HISTOPATHOLOGICAL & HISTOCHEMICAL STUDIES ON THE EFFECTS OF TWO PLANT PHOSPHATE FERTILIZERS

(SINGLE SUPER PHOSPHATE"SSP") & (TRIPLE SUPERPHOSPHATE "TSP")

ON THE LIVER OF THE WHITE RAT

A Thesis submitted

By

Mohammed Abdel – Mohsen M. El– Mallah

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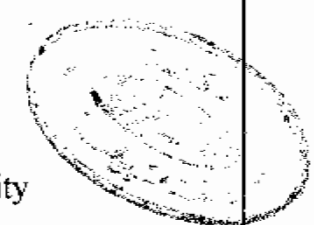

To

The Faculty of Science - Ain Shams University

For

The Partial fulfilment

of the Master Degree of Science (M.Sc.) in Zoology

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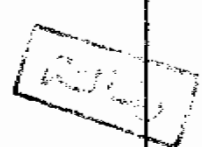


Under the supervision

of

Prof. Dr. Mahmoud Ahmed El-Banhawy

professor of Experimental Zoology

(Cell Biology and Histochemistry)

Ain Shams University

Faculty of Science

1994

SUPERVISOR

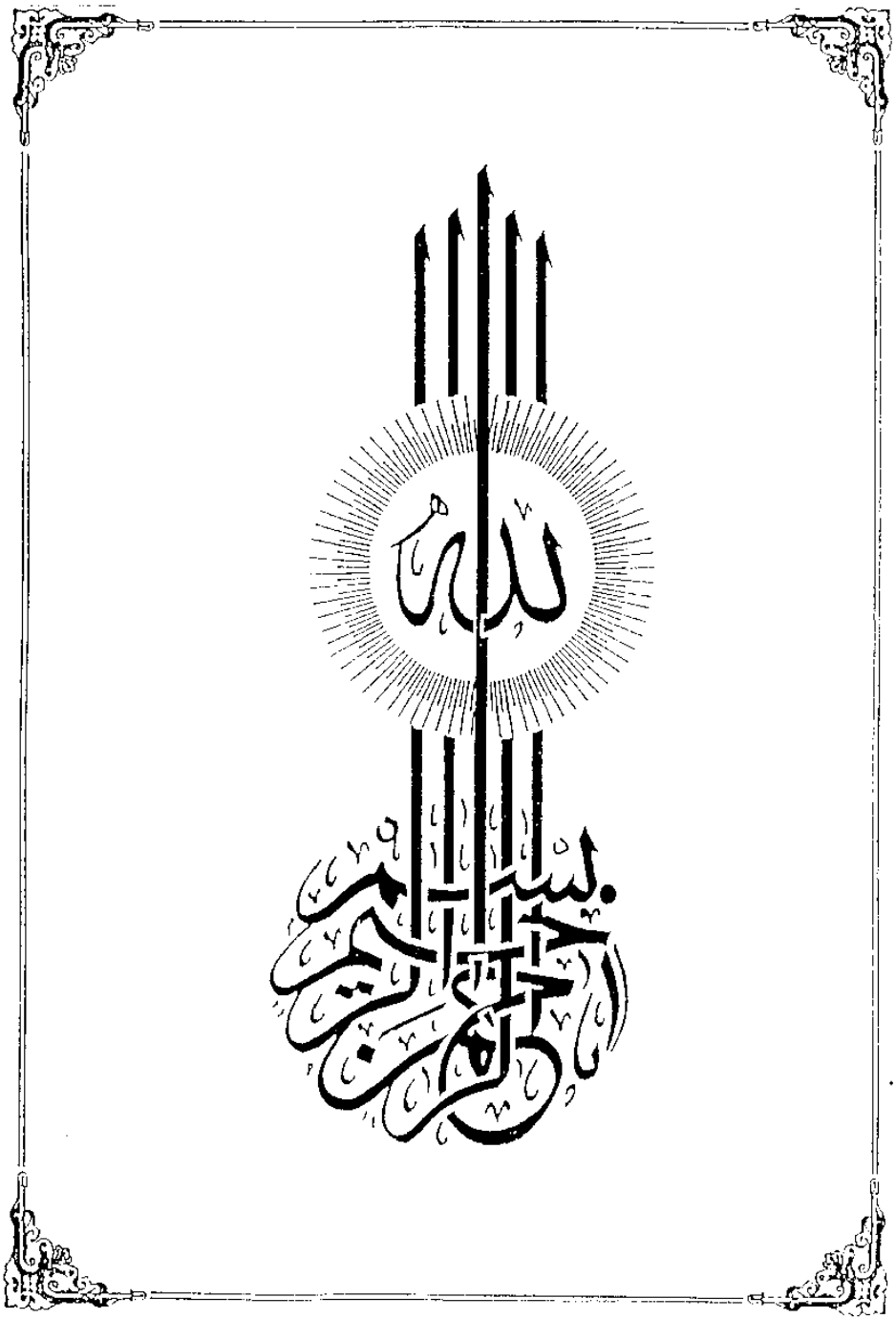
Professor Dr. Mahmoud Ahmed El-Banhawy

Professor of Experimental Zoology

(Cell Biology and Histochemistry)

Faculty of Science

Ain Shams University



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Acknowledgment

ACKNOWLEDGEMENT

I would like to express my deep gratitude to Prof. Dr. Mahmoud A. El-Banhawy, Professor of Experimental Zoology (Cell Biology & Histochemistry), Faculty of Science, Ain Shams University for suggesting the problem of this thesis and supervising the whole work. Thanks are also due to him for his continuous help and guidance and for the critical reading of the manuscript.

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Introduction

INTRODUCTION

Fertilizers - in general - and phosphate ones - in particular - are almost indespensible chemicals in agricultural areas in many parts of the world including Egypt. These compounds were postulated by *Bolton (1971) and Cooke, (1974)* to improve the quality of the soil, help and speed up seed germination and promote proper and better plant growth, thus ensuring a rich yield and good qualities of the cultivated crops.

These fertilizers are mainly of two types: the single superphosphate (SSP) and the triple superphosphate (TSP) ones. By the way, both types are nowadays widely used in Egypt, being applied in a powder form, which is easily dissolved by irrigation water. Worthwhile is that such compounds are rich in phosphorus and other elements which are well known for their hazardous effects on animals and human beings.

In view of these facts, it is quite natural that there is a great possibility for human beings to intake and ingest some of these fertilizers through eating the contaminated crops and vegetables, or edible domestic animals. Such animals are those normally living in the neighbourhood of the fields holding irrigation water contaminated with these chemicals, or those eating the poluted crops and vegetations *(Garner, 1963)*.

Aim of the Work

AIM OF THE WORK

Taking into consideration the previously listed introductory remarks, the present work was planned to assess and evaluate any possible deleterious impacts of two phosphate fertilizers on the body organs, in one of the accessible laboratory animals, aiming to get an idea of the consequences of such impacts, on the domestic animals, which are also mostly involving human beings to a large extent.

The rat was to be selected as an experimental model in this investigation in view of the fact that there is a general agreement that rats have the first priority in detecting any lesions produced in the body as a result of the noxious effects of various hazardous factors (Hafez, 1970).

In general, this study was meant to emphasize on the following aspects:

- Deterimentation of suitable dosage application of both single superphosphate (SSP), and triple superphosphate (TSP) fertilizers. It is worthy to mention in this respect that no determination of such dosing has as yet, been marked in the accessible literature.

- This dose was to be utilized mainly in a single manner somtimes in a repeated fashion for a certain period of time (i.e. accumulative dosing).

The impacts of these fertilizers were tested in the following areas:

1. General behaviour of the experimented animals.
2. Growth rates of the same animals relative to the untreated ones.
3. Histological and histopathological picture of untreated and treated animals respectively.
4. Histochemical investigation, comprising:
   a. General carbohydrates using periodic acid Schiff's (PAS) Reagent.
   b. Lipid inclusions by Sudan IV application.
   c. Total proteins in mercuric bromophenol blue-stained specimens.
   d. Nucleic acids (DNA) and (RNA), utilizing methyl green-pyronin technique.
   e. Sites of acid phosphatase activity following the specific Gomori's procedure.

Hopefully, the obtained results could be of some value in illustrating the hazardous consequences of these chemicals, thus calling attention for creating safety measures for their application as well as developing effective means of remedy and curation of any serious responses developed or expected in the body organs in such cases.

Review of Literature