Faculty of Medicine
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EFFECT OF THE INSECTICIDE CYOLANE ON OVULATION AND PREGNANCY OF THE FEMALE MICE

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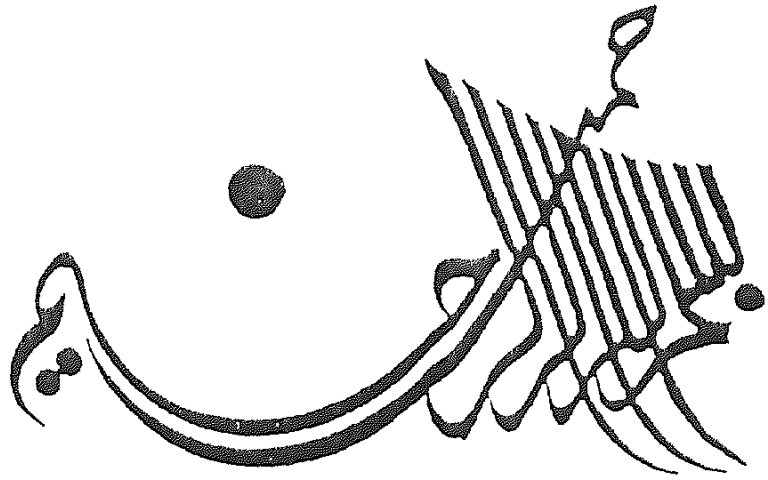
By
Zineb Mohamed Al-Amir Al-Sharkawy
(M.B., B.Ch.)

Supervised by

Prof. Dr.
Mohamed Ezz El-Din Azzam
Professor of Gyna. & Obst.
and Head of Early Detection of Cancer Unite
Faculty of Medicine Ain Shams University

Dr.
Mohamed Allaa Mohy El-Din Al-Ghannam
Lecturer of Gyna. & Obst.
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
1994



وترى الأرض هامدة فإذا أنزلنا عليها
الماء اهتزت وربت وأنبتت
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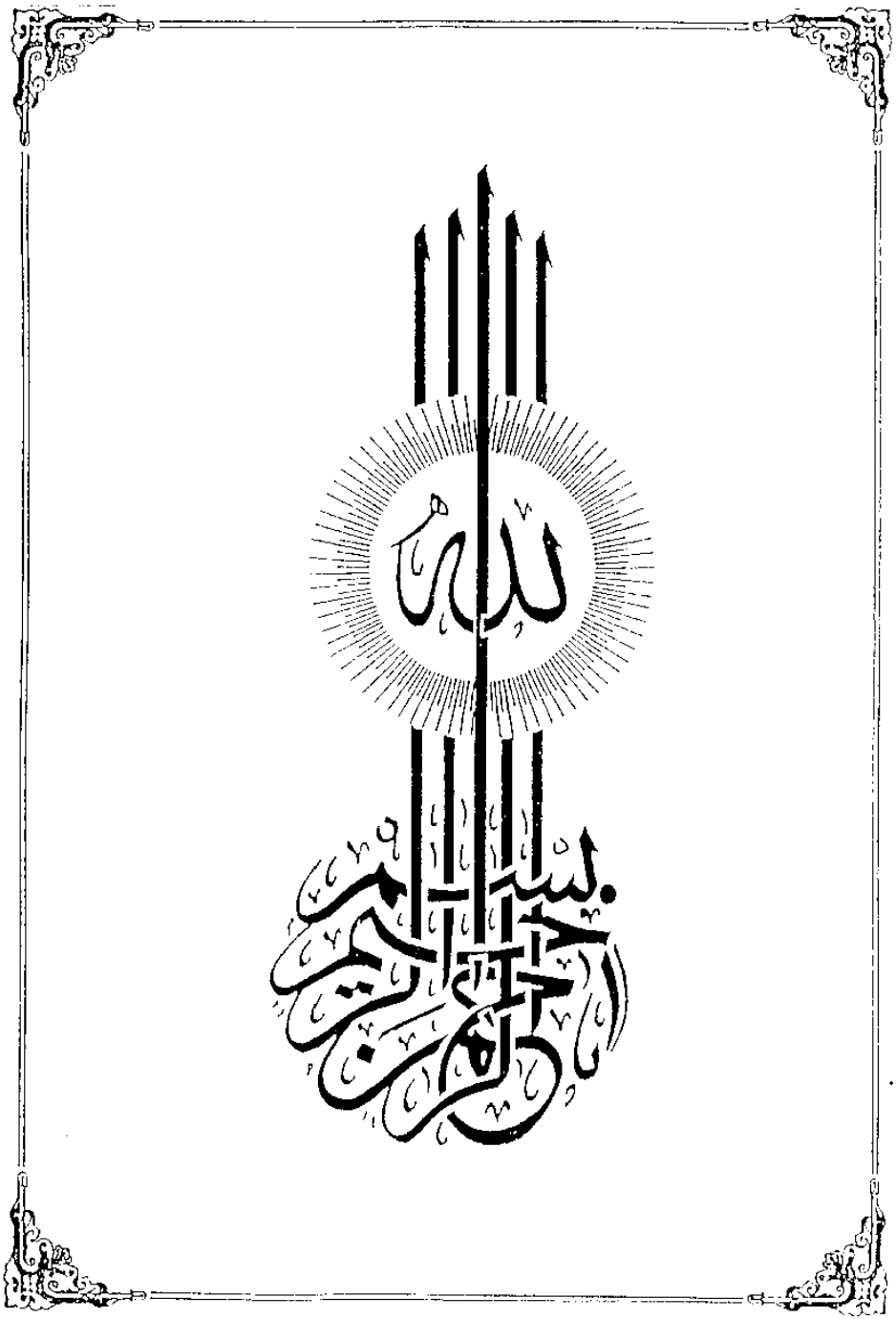

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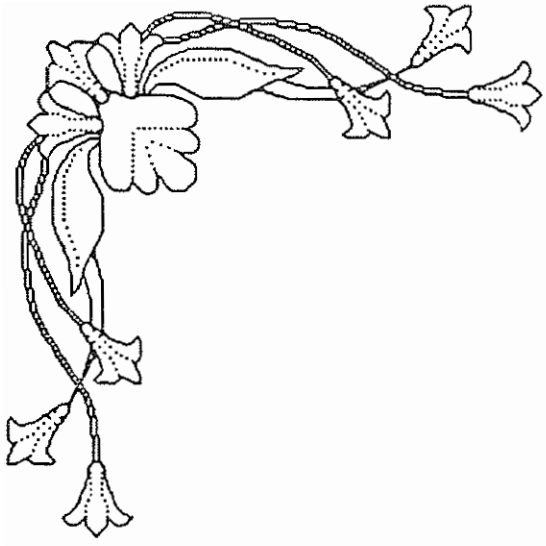
Dedication

To

My Family

CONTENTS



INTRODUCTION

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INTRODUCTION

Most organic insecticidal prouducts foll within four main classes, the organochlorins, organophosphates, carbamates, pyrethroids and others (Ahmad., 1991).

Pesticides are chemicaly used for controlling of pestes particulary in developing countries. They are not highly selective but considered generaly toxic to other species due to environmental pollution during their application. According to WHO report (1973), concerning the use of such chemicals in the Middle East, the total usage per annum reported from ten countries was approximatly 75.760 metric tons of active intergradients. Of this, 17.727 metric tons (38.75%) were organophosphate, 15.12 metric tons (33.05%) organochlorine, 2.429 metric tons (5.3%) carbamate and remainders (22.8%) were pyrethroids and other pesticides. The world usage of all pesticides is believed to be increasing by 10% per annum, a rate which is expected to increase in future.

In Egypt, the total quantity of pesticides which have been injected in the invironment since 1953 and up to 1984 is 617507 metric tons (Abdel Gowaad, 1985). This quantity comprises 182 different insecticidal compounds.

The problem of the environmental pollution by pesticide residues become one of the major problems which faces developing countries. Numerous individuals, societies, public organization and governmental agencies, has become involved in the evaluation of the benefits and risks of the use of pesticides specialy the risks which the pesticides may pass to human beings. The risk of human exposure to such biocides has been recognized, thus, toxicity and even death has occured in human exposed to organochlorine (Guzelian *et al.*, 1980) carbamates (Leavitt *et al.*, 1982), pyrethroid (Fouda, 1983) and organophosphate (Hagras, 1984).

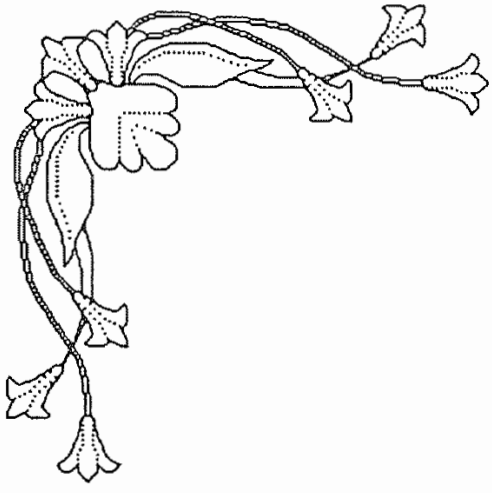
The major porblems arising from pesticide application are either acute or chronic effects. The WHO estimated that there are approximatly 500,000 cases occuring annually with about 1% case fatality rate (WHO, 1975 a,b,c).

Pesticides, in all types of preparations (solution, suspension, powder or gaseous) may gain entery into the body of human as well as animals through, inhalation, ingestion and absorption of unremoved contaminations on the skin (Gunther *et al.*, 1977; Spear *et al.*, 1977a; Wier and Hazleton, 1982). Dermal absorption is the most common methods for occupational workers and usually causes the least severl effect

(Davies., 1977). Plants and water are accidentally polluted during spraying of herbicides and leading to several death and health hazards (Al Kelch., 1981).

Death of fertilized ova and interference with implantation in early pregnancy teratogenic effects and decrease body weight of the offsprings were noticed in the exposed pregnant animals to herbicides (Doull *et al.*, 1986). It was recently noted that the pesticides could also reduce the fertility in the female rats when the exposure was delayed until the day following ovulation (Pinkston and Uphouse, 1987).

The aim of this work is to study the possible effect of the insecticide cyolane on ovulation in mice and also its possible teratogenic effects on mice embryos. This is to explore some of the exposure hazards of the insecticides on the human beings.



REVIEW OF LITERATURE

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Insecticide cyolane:

The applied insecticide in the present work is 65% technical cyolane (phospholan) {2-diethoxy phosphinyl imino-1,3 dithiolane} or {cyclic ethylene (diethoxy phosphinyl) dithiornido carbonate} or {imidocarboxy phosphinyl dithiornido carbonate} or {imidocarbonic acide, (dithoxy phosphinyl) dithiocyclic ethylene ester} as indicated by its formula, $G_7H_{14}O_3S_2PN$. It was supplied by American cynamide company, and it was also pepared by the condensation of the diethyl-phosphoryl chloride and 2-iminodithiolane (Bahig and Wafa, 1980).

Chemical properties:

It is relatively stable under neutral or slightly acidic conditions but it is unstable under alkaline conditions.

Physical properties:

Cyolane is a heavy yellowish compound with melting point 37°C-45°C and boiling point 115°C, it is soluble in corn

oil, acetone, benzene, toluene, ethanol and cyclohexane, slightly soluble in water and ether and very slightly soluble in hexane.

Biological properties:

This insecticide is chrachterized by its leaf penetrating and plant systemic activity and hence it is usually termed systemic insecticide. Moreover, cyolane is chrachterized by having a comparatively long residual action.

During the last few years, cyolane has been subjected to detailed laboratory investigations and field tests throughout the world. Its effectiveness first evaluated against cotton pests in the Middle-East in 1962 as reported by (Vermes., 1967) and (Hassan et al., 1969). According to these authors, cyolane is extremely effective against the cotton leaf worm *Spodoptera littoralis* and also against sucking insects and mites.

Since 1967, cyolane systemic insecticide has been used commercially on a large scale for the control of *Spodoptera littoralis,* generally in the Middle East and particulary in Egypt as reported by (Kamel and Moustafa, 1968), (Khalil et al., 1972) and (Bahig., 1975). Cyolane was found to bring about a high percentage of mortality of all larval instars of

cotton leaf worm; 95.6% , 94.0% and 95.5% at doses of 0.78, 1.11 and 1.49 Kg/ha. respectively (Serghiou., 1971).

Soliman *et al.*, (1979) stated that cyolane was one of the most widely used insecticides for the protection of cotton plant in Egypt. Furthermore, cyolane has been successfully used for the control of a number of other insects e.g. *Thrips tabaci on onions* (Damiano., 1967a), and other pests of citrus trees (Damiano., 1967b).

Regarding the hazardous effects of the insecticides, there is a general belief that the mortality and signs of toxicity induced by organophosphorus compounds are mainly attributed to thier anticholinesterase activity and consequent accumulation of acetylcholine at the neuromuscular junctions and autonomic ganglia (Jolly., 1957), and (Clarke and Clarke, 1975).

Radeleff and Woodard, (1957) recorded that the cholinesterase inhibition due to organophosphours action was associated with pronounced muscular weeknes, incoordination and prostrate in cattle and sheep. According to (Holmstedt., 1959) and (Clarke and Clarke, 1975) symptoms of organophosphorus poisoning in mammals are highly dependant on the dosage level. Such symptoms include

nausea, vomiting, lacrimation, musclar twitching and convulsions, accompanied by respiratory and secretory reactions and death eventually occurs as a result of asphyxia. Tyzhnikov and Dogaev, (1964) identified three stages in the symptomatology of organophosphorus injuries; exitation, convulsions and deep coma.