BIOCHEMICAL STUDIES ON THE EFFECT OF CHLORPYRIFOS INSECTICIDE ON RATS

By

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B. Sc. Chemistry, Faculty of girls, Ain Shams University,1998.

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Approval Sheet

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ABSTRACT

Dina Abd-Ellattif Mohamed: Biochemical Studies on The Effect of Chlorpyrifos Insecticide on Rats. Unpublished M.Sc. Thesis Department of Agricultural Biochemistry , Faculty of Agriculture, Ain Shams University, 2015

Two toxicological studies were carried out to illustrate the toxic influence of technical (96.9%) and formulated (48%) forms of chlorpyrifos on some biological parameter in male albino rats (*Rattus norvegicus*).

The first study dealing with the influence of orally administering acute single dose ($1/4LD_{50}$), as samples were taken after 72 hrs for analysis. The second study dealing with subchronic toxicity ($1/40LD_{50}$), as rats were dosed orally multi doses (5 times per week). Samples were taken after 45 and 90 days of the experimental course, and subjected to analysis.

The obtained data for both acute and subchronic toxicity have been summarized in the following statements:

Significant decreases have been recorded in case of average gain in body weight, liver weigh, liver weight/body weight ratio, levels of T_3, T4, total cholesterol and liver glycogen as well as inhibiting AchE (serum and brain) and LDH enzymes.

Significant increases have been noticed concerning with the levels of blood glucose, triglyceride and urea, as well as elevation of the activities of ALT, AST, ALP (serum).and G-6-PDH (liver).

Blood total protein and ACP activity did not respond in significant manner in case of either technical or formulated form.

However, one can put stress on the following aspects:

* Brain AchE was more sensitive to both acute and subchronic toxicity compared with serum one.
* T_4 was highly responded to toxicity compared with T_3.

* The sharp decreases in LDH activity in subchronic toxicity, compared with acute one may be considered as subchronic syndrome.
* The sharp decreases in liver glycogen were associated with marked increases in blood glucose due to both acute and subchronic toxicity.
* A rapid kidney disorder (damage) may be occurred, as urea increases sharply, especially in case of acute toxicity.
* The relative increases in ALT and AST on one hand and ALP on the other hand may be considered as an useful tool for diagnosis of liver damage in the present study. ALP activity increased to greater extent than ALT and AST, which may indicate that dosed rats were suffered from obstructive liver diseases. However, histopathological examination may confirm this assumption or not.

***** Histopathological examination showed that in rats liver administered formulated form there were congestion and dilatation in central veins and sinusoids associated with inflammatory cells infiltration and diffuse kupffer cells proliferation in between the degenerated hepatocytes, in comparison with untreated rats liver.
Also, in rats liver administrated technical form there was congestion in the central veins associated with degeneration in hepatocytes.
* In rats brain administered formulated form there was vacuolization in matrix of the hippocampus while the cerebrum showed focal gliosis as well as focal hemorrhages in comparison with untreated rats brain. While in rats brain administered
technical form, there were focal gliosis with congestion in the blood vessels in the cerebrum.

Keywords, Chlorpyrifos, acute toxicity, subchronic toxicity, acetylcholinesterase (AchE) activity, Liver function, AST, ALT, ALP, LDH, G6PDH, ACP, body weight, Total protein, Cholesterol, Triglyceride, Urea, Thyroid hormone.

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