The hydrolysis of pyrethroid insecticides is an important mechanism in their detoxication in both vertebrate and invertebrate species [1]. Hydrolysis by esterases provides a resistance mechanism for insects [2,3] and can determine the absolute ethanol, acidified to pH 2.0 using aq.d parent compound aq.d metabolites extracted with diethyl ether (4 x aq.d). The position of the radiolabelled acid product determined against a labelled standard with age (Figure 1), however hydrolysis in female domestic chickens (Gallus domesticus). The birds were maintained under a 16h of light photoperiod: Food and water available ad libitum.

Blood samples were taken by brachial venepuncture from birds between 56 & 116 days of age. All samples were taken at the same time of day (1400-1600h), allowed to clot and serum decanted after centrifuging for 30 min at 4,600

Trans-cypermethrin hydrolysis was assayed by incubating 0.25ml serum in 2.75ml 50mM sodium phosphate buffer pH 7.5 containing 1μM trans (trans-cyclopropyl) cypermethrin (specific radioactivity 3mCi/mmol) for 1hr at 42°C, after this time the reaction was terminated by the addition of 3ml of absolute ethanol, acidified to pH 2.0 using concentrated HCl and parent compound and metabolites extracted with diethyl ether (4 x 3ml). The extract was blown to dryness and applied to a tlc plate (Silica gel, Merck) in 2 x 50ul diethyl ether. The tlc plate was developed in 2:5:1 ethyl acetate:acetic acid (75:25:1) and the position of the radiolabelled acid product determined against a labelled standard using a Berthold Automatic Linear Analyser. The relevant regions of the tlc plate were scraped and eluted with 2.5ml absolute methanol. Both acid metabolite and unchanged substrate were quantified in 1ml of eluant by adding 10μl of Eco-Sol and determining radioactivity using a Packard Model 3255 Tri-Carb liquid scintillation spectrophotometer. The mean recovery of radioactivity was 80 ± 6.5%

The hydrolysis of pyrethroid insecticides is an important method of detoxication, so it is possible that the sex dimorphism which exists in the domestic chicken may effect the selective toxicity of these compounds to the different species.

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References