ULTRASTRUCTURAL AND HISTOPATHOLOGICAL STUDIES AND RESIDUE DETERMINATION OF THE INSECTICIDE PROFENOPHOS IN THE ALBINO RAT

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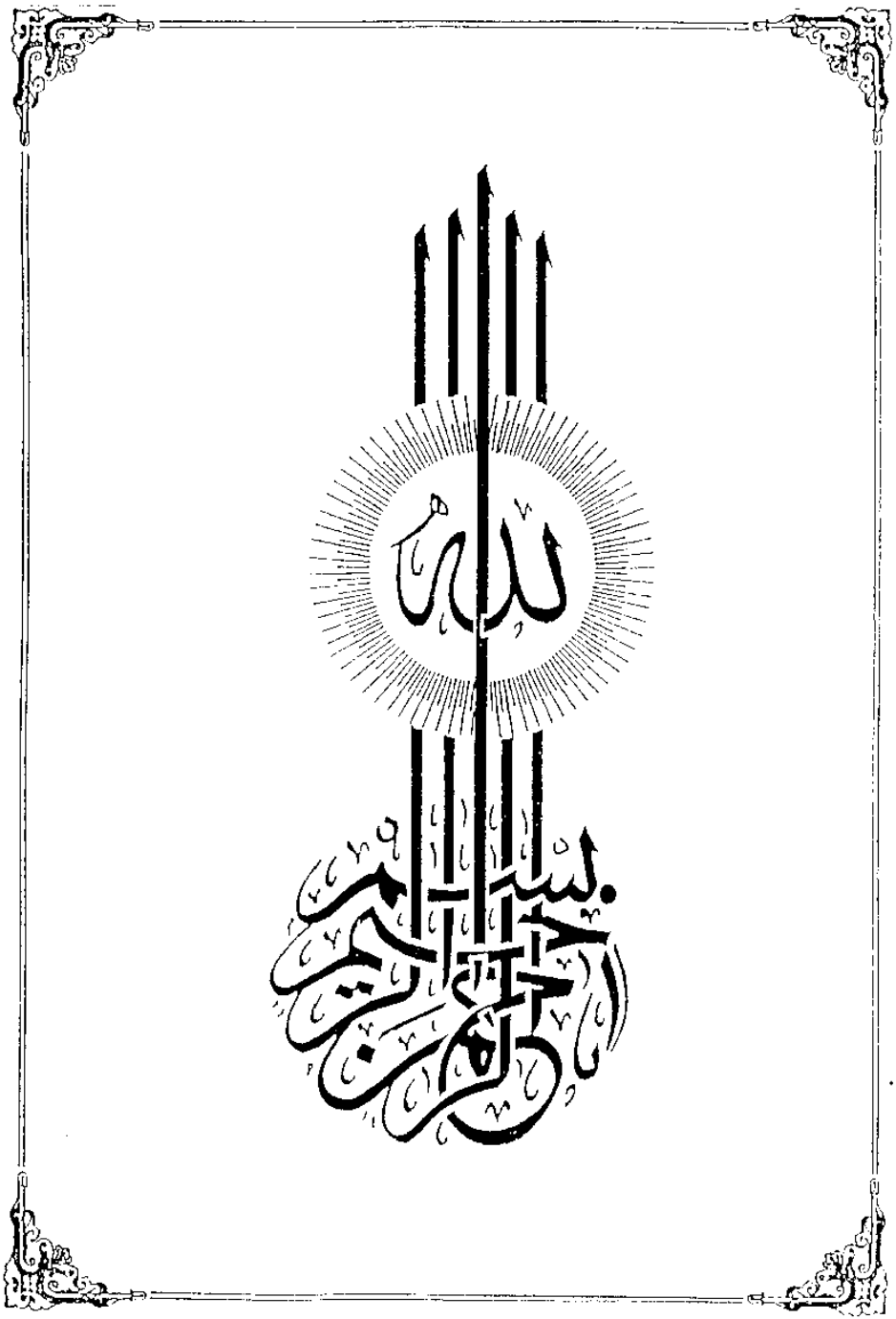

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ABSTRACT

Abdel-Razik Hussein Farrag. ***Ultrastructural and Histo-pathological Studies and Residue Determination of the Insecticide Profenophos in the Albino Rat.*** **M. Sc. Ain Shams University- Institute of Environmental Studies and Research- Department of Biology and Natural Sciences, 1996.**

The present study was carried out to evaluate the effects of the organophosphorous insecticide, profenophos on the histology and histochemistry of stomach , liver and kidneys and the ultsastructure of kidneys of the adult female albino rat Rattus norvegicus. Besides, the residue of profenophos were estimated in stomach, liver, kidneys and perinephric fat. Furthermore, the oral LD50 of profenophos to female adult rats has been estimated in this study as 867. 8 mg / kg body weight.

The insecticide was orally given to rats in daily doses equivalent to 1/10 LD50 (for 10 consecutive days) , 1/4 LD50 (for 4 successive days) and LD50 (as a single dose) . Rats were sacrificed 24 hours after the last dose and organs to be tested (stomach , liver , kidneys and perinephric fat) were taken .

The histopathological findings indicated that profenophos caused different alterations on the tested organs. In stomach , such alterations included haemorrhagic areas in the mucosa and submucosa and degenerative changes , ulceration and erosion in the mucosa. The liver of profenophos-treated rats showed lymphocytic infiltration in the portal and periportal areas, dilated blood sinusoids, focal necrosis and fatty change. In kidneys of rat treated with profenophos, the glomeruli exhibited different stages of degeneration. Some renal tubules showed complete

loss of their epithelial lining cells . The nuclei of these tubules exhibited signs of pyknosis and karyolysis .

Ultrastructural changes of kidneys of rats exposed to profenophos included defects in the shape and the number of the foot processes of the epithelium present in the glomeruli . The cells of the proximal convoluted tubules showed extreme damage in form of microvillar loss , necrosis and the appearance of numerous vacuoles containing necrotic materials. Swollen and distorted mitochondria, pyknotic nuclei with marked dilatation of the nuclear envelope were observed. The cells of the distal convoluted tubules showed large vacuoles very close to some mitochondria. Lumina of such tubules showed spherical cytoplasmic extensions from their epithelium characterized ultrastructurally by presence of number of scattered granules.

The histochemical examination showed noticeable reduction in both total proteins and polysaccharide materials of stomach , liver and kidneys of the profenophos-treated rats; the cells of such organs displayed faint stainability.

No residues of profenophos were found in the analyzed tissues (stomach , liver , kidneys and perinephric fat) with a minimum detectable amount of 0.001 ppm .

Key Words :

Histopathology - Histochemistry - Ultrastructure - Pesticides- Profenophos - Stomach - Liver - Kidneys - Perinephric fat - Residues - LD50.

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