



Cairo University
Faculty of Veterinary Medicine



**Effect of lead acetate on some organs of adult albino rats with
possible protective trials**

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For the degree of the Ph.D

(Cytology & Histology)

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2019

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Abstract:

Lead (Pb) is a ubiquitous environmental and industrial pollutant with worldwide health problems. The present study was designed to investigate the neuronal and reproductive toxicity of Pb in albino rats and to evaluate the ameliorative role of garlic as well as *Spirulina maxima* against such toxic effects. Forty adult male rats were used in this study (10 rats/group). Group I: served as control, Group II: rats received lead acetate (100 mg/kg), Group III: rats received both lead acetate (100 mg/kg) and garlic (600 mg/kg) and Group IV: rats received both lead acetate (100 mg/kg) and spirulina (500 mg/kg) daily by oral gavage for one month. Exposure to Pb acetate adversely affected the measured acetyl cholinesterase enzyme activity, dopamine level, serum testosterone level, oxidative stress and lipid peroxidation parameters as well as caspase-3 gene expression in both brain and testicular tissues. Light and electron microscopical examination of the cerebrum, cerebellum and testis showed various lesions after exposure to Pb which were confirmed by immunohistochemistry. In addition, it adversely affected sperm concentration, motility and viability. On the other hand, administration of garlic and spirulina concomitantly with lead acetate ameliorated most of the undesirable effects. It could be concluded that, the adverse effects induced by lead acetate, were markedly ameliorated by co-treatment with *S. maxima* more than garlic.

Keywords: Lead, Garlic, Spirulina, Brain, Testis

Acknowledgement

Praise to Allah the most gracious and the most merciful, for all his countless graces, guidance and help to accomplish this research and for providing me with such encouraging and supportive supervisors.

*It gives me great pleasure to express my deepest gratitude and appreciation to **prof. Dr. Youssef Y. M. Shaheen** who made great effort with me in this thesis for devoting much of his precious time, true concern, meticulous supervision and fruitful instructions to achieve this work in the best possible image. It was an honor to be supervised by him.*

*My sincere thanks are offered to **Dr. Mohamed I. Abdrabou** for his careful supervision, insistence on perfection together with the valuable assistance he devoted in the supervision of this study.*

*I would like to express my great thanks to **Dr. Ebtihal M. M. Elleithy** for her great assistance and for providing me with the experience, continuous cooperation and close supervision throughout the work. I appreciate her unforgettable support as well as her generous effort in this study.*

*My appreciation and deep thanks to **Dr. Mona Khamis Galal**, assistant professor of Biochemistry, Faculty of Veterinary Medicine, Cairo University, for her sincere help in the biochemical study in this work, for valuable experience and time and great concern to bring this study to completion.*

*Sincer thanks to **Dr. Mohamed Fathy Mohamed abd-alla**, lecturer of Theriogenology, Faculty of Veterinary Medicine, Cairo University for his kind help in semen analysis.*

I extend my thanks to my senior staff members, my colleagues and all technicians in the department of Cytology and Histology, Faculty of Veterinary Medicine, Cairo University, for their continuous help and kindness during this work,

Finally, I would like to express my appreciation and gratitude to my beloved father “may mercy be upon him”, my beloved mother and my whole family for teaching me devotion to work and for their endless love, care, support and motivation.

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List of Abbreviation

ACh :	Acetylcholine
AChE:	Acetylcholinesterase
ACP :	Acid phosphatase
AKP :	Alkaline phosphatase
ATP :	Adenosine triphosphate
BAX :	BCL2-associated X protein
BBB :	Blood Brain Barrier
Bcl-2 :	B- cell lymphoma 2 protein
BTB :	Blood Testes Barrier
b.wt. :	Body Weight
CAT :	Catalase
CCL ₄ :	Carbon tetrachloride
CNS :	Central Nervous System
DAS :	Diallyl sulfide
DADS:	Diallyl disulfide
DATS:	Diallyl trisulfide
DMSA:	2, 3-meso-dimercaptosuccinic Acid
DNA :	Deoxy-ribonucleic Acid
FSH :	Follicle Stimulating Hormone
GFAP :	Glial Fibrillary Acidic Protein
GPx :	Glutathione Peroxidase
G6PDH :	Glucose -6- phosphate dehydrogenase
GSH :	Reduced Glutathione
GST :	Glutathione S-Transferases
H & E :	Hematoxylin and Eosin

H ₂ O ₂	:	Hydrogen Peroxide
HSP70:		anti-heat shock protein 70
IHC	:	Immunohistochemistry
Kg	:	kilogram
LH	:	Luteinizing Hormone
LPO	:	Lipid Peroxidation
LPP	:	Lipid Peroxidation Product
MAO	:	Monoamine Oxidases
mg	:	Milligram
ml	:	Milliliter
nmol	:	Nanomol
NOS	:	Nitric Oxide Synthase
6-OHDA:		6-hydroxydopamine
Pb	:	Lead
PbAc	:	Lead Acetate
rER	:	Rough Endoplasmic Reticulum
ROS	:	Reactive Oxygen Species
Se	:	Selenium
sER	:	Smooth Endoplasmic Reticulum
SOD	:	Superoxide Dismutase
TEM	:	Transsmition Electron Microscope
μm	:	Micrometer
Zn ²⁺	:	Zinc ion
Fe	:	Iron

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