



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

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**Phytochemical Screening and Some Pharmacological Effects of Aqueous and
Alcoholic Extracts of *Echinacea Purpurea* flowers.**

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for
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Phytochemical Screening and Some Pharmacological Effects of Aqueous and Alcoholic Extracts of *Echinacea* *Purpurea* flowers

M.V. Sc. thesis

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ABSTRACT

Echinacea purpurea L. is a perennial plant of family *Asteraceae* with a long, well-established medicinal use in North America, Europe and Australia. The aqueous and alcoholic extracts of *Echinacea purpurea* (*E. purpurea*) were studied against the male reproductive toxicity, Alzheimer's disease and hepatotoxicity. Both plant extracts have no impact on male reproductive efficacy. However, these extracts can protect against Aluminium chloride (AlCl₃) induced reproductive oxidative stress in male rats. This was evident from serum testosterone level, semen picture and histopathological picture of the testes. Both extracts of *E.purpurea* were able to reveal AlCl₃-induced neurotoxicity of the brain tissue induced by its oral administration at 150 mg/kg for 60 days. This activity was reflected *in vivo* by measuring cholinesterase enzyme (ACHE), oxidative stress markers, as well as histopathological picture of the brain and behavioral tests and confirmed *in vitro* using Ellman's assay. Hepatic toxicity was induced by carbon tetrachloride (CCL₄) for 2 consecutive days/week for 2 weeks. The hepatoprotective effect of *E. purpurea* extracts was detected *in vivo* by measuring serum liver enzymes (ALT, AST, ALP), liver oxidative stress markers (MDA, SOD and GSH) and histopathological picture of the liver tissue. The anti-oxidant effect of *E. purpurea* extracts was confirmed using MTT assay *in vitro*. The hepatoprotective effect could be due to the antioxidant activity of these extracts.

Conclusion: *Echinacea Purpurea* herb extracts have good antioxidant effect against male reproductive toxicity, Alzheimer's disease and hepatic toxicity.

Keywords: *Echinacea Purpurea*, Reproductive toxicity, Alzheimer's disease, Hepatotoxicity, Anti-oxidant.

Dedication

TO

My Parents

My Brother and Friends

Who

Are Responsible for Bringing Me Up

To Be Grateful

And

To All Those Who Taught Me

Salma Mostafa

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In the name of Allah, the almighty, who taught the man about matters that he does not know and prayers and peace be upon our holy Prophet Muhammed and his followers till the Day of Judgment.

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CONTENTS

Title	Page
Chapter (1): Introduction	1
Chapter (2): Review of Literature	5
Chapter (3): Papers (Manuscripts)	
3.1. Hepatoprotective Effect of <i>Echinacea Purpurea</i> Herb Extracts against Carbon Tetrachloride-Intoxicated rats	19
3.2. Protective Effect of <i>Echinacea Purpurea</i> Herb Extracts against Reproductive Toxicity in Male Rats	40
3.3. Neuroprotective Effects of <i>Echinacea Purpurea</i> Herb Extracts on Aluminum Chloride-Induced Learning-Impaired Rat Model of Alzheimer's Disease	58
Chapter (4): Discussion	91
Chapter (5): Conclusion	100
Chapter (5): Recommendations	102
Chapter (6): Summary	103
Chapter (7): References	106
المخلص العربي	
المستخلص العربي	

LIST OF FIGURES

Figure	Title	Page
1st paper		
1	Representative figure for Liver Function Parameters (ALT, AST, ALP and Total bilirubin)	28
2	Representative figure for Oxidative Stress Markers (MDA, SOD and GSH)	29
3	Representative figure for Histological Examination of liver tissue	31
2nd paper		
1	Representative figure for serum testosterone level	47
2	Representative figure for Semen picture Sperm cell concentration, progressive motility percentage, live/dead ratio, and sperm abnormality	48
3	Representative figure for Histopathological examination of the testes	50
4	Representative figure for Diameter (μm) of the seminiferous tubules in the different experimental groups	51
5	Representative figure for Johnsen's spermatogenesis score	52
3rd paper		
1	Representative figure for In vitro evaluation of Anti Alzheimer's (Acetyl Cholinesterase inhibitory activity) for both extracts and different fractions using Ellman's assay.	70
2	Representative figure for Cholinesterase Estimation in brain tissue, Data analyzed by GraphPad (Prism 8).	71
3	Representative figure for Oxidative stress markers estimation (MDA, SOD, GSH, NO and catalase), Data analyzed by GraphPad (Prism 8).	72
4	Representative figure for behavior evaluation for Alzheimer's disease rats (Y-maze test, NOR test and forced swimming test)	75
5	Photomicrograph of cerebral cortex (H&E) and (Congo red) stained showing dark degenerating neurons (red arrows) and amyloid plaques	77
6	Photomicrograph of hippocampus (H&E) stained showing degenerating neurons within the different regions of the hippocampus	78

LIST OF TABLES

TABLES	Title	Page
Review		
1	Taxonomy of Echinacea purpurea herb	7
2	Traditional uses of different species of echinacea	11
3	Possible interaction of Echinacea with other supplements/drugs/foods	17
2nd paper		
1	Phytochemical constituents of E. Purpurea ethanolic extract	46
3rd paper		
1	Primer sequences used in the real time PCR for estimating gene expression of IL-6 and TNF-α	67
2	Representative table for down regulation of Gene expression of IL-6 in brain tissue using Real-time quantitative PCR	73
3	Representative table for down regulation of Gene expression of TNF-α in brain tissue using Real-time quantitative PCR	74

LIST OF ABBREVIATIONS

ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
ALP	Alkaline phosphatase
AD	Alzheimer's disease
ACHE	Cholinesterase enzyme
ACH	Acetyl choline
Aβ plaques	β amyloid plaques
AlCl₃	Aluminium chloride
COX-1	Cyclooxygenase-1
COX-2	Cyclooxygenase-2
CCL₄	Carbon tetrachloride
CAT	Catalase
FCT	Forced swimming test
GSH	Reduced Glutathione
H&E	Hematoxylin and Eosin
HC	Hippocampus
IC₅₀	Inhibitory concentration 50
IL-6	Interleukin-6
IL-1b	interleukin 1b
LPO	Lipid peroxidation
MDA	Malondialdehyde
NO	Nitric oxide
NOR test	New object recognition test
PBS	Phosphate buffered saline
RNA	Ribonucleic acid
RT-PCR	Real time-polymerase chain reaction
ROS	Reactive oxygen species
SOD	Superoxide dismutase
O₂-	superoxide anion
OH-	hydroxyl radical
TNF-α	Tumor necrosis factor alpha

Chapter (1)
Introduction

Introduction

Medicinal plants are important for pharmacological research and drug development, not only when plant constituents are directly used as therapeutic agents, but also as starting for the synthesis of drugs or as a model for pharmacologically active compounds (**Mukherjee, 2003**). According to World Health Organization about 80% of people in developing countries still depends on traditional medicine based largely on species of plants and animals for their primary health care (**Verma and Singh, 2008**).

Current research in drug discovery from medicinal plants involve a multifaceted approach which include botanical, phytochemical, biological, and molecular techniques. Drug discovery from medicinal plants continues to provide an important effect against various pharmacological effects including cancer, Alzheimer's disease, diabetes and liver diseases. Several natural products of plant origin had recently been introduced to the market as food supplements for the treatment of different diseases (**Billah *et al.*, 2019**). Medicinal plants represent the oldest and most widespread form of medication. Nature always stands as a golden mark to exemplify the outstanding phenomena of symbiosis. Chemists of natural products prepare extracts from the plant materials, subject these extracts to biological screening in pharmacological assays, and commence the process of isolation and characterization of the active compounds through bioassay-guided fractionation. Molecular biology has become essential to medicinal plant drug discovery through the determination and implementation of appropriate screening assays directed towards physiologically relevant molecular targets (**Balunas and Kinghorn, 2005**).

Recently, the use of plants as medicine has involved the isolation of bioactive compounds, beginning with the isolation of morphine from opium in the early 19th century. The discovery of pharmacologically active compounds from medicinal plants is very important to overcome side effects of synthetic chemical drugs. Nowadays, drug discovery techniques have been applied to the standardization of herbal medicines to elucidate analytical marker compounds (**Senica *et al.*, 2019**).

Natural products are increasing gradually as many synthetic drugs have revealed serious side effects. Therefore, it is better to look for natural substances with effective pharmacological actions and more safety (**Padmavathi, 2013**). In the field of herbal medicine there is an exponential growth in both developing and develop