بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

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Study of Toxicity and Endocrine Disruptions in Two Classes of Pesticides in Male Albino Rats

Thesis

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ABSTRACT

Background: Endocrine disrupting chemicals (EDCs) are chemicals released into the environment and affect an organism's endocrine system. Endocrine disrupting pesticides (EDPs) are the largest group of EDCs in numbers. Pesticides have been associated with endocrine disrupting activity and their potential to modify the hormonal profile was noticed. Organophosphorus (OP) and Carbamate are the most commonly used pesticides in agriculture field **Aim:** This study aimed to determine the toxicity and endocrine disrupting effect of Chlorpyrifos (CPF) as organophosphate pesticide and Carbaryl as carbamte and their mixture in male albino rats. **Material and methods:** Fourty adult Male Swiss albino rats were divided into four groups (10 rats/group): Group (I): control group, Group (II): rats were treated with CPF 10.6mg/kg bw, Group (III) rats were treated with Carbaryl 30mg/ kg bw and Group (IV) rats were treated with mixture of CPF and Carbaryl for two months. The levels of serum MDA, TAC, PON1 and pseudo cholinesterase) as well as serum lipid profile were determined for the study animals. In addition, the endocrine disruptor effect of the studied pesticides was evaluated through measuring serum levels of Testosterone and Estradiol hormones and their receptors AR and ER. Serum thyroid hormones levels were also determined. Histopathological analysis for liver, testes and thyroid was also performed. **Results:** our finding revealed a decrease in TAC, PON1 and cholinesterase levels with an increase in MDA levels in all groups. Levels of lipid profile showed significant increase except HDL levels which decreased in all groups. We also found a reduction in serum hormones (Testosterone, AR, ER and thyroid hormones) while Estradiol showed no significant increase in all groups except in Mix group in the first month it showed significant increase. The histopathological examination showed changes in the examined sections of liver, testis and thyroid. **Conclusion:** The obtained results strongly suggest the toxicity and endocrine disruptor effect of CPF and carbaryl and their mixture.

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List of Abbreviations

Abb.	Full term
AChE	Acetylcholinesterase
ADP	Adinosine diphosphate
AI	Atherogenic index
AR	Androgen receptor
ATP	Adinosine triphosphate
BTC	Butyril-thiocholine
BuChE	Butyrylcholinesterase
Carba	Carbamate
CE	Cholesterol esters
CHE	Cholinesterase
CO	Cholesterol oxidase
CPF	Chlorpyrifos
CPO	Chlorpyrifos oxon
DBD	DNA binding domain
DHT	Dihydrotestosterone
DTNB	5,5- Dithiobis-2-nitrobenzoic acid
DZO	Diazoxon
E2	Estradiol
EDC	Endocrine disrupting chemicals
EDP	Endocrine disrupting pesticides
ER	Estradiol receptor
FSH	Follicle stimulating hormone
GK	Glycerol kinase
GnRH	Gonadotropin-releasing hormones
GPO	Glycerol phosphate oxidase
GR	Glucocorticoid receptor
HDL	High density lipoprotein
LBD	Ligand binding domain
LDL	Low density lipoprotein
LH	Luteinizing hormone
LPL	Lipoprotein lipase
LPO	Lipid peroxidation
MDA	Malonylaldehyde
MR	Mineralocorticoid receptor

List of Abbreviations cont...

Abb.	Full term
mRNA	messenger ribonucleic acid
NES	Nuclear export signal
NLS	Nuclear localization signal
NR	Nuclear receptor
NTE	Neuropathy Target Esterase
OD	Optical density
OP	Organophosphours
OPC	Organophosphours compound
PChE	Pseudo cholinesterase
PO	Paraoxon
POD	Peroxidase
PON1	Paraoxonase1
PR	Progesterone receptor
PVC	Polyvinyl chloride
RLU	Relative light unit
ROS	Reactive oxygen species
RV	Reaction vessels
SD	Standard deviation
StAR	Steroidogenic acute regulatory
T3	Triiodothyronine
T4	Thyroxine
TAC	Total antioxidant capacity
TBA	Thiobarbituric acid
TG	Triglycerides
TSH	Thyroid stimulating hormone
US EPA	Unites States Environmental Protection Agency
VLDL	Very low density lipoprotein
WHO	World health organization

INTRODUCTION

The endocrine system is constituted by a large network of hormones allowing the coordinate functions of many different cell types in multicellular organisms. This network possesses numerous loops of stimulation and retroaction in cascade so that the different physiological parameters and physiological functions (such as development, growth, reproduction, etc.) are set in the proper range for the good health of the whole organism and for the survival of the species **(Yves Combarnous, 2017).**

Endocrine disrupting chemicals (EDCs) are exogenous compounds that have the potential to interfere with hormonal regulation and the normal endocrine system, thereby affecting the health of animals and humans. EDCs can affect an organism's endocrine system in various ways, including the mimicking of endogenous hormones, antagonizing their action or modifying their synthesis, metabolism, and transport **(Kojima *et al*., 2010).**

Many EDCs are man- made chemicals that are released into the environment; for example, phthalates, bisphenol, plasticizers, pesticides, flame retardants and alkylphenols **(Kojima *et al*., 2010).** Endocrine disrupting pesticides (EDPs) are the largest group of EDCs in numbers compared to other chemical groups **(La Fleur & Schug, 2011).**

Pesticides are synthetic chemicals that use worldwide for controlling the agricultural and domestic pest. The active component of pesticides is broad and includes Organochlorine,