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Assesment of *Aloe vera*, *Azadirachta indica* and *Moringa oleifera* aqueous extracts on induced hepatotoxicity in rat

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جامعة عين شمس
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تأثير مستخلصات الصبار و النيم و المورينغا على تحسين التسمم الكبدي المستحث في الجرذان

رسالة مقدمة للحصول على درجة الماجستير في العلوم كجزء مكمل لمتطلبات رسالة الماجستير بكلية العلوم

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ABSTRACT

Eighty albino rats have been divided into ten groups. First group was fed on a basal diet while the second group was administered paraffin (10 ml/kg body weight) through gavage for four days. The third to the tenth groups received (5 ml/kg b. wt.) CCl_4: liquid paraffin (2:1) for three days followed by (10 ml/kg body weight) CCl_4: liquid paraffin (2:1) for one day through gavage. Group three kept without any treatment, other groups then received (AV) (60 mg/kg body weight), (MO) (200 mg/kg body weight), (N) (200 mg /kg body weight), bi-extract of (AV+N), bi-extracts of (AV+MO), bi-extract of (MO+N), and tri-extracts of (AV+N+MO) respectively for 36 days. The liver and blood were studied for hepatotoxicity and antioxidant indices.

Biochemical and histopathological analysis revealed that CCl_4 elevated plasma liver enzymes (aspartate transaminase, alanine aminotransferase, and gamma glutamyl transferase). Carbon tetrachloride also caused an elevation in erythrocyte content of glutathione with a concomitant increase in the plasma malondialdeyhde content, along with marked atrophy of hepatocytes. However, these effects were ameliorated by the treatment of rats with the different extracts.

Results showed that administration of the aquatic extracts of *Aloe vera*, Neem and Moringa (separately/mixedly) played a therapeutic role against CCl_4-induced liver damage by improving liver enzyme activities, blood antioxidant parameters, and liver histopathological picture of intoxicated rats.

CONTENTS

LIST of ABBREVIATIONS

AGE	Analogy to advanced glycation end-products
ALE	Advanced lipoxidation end-products
ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
AV	Mono aqueous extract of *Aloe vera*
b. wt.	Body weight
CAT	Catalase
CDDP	Cisplatin, cis-diamminedichloroplatinum
$CH_2(CHO)_2$	1,3-Propanedial
DPPH	2,2-diphenyl-1-picrylhydrazyl
DNPH	2,4- Dinitrophenylhydrazine
DTNB	5,5` dithiobis (2-nitrobenzoic acid)
EPR	Electron paramagnetic resonance

FRAP	Ferric reducing ability of plasma
GPx	Glutathione peroxidase
GSH	Reduced glutayhione
HE	Hematoxylin and eosin
IL	Interleukin
I.p.	intra-peritoneally
MDA	Malondialehyde
MNLE	Methanolic neem leaves extract
MO	Mono aqueous extract of Moringa
N	Mono aqueous extract of Neem
NO	Nitric oxide
Ppb	Parts-per-Billion
PUFA	Poly unsaturated fatty acid
ROS	Reactive Oxygen species
SOD	Superoxide dismutase

TBA	Thiobarbituric acid
TGFs	Transforming growth factors
TNF-α	Tumor necrosis factor-alpha

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INTRODUCTION AND AIM OF THE WORK

Exposure to toxic chemicals, environmental pollutants and drugs can cause cellular injuries through metabolic activation of reactive oxygen species (ROS) (Szymonik-Lesiuk, *et al*. 2003). Carbon tetrachloride is used to induce hepatotoxicity in animal models through lipid peroxidation. Flavonoids are a large group of polyphenolic compounds that play an important role in detoxification of free radicals and are markedly found in fruits, vegetables, and medicinal plants (Potter 1997). *Moringa oleifera*, *Azadirachta indica*, and *Aloe vera* are phenolic rich plants which have remarkable medical importances. This study has investigated the effect of *Moringa oleifera*, *Azadirachta indica*, and *Aloe vera* mono, bi-, and tri aqueous extracts on rats received (5 ml/kg b. wt.) for three days followed by (10 ml/ kg b. wt.) CCl_4: liquid paraffin (2:1). Protective effect of *Moringa oleifera*, *Azadirachta indica*, and *Aloe vera* on plasma liver enzymes, proteins, antioxidant and liver pathology in CCl_4-induced hepatotoxicity in rats.

This study aims to identify the correlation between *Moringa oleifera*, *Azadirachta indica*, and *Aloe vera*