THE TOXIC EFFECTS OF DIFFERENT TYPES OF ORGANOPHOSPHORUS INSECTICIDES ON INTOXICATTED PATIENTS FROM DIFFERENT ENVIRONMENTAL AREAS

By

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B.Sc. Ain Shams University, 2002

Diploma of Environmental Science, *Ain Shams University*

A thesis Submitted in a partial fulfillment

Of

The Requirement for the Master Degree

In

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APPROVAL SHEET

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التأثيرات السامة للأنواع المختلفة من المبيدات الفسفورية العضوية على حالات التسمم من مناطق بيئية مختلفة"

رسالة مقدمة من الطالبة

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دبلومة علوم بيئية - ٢٠٠٥

لاستكمال متطلبات الحصول على درجة الماجستير

في العلوم البيئية

قسم العلوم الأساسية البيئية

معهد الدراسات والبحوث البيئية

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صفحة الموافقة على الرسالة

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Amira Haridy A.El-AL

ABSTRACT

Organophosphorus compounds are most commonly used as insecticides in Egypt. There are more than 40 different types known and used today either individually or in mixed forms between more than one type.

This study aims to detect various types of organophosphorus insecticides from poisoned patients admitted to Poison Control Center, Ain Shams University (PCCASU). Sixty acutely intoxicated patients and ten workers chronically exposed to OPI were admitted to (PCCASU), Ten healthy adults served as control .The study found that 15 out of 60(26%) acute patients were from age group (10-20) and 15 out of 60 (26%) were from age group (30-40). 46% of the total number of patients (n=70) were exposed due to suicidal attempts, 40% were accidentally exposed and 14% were due to occupational hazard.

56% of the studied cases were from urban residents. 23% of total numbers of suicidal cases were unemployed, where 50% of them are from low socio-economic status.

The study detected 7 different OPI (Malathion, Dimethoate, Chloropyrofois, Phenthoate, Prothiphos, Profenfos, and Ethion). 45.7% of total detected where combination of more than one type (mixed form). 54.3% were intoxicated due to a single form of OPI of which the Malathion showed highest prevalence with 17.2%, While Chloropyrofis showed highest frequency (55.7%) of cases in both mixed and single forms of OPI.

Blood random glucose level significantly increased in deceased and severe groups in comparison to control, while serum sodium level showed no significant difference. Potassium level significantly decreased in severe and moderate group. Amylase was significantly high in severe and deceased group, while urea slightly elevated in sever group only. Creatinine level

significantly high in severe group. Significant increase on both AST, ALT was also noticed. The study also revealed that pseudocholinestrase level was decreased significantly in deceased, severe and moderate group with no significant difference among three previous groups.

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ABG : Arterial blood gases
AChE : acetyl cholinesterase enzyme
ALT : Alanine transaminase
AMS : Amylase
AQAC : official methods of analysis
AST : Aspartate transaminase
BBB : blood brain barrier
Beta-G : beta-glucuronidase
BUN : Blood urea nitrogen
CBC : complete blood picture
ChE : cholinesterase enzyme
CNS : central nervous system
DAP : Dialkyl phosphate
DDT : dichlorodiphenyltrichloroethane
EPA : Environmental protection agency
FPD : Flame photometric detector
GC : gas chromatography
GIT : Gastrointestinal tract
LPS : lipase
NMDA : N-methyle-D-asparte
NTE : Neuropathy target estrase
Opc : organophosphorus compound
PCC : poision control center
PChE : pseudocholinestrase enzyme
PPM : part per million
RBCs : red blood cells
RES : reticuloendothelial system
RF : respiratory failure

I-Introduction

Organophosphorus compounds (OPC) are the most widely used group of insecticides in the world. Their acute toxicity causes hazardous to both professional and amateur users. **(Dippenaar and Diedericks, 2005**)

OPC also have become the most frequently used pesticides because of their rapid breakdown into environmentally safe products. However, they have far more acute toxicity than DDT, and other related products. (**Cocker *et al.*, 2005)**

WHO (2009) estimated that the yearly death 200,000 people worldwide due to pesticides poisoning mainly in developing countries. This is can be attributed to their easy availability and wide occupational exposure altogether with inadequate protective procedure.

Since the mid-1960s, the quantity of pesticides used in Africa and Egypt has increased about five folds. About 1 million tones have been injected into Egyptian environment during the last 40 years. **(Amr ,1999).**

In spite of increasing numbers of insecticides used in agricultre,there are serious concerns regarding their potential risk of exposure .many reports described the acute toxicity resulting from insecticides exposure particularly to individuals who are occupationally exposed to these chemicales.OPC are used in agriculture ,domestics ,gardens, and veterinary practice. They all act through inhibiting acetylcholinestrase enzyme (ACHE) and cause poisoning symptoms include excessive sweating .salivation, lacrimation, nausea, vomiting, diarrhea, general weakness, constricted pupil, poor concentration and tremors. In serious cases respiratory failure and death can occurs. **(Katz *et al.*, 2006)**