BIOCHEMICAL STUDIES ON WATERMELON RINDS AGAINST ACUTE NEPHROTOXICITY AND HEPATOTOXICITY

By

HEBA BADOA IBRAHIM MOHAMED

B.Sc. Agric. Sci. (Agricultural Biochemistry), Fac. Agric., Cairo Univ., 2010

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Date: 11/6 /2019

SUPERVISION SHEET

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Title of Thesis: Biochemical studies on watermelon rinds against acute nephrotoxicity and hepatotoxicity

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Dr. Eman Ahmed Hanafy

Department: Agricultural Biochemistry **Approval: 11/6/2019**

ABSTRACT

The present study was carried out to highlight the protective effect of watermelon rind against dimethoate induced nephrotoxicity and hepatotoxicity. Proximate analysis of watermelon rinds in dry weight and some phytochemical screening and HPLC quantitative analyses of phenolic compounds, flavonoids and organic acids in water extract (WE) and ethanolic extract (EE) of watermelon rinds were determined. Amino acids were analyzed by amino acid analyzer. The results showed that moisture content, ash, crude protein, crude fat, crude fiber and total hydrosable carbohydrate were 14.80, 16.50, 15.3, 1.8, 13.60 and 38.20% respectively. Also phenolic compounds, flavonoids, tannins and vitamin C were 14.88 mg/g, 2.55 mg/g, 2.11 mg/100g and 6.65 mg/100g respectively in water extract and 13.66 mg/g, 2.34 mg/g, 1.52 mg/100g and 5.22 mg/100g respectively in ethanolic extract. Catechol, epicatechein, e-vanillic, pyrogallol and salycilic were identified by HPLC at highly levels in phenolic compounds in WE and EE. While hisperidin and narengin were the major flavonoids identified by HPLC in both extracts (WE, EE). Citric, D, L malic, acetic and propenoic acids were main organic acids detected by HPLC in WE and EE. Lysin, arginine, valine, glutamic acid, aspartic acid and proline were a much higher amino acids identified by amino acid analyzer.

The male albino rats treated with WE (2g /kg b.w.), EE (2g /kg b.w.) and WMRP5% (basal diet supplemented with 5% watermelon rinds powder). Along with administration of dimethoate (40 mg/kg b.w.) 1/10 LD_{50} and (20 mg/kg b.w.) 1/20 LD_{50} for 6 weeks. The obtained results showed that the treatments generally lowered the DM-induced activity of hepatic enzyme markers (AST, ALT, ALP) and total bilirubin, kidneys function parameter levels (urea, uric acid and creatinine) and lipid profiles levels (triglycerides, cholesterol, LDL-c and VLDL-c) but increased protein profile (protein, albumin and globulin) and HDL-c levels. Also, the histopathological examination showed marked improvements in histological structure of the liver, kidneys and testes. These results indicate that watermelon rinds has protective effect against dimethoate induced hepatotoxicity and nephrotoxicity. This may be attributed to the powerful antioxidants (phenolic compounds and flavonoids) which present in high levels in watermelon rinds.

Key words: watermelon rinds , phenolic compounds, flavonoids, dimethoate, rats, hepatotoxicity, nephrotoxicity

DEDICATION

I dedicate this thesis firstly to my ***lovely Parents, my brothers Mohamed*** *and* ***Ibrahim and my sisters Dina , Rahma and rabab*** *whom support me in everything who helped me to finish my master thesis. As well as* ***to my husband Tarek and my daughters logain and Noursen*** *for their help and patience.*

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LIST OF ABBREVIATIONS

Abbreviation	
AChE	Acetylcholinesterase
ALP	Alkaline phosphatase
ALT	Alanine aminotransaferase
AST	Aspartate aminotransaferase
ATF	Anti tumer factor
ATP	Adenosine triphosphate
CCl4	Carbon tetrachloride
DM	Dimethoate
DMSO	dimethylsulfoxide.
D.A.AS	dispensable amino acids
FAO	Food and Agriculture Organization
GD	Gestation days
GK	Glycerol kinase
GOD	Glucose oxidase
GPO	Glycerol phosphate oxidase
GPX	Glutathion peroxidase
GST	Glutathione-S-transferase
GR	Glutathione reductase
H and E stain	Heamtoxyline and eosin stain
H2O2	Hydrogen peroxide

Continued.

HDL-c	**High density lipoprotein-cholesterol**
I.A.As	**indispensable amino acids**
LDH	**Lactate-dehydrogenase**
LDL-c	**Low density lipoprotein cholesterol**
LPL	**Lipoprotein lipase**
LPO	**Lipid peroxidation**
NRC	**National Research center**
OPI	**Organophosphorus insecticide**
POD	**Peroxidase**
ROS	**Reactive oxygen species**
SDS	**Sodium dodecyl sulphate**
SOD	**Superoxide dismutase**
TB	**Total bilirubin**
VLDL-c	**Very low density lipoprotein-cholesterol**
WHO	**World Health Organization**

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