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A Study on the antioxidative properties of *Ginkgo biloba* leaf extract in albino rats exposed to gamma radiation or monosodium glutamate.

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

اقالوا سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

This work is dedicated to my father's spirit, my mother, my husband, my lovely daughter Yara, and my brothers and sisters.

I declare that this thesis has been composed by myself and that the work of which is a record has been done by myself. It has not been submitted for a degree at this or any other university.

Noura Mahmoud Marrouf Arafa.

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ABSTRACT

The present study was designed to evaluate the effect of *Ginkgo biloba* leaf extract to improve the hepatic and renal damage induced by γ - radiation or monosodium glutamate (MSG) on certain biological functions in albino rats. The study includes serum transaminases (ALT & AST), γ -glutamyl transferase (GGT), urea, creatinine, glucose-6-phosphate dehydrogenase (G-6-PD) and glucose in serum. Metallothionein (MT), malondialdehyde (MDA), glutathione content (GSH) and superoxide dismutase (SOD) activity were determined in liver and kidney homogenate. The trace elements: iron, zinc, copper, manganese and selenium in liver, kidney, spleen and blood.

The results revealed that γ - radiation or monosodium glutamate caused a significant increase in serum activities of liver enzymes, kidney function, and the glucose level, a decrease in G-6-PD, GSH content, SOD activity while there was an increase in MDA, MT accompanied by changes in trace element concentrations.

Administration of *Ginkgo biloba* extract ameliorated the harmful effects induced by gamma-radiation or monosodium glutamate ; taking in consideration the effect of *Ginkgo biloba* extract as a potent natural antioxidant and scavenger for free radicals.

LIST OF ABBREVIATIONS

ADHA	Attention Deficit-HyperActivity disorder.
AIDS	Acquired Immune deficiency syndrome.
ALT	Alanine transaminase.
ALP	Alkaline phosphatase.
ARC	Hypothalamus Arcuate nucleus.
AST	Aspartate transaminase.
ATP	Adenosine triphosphate.
CAT	Catalase.
CNS	Central nervous system.
CP	Ceruloplasmin.
CRS	Chinese Restaurant Syndrome disease.
Cu-Zn-SOD	Copper Zinc superoxide dismutase.
DTPA	Diethylenetriamine pentaacetic acid.
DNA	Deoxyribonucleic acid.
Ec-SOD	Extracellular superoxide dismutase.
EDTA	Ethylenediamine tetraacetic acid.
FAO	Food and Agriculture Organization.
GBE	<i>Ginkgo biloba</i> leaf extract.
GBSP	Novel antioxidant protein purified from <i>Ginkgo biloba</i> seeds
GGT	Gamma glutamyl transferase.
G-6-PD	Glucose-6-phosphate dehydrogenase.
GSSR	Oxidized Glutathione
GSH	Glutathione reduced enzyme.
GSH-R	Glutathione reductase enzyme.
GSHPX	Glutathione peroxidase enzyme.
H₂O₂	Hydrogen peroxide.
IR group	Irradiated group.
JECFA	Joint Expert Committee on Food Additives.
LOOH	Lipid hydroperoxide.

Mn-SOD	Manganese superoxide dismutase
MDA	Malondialdehyde.
MSG	Monosodium glutamate.
MT	Metallothionein.
NADPH	Nicotinamide adenine dinucleotide phosphate.
NCRRT	The National Center for Radiation Research and Technology.
NO	Nitric oxide
NOS	Nitric oxide synthase.
NPSH	Non-protein sulfhydryl compound.
PAF	Platelet Activating Factor.
RBCs	Red blood corpuscles.
ROS	Reactive oxygen species.
RNA	Ribonucleic acid.
SAT	Serum pyruvate transferase.
SOD	Superoxide dismutase.
SOT	Serum oxalate transferase.
T3	3,5,3'- Triiodothyronine.
T4	L-3,5,3',5' Tetraiodothyronine (Thyroxine).
TBA	Thiobarbituric acid.
TBRAS	Thiobarbituric acid reactive substances.
TCA	Tricholoro aceticacid.
TPO	Antibodies related to thyroid hormones deficiency.
Tris-HCL	Tris-Hydrochloric acid.
UV	Ultraviolet.
XOR	Xanthine oxidoreductase system.
WHO	World Health Orgaization.

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