بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HANAA ALY

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

**نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات**

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

Cairo University

Faculty of Veterinary Medicine

Department of Pharmacology

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

Thesis submitted by

Salma Mostafa Mohamed

(B.V.Sc., Cairo University, 2017)

for

(M.V.Sc. degree) (Veterinary Pharmacology)

Under Supervision of

Prof.Dr. Mostafa Abbas Shalaby

Professor of Pharmacology

Faculty of Veterinary Medicine

Cairo University

Prof.Dr.Hossny Awad ELbanna

Professor of Pharmacology

Faculty of Veterinary Medicine

Cairo University

Dr.Abdelbary Mohamed Elprince

Assistant Professor of Biochemistry

Faculty of Veterinary Medicine

Cairo University

(2021)

Cairo University
Faculty of Veterinary Medicine

APPROVAL SHEET

This is to certify that the Thesis presented by **Salma Mostafa Mohamed** to Cairo University entitled **" Phytochemical Screening and Some Pharmacological Effects of Aqueous and Alcoholic Extracts of** *Echinacea Purpurea* **flowers "** for the master's Degree in Veterinary Medical Sciences (**Pharmacology**) has been approved (**4/ 1/ 2021**) by the following examining Committee:

1. **Prof. Dr. Ashraf Abdel Hakeem Elkomy**

   Professor of and Head of Pharmacology, Faculty of Veterinary Medicine, Banha University.

2. **Prof. Dr. Khaled Abu ELSooud**

   Professor and Head of Pharmacology Department, Faculty of Veterinary Medicine, Cairo University.

3. **Prof. Dr. Mostafa Abbas Shalaby**

   Professor of Pharmacology, Faculty of Veterinary Medicine, Cairo University.

4. **Prof. Dr. Hossny Awad Elbanna**

   Professor of Pharmacology, Faculty of Veterinary Medicine, Cairo University.

(2021)

SUPERVISION SHEET

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

M.V. Sc. thesis

By

Salma Mostafa Mohamed

(B.V. Sc. 2017; Cairo University)

SUPERVISION COMMITTEE

Prof. Dr. Mostafa Abbas Shalaby

Professor of Pharmacology, Faculty of Veterinary Medicine, Cairo University.

Prof. Dr. Hossny Awad Elbanna

Professor of Pharmacology, Faculty of Veterinary Medicine, Cairo University.

Dr. Abdelbary Mohamed Elprince

Assistant professor of Biochemistry, Faculty of Veterinary Medicine, Cairo University.

Name: Salma Mostafa Mohamed

Date of Birth: 14/10/1993

Nationality: Egyptian

Specialization: Pharmacology

Degree: Master Degree

Title of thesis: **Phytochemical Screening and Some Pharmacological Effects of Aqueous and Alcoholic Extracts of *Echinacea Purpurea* flowers**

Under supervision of:

Prof. Dr. Mostafa abbas shalaby

Professor of pharmacology, Faculty of Veterinary Medicine, Cairo University

Prof. Dr. Hossny Awad Elbanna

Professor of pharmacology, Faculty of Veterinary Medicine, Cairo University.

Dr. Abdelbary Mohamed prince

Assistant Professor of Biochemistry, Faculty of Veterinary Medicine, Cairo University.

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

ACKNOWLEDGEMENT

CONTENTS

LIST OF FIGURES

LIST OF TABLES

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	Cycloxygenase-1
COX-2	Cycloxygenase-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	Malondialdhyde
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