BIOCHEMICAL STUDIES OF *ZINNIA* PLANT

By

ASMAA HUSSIEN MOHAMED AHMED

B.Sc. Agric. Sci. (Agric. Biochemistry), Fac. Agric., Cairo Univ., 2009

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

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In

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APPROVAL SHEET

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APPROVAL COMMITTEE

Dr. ADEL ELSAYED AHMED HEGAZY.....
Professor of Plant Biotechnology, Genetic Engineering and Biotechnology Research Institute, University of Sadat City

Dr. ABD EL MONEIM MOHAMED RADWAN AFIFY.....
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. OSAMA KONSOWA AHMED .....
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. FOUAD ABD EL REHIM AHMED .....
Professor of Biochemistry, Fac. Agric., Cairo University

Date: 6 / 7 / 2015

SUPERVISION SHEET

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Dr. OSAMA KONSOWA AHMED
Professor of Biochemistry, Fac. Agric., Cairo University

Name of Candidate: Asmaa Hussien Mohamed Ahmed **Degree: M.Sc.**
Title of Thesis: Biochemical Studies of *Zinnia* Plant
Supervisors: Dr. Fouad Abd EL Rehim Ahmed
Dr. Osama Konsowa Ahmed
Department: Agric. Biochemistry

Approval: 6 /7 / 2015

ABSTRACT

This study aimed to evaluate the hepatoprotective and antioxidant activity of *Zinnia elegans* leaves ethanolic extract comparing with silymarine, (as standard) in rats. The data revealed scored high concentration of phenolic compounds (2.6mg/g d.w of plant)**,** which significantly reflected an antioxidant scavening activity (88%) at 250 ppm of *Zinnia elegans* leaves ethanolic extract**.**

The hepatoprotection activity of *Zinnia elegans* leaves ethanolic extract (50, 100 and 125 mg/100g b.w) comparing with silymarine (0.2 g/kg b.w) against CCl_4 toxicity. The ethanolic extract improved the AST and ALT activity and recovered the function of kidney by decreasing the urea and creatinine contents, the administration of *Zinnia elegans* leaves ethanolic extract significantly suppress the oxidative stress via its direct scavenging activity against the reactive oxygen species under oxidative stress. The results reported decreases in the MDA, H_2O_2 and NO accumulation and increase of GSH content.

Finally the administration of *Zinnia elegans* leaves ethanolic extract have recovered the total lipids, triglycerides, cholestrol, VLDL, LDL and HDL and significantly suppress the CCl_4 toxicity via its stimulation of antioxidant enzymes (GST and SOD) activity.

Liver and kidneys function as well as lipid analysis, liver antioxidant enzymes and histopathological degenerative changes in heptocytes were also monitored in the tested groups comparing with silymarin and control treatments.

In vitro anticancer activity with EACC obtained significantly inhibition of cell growth with *Zinnia elegans* leaves ethanolic extract compared with the control.

The results indicated that the *Zinnia elegans* leaves played important roles in the antioxidant hepatoprotective and anticirrhosis activities against CCl_4 induced toixicity on rats and anticancer activity.

Key words: *Zinnia elegans*, CCl_4, EACC, Liver cirrhosis, Hepatoprotective, Oxidative stress, Antioxidant and Anticancer.

DEDICATION

I dedicate this work to whom my heart felt thanks; to my ***mother*** *and my* ***father*** *for their patience and help, as well as to my lovely* ***husband****, my son* ***Mohamed****, my brothers, my sisters and my friends for their support and I can't find adequate words to express my feeling towards them.*

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LIST OF ABBREVIATIONS

No.	Abbreviation	
1	%	Percent
2	4-AAP	4-amino antipyrine
3	4-AP	4- amino phenazene
4	AAP	4-amino antipyrine peroxidase
5	AAS	All America selections
6	ABTS	2,2-Azino bis-(3-ethyl benzo thiazoline)
7	ALP	Alkaline phosphatase
8	ALT	Alanine aminotransferase
9	AR	The androgen receptor
10	AST	Aspartate aminotransferase
11	b.w	Body weight
12	BHT	Butylated hydroxy toluene
13	BUN	Blood urea nitrogen
14	$^{\cdot}CCl_3$	Trichloro methyl radical
15	CCl_4	Carbon tetrachloride
16	CDNB	1-chloro-2,4-di nitro benzene
17	CEE	Crude ethanolic extract
18	COX2	Cyclo oxygenase-2
19	CRP	C-reactive protein
20	d.w	Dry weight
21	DHBS	Dichloro hydroxyl benzene sulfonic
22	dl	Dici litre
23	DNTB	5,5 di thio bis (2-nitro benzoic acid)
24	DPPH	1,1-diphenyl-2-picryl hydrazyl
25	EACC	Ehrlish ascites carcinoma cells
26	EEWC	Ethanolic leaf extract of *W. calendulaceae*
27	Fe-NTA	Iron nitrilo triacetate
28	g	Gram
29	GAE	Gallic acid equivalents
30	GK	Glycerol kinase
31	GOD	Glucose oxidase
32	GPO	Glycerol phosphate oxidase
33	GSH	Glutathione reduced

34	GST	Glutathione-s-transferase
35	H_2O_2	Hydrogen peroxide
36	HDL	High density lipoproteins
37	iNOS	inducibicle nitric oxide synthase
38	kg	Kilo gram
39	LDH	Lactate dehydrogenase
40	LDL	Low density lipoproteins
41	LFP	Litchi fruit pericarp
42	LPL	Lipo protein lipase
43	MDA	malondialdehyde
44	mg	Milli gram
45	MIC	Minimum inhibitory concentration
46	ml	Milli litre
47	NCI	National cancer institute
48	NF-KB	Nuclear factor-KB
49	NO	Nitric oxide
50	NOS	Nitric oxide synthase
51	$^{\cdot}OOCCl_3$	A peroxyl radical
52	PMS	Phenazine metho sulphate
53	POD	peroxidase
54	ppm	Part per million
55	QE	Quercetin equivalents
56	ROS	Reactive oxygen species
57	SDH	Succinate dehydrogenase
58	SOD	Superoxide dismutase
59	TBA	Thiobarbituric acid
60	TCA	Trichloro acetic acid
61	TG	Triglycerids
62	TNF-α	Tumor necrosis factor -α
63	v	Volume
64	VLDL	Very low density lipoproteins