

Kinetics and Specificity of *Drosophila melanogaster* Molybdo-Flavoenzymes towards Their Substrates

Authors : Khaled S. Al Salhen

Abstract : Aldehyde oxidase (AO) and xanthine oxidoreductase (XOR) catalyze the oxidation of many different N-heterocyclic compounds as well as aliphatic and aromatic aldehydes to their corresponding lactam and carboxylic acids respectively. The present study examines the oxidation of dimethylamino-cinnamaldehyde (DMAC), vanillin and phenanthridine by AO and xanthine by XOR from *Drosophila* cytosol. Therefore, the results obtained in the present study showed the DMAC, vanillin and phenanthridine substrates used were found to be good substrates of *Drosophila* AO and xanthine is the preferred substrate for *Drosophila* XOR. Km values of AO substrates were observed with DMAC ($50 \pm 5.4 \mu\text{M}$), phenanthridine ($80 \pm 9.1 \mu\text{M}$) and vanillin ($303 \pm 11.7 \mu\text{M}$) respectively for *Drosophila* cytosol. The Km values for DMAC and phenanthridine were ~ 6 and ~ 4 fold lower than that for vanillin as a substrate. The Km for XOR with xanthine using NAD⁺ as an electron acceptor was $27 \pm 4.1 \mu\text{M}$. Relatively low Vmax values were obtained with phenanthridine ($1.78 \pm 0.38 \text{ nmol/min/mg protein}$) and DMAC ($1.80 \pm 0.35 \text{ nmol/min/mg protein}$). The highest Vmax was obtained from *Drosophila* cytosol with vanillin ($7.58 \pm 2.11 \text{ nmol/min/mg protein}$). It is concluded these results that AO and XOR in *Drosophila* were able to catalyse the biotransformation of numerous substrates of the well-characterised mammalian AO and XOR. The kinetic parameters have indicated that the activity of AO of *Drosophila* may be a significant factor the oxidation of aromatic aldehyde compounds.

Keywords : aldehyde oxidase, xanthine oxidoreductase, dimethylamino-cinnamaldehyde, vanillin, phenanthridine, *Drosophila melanogaster*

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