

Experimental Measurements for the Effect of Dilution Procedure in Blood Esterases as Animals Biomarker for Exposure to Organophosphate Compounds

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Abstract : This main aim of this study was to confirm and extend our current knowledge about the effects of dilutions on esterases activities in the blood for birds with respect to protecting the enzyme from organophosphate inhibition. There were significantly higher esterases activities in dilution 1:10 in all blood samples from quail, duck, and chick compared to other dilutions (1:5, 1:15, 1:20, and 1:25). Furthermore, our results also pointed to the importance of estimating different dilutions effects prior to using in birds as biomarker tools of environmental exposure. Concentration-inhibition curves were determined for the inhibitor in the presence of dilutions 1:5, 1:10 plus 1:15 (to stimulate carboxylesterase). Point estimates (concentrations calculated to produce 20, 50, and 80% inhibition) were compared across conditions and served as a measure of esterase-mediated detoxification. Among the thiol esters (dilution 1:5) was observed to have the highest specificity constant (k_{cat}/K_m), and the K_m and k_{cat} values were 176 μM and 16,765 s^{-1} , respectively for S-phenyl thioacetate ester, while detected in (dilution 1:15) the lowest specificity constant (k_{cat}/K_m), and the K_m and k_{cat} values were 943 μM and 1154 s^{-1} , respectively for acetylthiocholine iodide ester.

Keywords : esterase, animal, dilution, pesticides

Conference Title : ICASVM 2015 : International Conference on Animal Science and Veterinary Medicine

Conference Location : Paris, France

Conference Dates : February 23-24, 2015