the section 'Performance, stability and reuse of synthesised biocatalyst films', the first two sentences should be amended as follows:

'As mentioned before, for both samples the  $K_M$  increased and  $V_{max}$  decreased, where TiF-9 exhibited smaller changes (~48 times increase of  $K_M$  and ~5 times decrease of  $V_{max}$ ) in comparison to the free enzyme. Due to the immobilization efficiency (44% and 65%), the specific activities of both samples is approximately the same (Table 3).'

The fourth sentence of this paragraph is also amended as follows:

'The accumulation of a hydrolysis product, *p*-nitrophenol, was measured spectrophotometrically at 405 nm.'

## References

15. Y. A. Votchitseva, E. N. Efremenko, T. K. Aliev and S. D. Volfomeyev, *Biochemistry (Moscow)*, 2006, **71**, 167.

The Royal Society of Chemistry apologises for these errors and any consequent inconvenience to authors and readers.

