Assessment of Some Medicinal Egyptian Plants as a Hepatoprotective Agent

Thesis

Submitted for the award of the degree of Ph.D.in Biochemistry

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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.

Wafik Abul Ella Mohamed Al-Khayat

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ABSTRACT

The vast majority of people on this planet still rely on their traditional material medica (medicinal plants and other materials) for their everyday health care needs. It is also a fact that one quarter of all medical prescriptions are formulations based on substances derived from plants or plant-derived synthetic analogs, and according to the WHO, 80% of the world's population, primarily those of developing countries, rely on plant-derived medicines for their healthcare.

The current study was conducted to assess the hepatoprotective activity of some medicinal antioxidant plants against carbon tetrachloride (CCl_4) intoxication in liver albino rats. *Centaurea aegyptiaca*, red and yellow carrot were the medicinal antioxidant plants of choice in the present study.

In the present study, 144 adult male albino rats, weighing from 150-200 gm, were classified into two main groups. Group A (normal control group) and group B (liver injured group). ***Group A:*** 24 rats were left to serve as normal basic controls and were subclassified into four subgroups (A1, A2, A3 & A4).

Group B: 120 rats were administered with CCl_4 in a dose of 1 mL/kg twice a week for 5 weeks and were divided into 4 subgroups: ***Group B1:*** treated with CCl_4 (+v) control, ***Group B2:*** treated with *Centaurea aegiptiaca* + CCl_4, ***Group B3:*** treated with red carrot + CCl_4 and ***Group B4:*** treated with yellow carrot + CCl_4. The results of the current study revealed

that the mean serum levels of AST, ALT, LDH, and GGT of carbon tetrachloride (CCl_4) treated (+ve) control group are highly significantly ($p < 0.01$) increased compared to that of untreated (-ve) control groups along the study duration. Meanwhile, the mean serum levels of AST, ALT, LDH, and GGT of *Centaurea aegiptiaca* protected groups are highly significantly ($P<0.01$) decreased compared to that of CCl_4 treated (+ve) control group. In the red and yellow carrot groups, the mean serum levels of AST, ALT, LDH, and GGT ranged between significant ($P<0.05$) and highly significant ($P<0.01$) decrease compared to that of carbon tetrachloride (CCl_4) treated (+ve) control.

On the other hand, the mean serum level of AChE activities of *Centaurea aegiptiaca*, red and yellow carrot protected groups are highly significantly ($p<0.01$) increased compared to the carbon tetrachloride (CCl_4) treated group throughout the study duration.

In conclusion, the selected medicinal plants (*Centaurea aegyptiaca,* red carrot and yellow carrot) have efficient hepatoprotective effect against carbon tetrachloride (CCl_4) hepatotoxicity.

Further studies are needed to identify and characterize the entire spectrum of mediators that energize the antioxidant effects of these plants specially on the cellular and molecular levels.

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List of Abbreviations

O_2^-	Superoxide radical
AChE	Acetylcholinestrase
ALT	Alanine aminotransferase
ASH	alcoholic steatohepatitis
AST	Aspartate aminotransferase
AVED	Ataxia and vitamin E deficiency
B[a]P	Benzo [a] pyrene
Ca^{++}	Calcium
CAH	Chronic active hepatitis
CCK	Cholecystokinin
CCl_3	Trichloromethyl radical
CCl_4	Carbon tetrachloride
C-I	Type I Collagen
C-II	Type II Collagen
C-III	Type III Collagen
CP	Ceruloplasmin
Cu	Copper
Fe	Iron
FLD	Fatty liver disease
GGT	Gamma glutamyl transferase
GLDH	Glutamate dehydrogenase
GSHPx	Glutathione Peroxidase
GSSG	Oxidized glutathione
GST	Glutathione S-Transferase

H_2O_2	Hydrogen Peroxide
HOCl	Hypochlorous Acid
ICDH	Iso-citrate dehydrognase
LOOH	Lipid hydroperoxide
MRP	Multidrug Resistance Protein
NAD	Nicotineamide adenine dinucleotide
NADH	Reduced B-nicotinamide adenine dinucleotide
NASH	Non-Alcoholic Steatohepatitis
Ni	Nickel
$NiCl_2$	Nickel chloride
OH	Hydroxyl Radical
PBL	peripheral blood lymphocytes
PBS	Phosphate-buffered saline
PCBS	Polychlorinated biphenyls
Q_0^-	Conenzyme Q_0
ROS	Reactive oxygen species
SDS	Sodium dodecyl sulfate
SLE	Systemic Lupus Erythematosus
SODs	Superoxide Dismutases
SSB	Single Strand Break
TE	Tris EDTA buffer
UQ	Ubiquinone

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