

TOXICOLOGICAL ASPECTS OF CERTAIN PESTICIDES AFFECTING LABORATORY ANIMALS

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53538

*A thesis submitted in partial fulfillment
of the requirements for the degree of*

Doctor of Philosophy

in

Agricultural Science
(Pesticides)

Department of Plant Protection
Faculty of Agriculture
Ain Shams University

1996

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APPROVAL SHEET

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ABSTRACT

Kadry Weshahy Mahmoud, Toxicological aspects of certain pesticides affecting laboratory animals, Unpublished Doctor of Philosophy, Ain Shams University, Faculty of Agriculture, Department of Plant Protection 1996.

The work was mainly conducted to investigate and asses the magnitude of hazards which may be encountered with the intraperitoneal injection of Acephate, Cyanophos and Esfenvalerate in mice.

In order to gain an insight into the toxilogical action of these pesticides, female and male mice were similarly treated with LD₅₀ or 1/2 LD₅₀. The mice were sacrificed and frequent measurments were made 2, 4, 12, 24 and 168 hours after the pesticides administration to determine cholesterol, glucose, haemoglobin and protein components. Moreover, the transaminases (GOT & GPT), Glutathione-S-transferases (GST) and mixed-function oxidases (MFO) activities were all assayed. The electrophysiological changes in nerve-muscle preparations were recorded.

Acephate caused increased heart beat, strong tremors, convulsions and flattened posterior region of the animals. Cyanophos initiated variable pathological symptoms, but, it showed less marked effects compared to that of Acephate or Esfenvalerate.

A significant increase over that of the check in serum cholestrol was noted in male and female mice treated with either LD₅₀ or 1/2 LD₅₀ of Acephate and Cyanophos, while opposite results have been recorded with Esfenvalerate.

It is evident that times-response relationship after the intraperitoneal injection of 1/2 LD₅₀, Acephate and Esfenvalerate caused hyperglycemia in both sexes, while, Cyanophos caused hypoglycemia.

Acephate and Esfenvalerate increased haemoglobin concentration in both sexes while, Cyanophos decreased in the parameter at 2 and 4 hour post-dosing in both sexes, followed by gradual increase.

Acephate and Cyanophos, at LD₅₀, showed a depression in total

protein concentration in both sexes few hours after administration, where, it increased after one day of administrations. Esfenvalerate increased the total protein concentration 2 hours posttreatment.

Acephate decreased A/G ratio, while, Cyanophos increased it compared with that of check in both sexes. Esfenvalerate decreased A/G ratio after few hours of treatment and increased it after one day posttreatment.

Acephate, Cyanophos and Esfenvalerate showed fluctuated depressions of GST activity in male and female mice. Smaller depressions were observed following treatment with Esfenvalerate.

Acephate and Cyanophos increased MFO activity in both sexes at the two doses, while, Esfenvalerate-decreased it till the end of the experimental time.

The tested pesticides increased the activities of GPT and GOT in both sexes at all times posttreatment.

The results showed that the percent concentration of GOT activity denoting highest efficacy of Esfenvalerate followed by Cyanophos whereas Acephate came last, since its effect gradually decreased by time. Although Cyanophos showed low activity at the end of the period tested, yet the other two compounds exhibited twice as much activity as that of Cyanophos.

The contraction amplitude of mice muscle as being affected with 0.05 mM Acephate, Cyanophos and Esfenvalerate gradually increased to reach 50, 40, and 46 %, respectively as compared with the amplitude of check muscle. Such compounds also increased the contraction duration and recovery of contraction was observed.

KEY WORDS

***Toxicological aspects-Acephate- Cyanophos- Esfenvalerate -
Mice-Toxicologic syndroms-Determination-Glucose-Cholestrol-
Haemoglobin-Protein components-Activity-GST-MFO-Transaminases-
(GOT-GPT)-Electrophysiological studies***

ACKNOWLEDGEMENT

The writer wishes to express his great appreciation and how much he is indebted to Professor Dr. Esmat M. K. Hussein, professor of Pesticides and Toxicology, Department of Plant Protection, Fac. of Agric., Ain Shams University, for the encouragement, guidance, revision, and help she has given me throughout the course of this work and also her suggestions during the preparation of the manuscript.

My gratitude is extended to Prof. Dr. A. A. Selim, Professor of Pesticides and Toxicology in the Department, for his encouragement, guidance, and supervision.

Also, My gratitude is extendent to Prof. Dr. A. H. Zidan, Professor of Pesticides and Toxicology in the same Department for his encouragement, guidance, and supervision.

I am very indepted to Dr. M. A. Daoud, Assist. Prof. of Economic Entomology in the same department for his distinguished help in the field of electrophysiology techniques.

Thanks are also due to Prof. Dr. Z. H. Zidan, Professor of Pesticide Chemistry and Toxicology at the same Department and vice Dean

for graduate studies and research, for his help to overcome many difficulties met during the research.

Furthermore, I appreciate all kinds of help offered to me by the staff members of Plant Protection Department, Faculty of Agriculture, Ain Shams University.

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