

BIOCHEMICAL STUDIES ON SOME BIOACTIVE COMPOUNDS FROM FRUIT BY-PRODUCTS

By

HABIBA ABD EL-AZIZ AHMED

B.Sc. Agric. Sci. (Agricultural Biochemistry), Fac. Agric., Cairo Univ., 2011

THESIS

**Submitted in Partial Fulfillment of the
Requirements for the Degree of**

MASTER OF SCIENCE

In

**Agricultural Sciences
(Agriculture Biochemistry)**

**Department of Agricultural Biochemistry
Faculty of Agriculture
Cairo University
EGYPT**

2016

APPROVAL SHEET

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APPROVAL COMMITTEE

Dr. SOBHY AHMAD EL-SOHAIFY
Researcher Professor of Biochemistry, Mubarak City for Science and
Technology, Arid Lands Cultivation Research Institute, Alexandria

Dr. HANY ABDEL-AZIZ EL-SHEMY
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. AHMED MAHMOUD MOSTAFA ABOUL-ENEIN
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. FATEN MOHAMED ABOU-ELELLA
Professor of Biochemistry, Fac. Agric., Cairo University

Date: 16/8/2016

SUPERVISION SHEET

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SUPERVISION COMMITTEE

Dr. AHMED MAHMOUD MOSTAFA ABOUL-ENEIN
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. FATEN MOHAMED ABOU-ELELLA
Professor of Biochemistry, Fac. Agric., Cairo University

Dr. ZEINAB HANEM ABD EL-RAHMAN SALAMA
Researcher Professor of Plant Nutrition, National Research Centre

Name of Candidate: Habiba Abd El-Aziz Ahmed **Degree:** M.Sc.

Title of Thesis: Biochemical Studies on Some Bioactive Compounds From
Fruit By-products

Supervisors: Dr. Ahmed Mahmoud Mostafa Aboul-Enein

Dr. Faten Mohamed Abou-Elella

Dr. Zeinab Hanem Abd El-Rahman Salama

Department: Agriculture Biochemistry

Approval: 16 / 8 / 2016

ABSTRACT

This research was carried out to investigate the chemical composition, and phytochemicals of some fruit by-products; kiwi peels (KP), banana peels (BP), banana leaves (BL) and olive leaves (OL). All tested samples were extracted by water, 80 % methanol, 80% ethanol and 80% acetone. Total phenols, flavonoids and tannins for all extracts were determined as well as the sample extracts were evaluated for their antioxidant, antimicrobial, anticancer and anti-diabetic activities. Phenolic compounds isolated from acetone extracts of samples were characterized and identified by HPLC.

Antioxidant assays by DPPH[•], ABTS^{•+}, reducing power and Fe²⁺ chelating were evaluated. The best IC₅₀ values to quench the DPPH[•], ABTS^{•+} and Fe²⁺ chelating of these samples extracts were obtained by acetone extracts. Acetone extracts (600µg/ml) showed higher antimicrobial activity than ethanolic extracts of KP, BP, BL and OL against gram positive and negative bacteria and fungi. The results showed that the acetone extracts of KP, BP, BL and OL exhibited cytotoxic effects on cancer human cells in a dose dependent manner assessed by MTT assay. Diabetes was induced in female rats using streptozotocin (45 mg/kg body weight). Oral ingestion (500 mg/kg bw daily) of KP, BP, BL and OL (acetone extracts) for 30 days led to decrease blood glucose levels, restored renal and liver function. In addition, acetone extracts for tested samples reduce GPX, GST and catalase activity, as well as anti-inflammatory biomarkers of diabetic rats. The histopathological study revealed protective effect of acetone extracts on β-cells, kidney and liver in diabetic rats and apparent normal. It could be concluded that, the antioxidant and anti-hyperglycemic properties of plants extracts may offer a potential therapeutic source for the treatment of diabetes.

Keywords: Antioxidant, antimicrobial, anticancer, anti-diabetic, kiwi, banana, olive wastes.

DEDICATION

*I dedicate this work to whom my heartfelt thanks; to my **Mother**, my **Father**, my **Brother's**, my **Sister's** and my **Friends** for their patience and help, for all the support they lovely offered along the period of my post graduation.*

ACKNOWLEDGEMENT

*I wish to express my sincere thanks, deepest gratitude and appreciation to **Dr. Ahmed Mahmoud Mostafa Aboul-Enein**, Professor of Biochemistry, Faculty of Agriculture, Cairo University for suggesting the problems, supervision, continued assistance and their guidance through the course of study.*

*I wish to express my sincere thanks, deepest gratitude and appreciation to **Dr. Zeinab Hanem Abd El-Rahman Salama**, Researcher Professor of plant Nutrition, Department of Plant Biochemistry, National Research Center, for suggesting the subject, for the extremely good research facilities, constructive supervision and criticism throughout the course of the work.*

*In addition, many thanks to **Dr. Faten Mohamed Abou-Ellella**, Professor of Biochemistry, Faculty of Agriculture, Cairo University for help me in the writing of the thesis and support me to complete this thesis and help me all the time. Grateful appreciation is also extended to **Dr. Alaa Gaffar**, Associate Professor of Biochemistry, Department of Plant Biochemistry, and to **Dr. Hanan Farouk**, Researcher Professor of Biochemistry, Department of Therapeutic Chemistry, National Research Center, for their help in the Biochemical assay and the revise of the thesis. Their knowledge and logical way of thinking has been of great value to me. Their understanding, encouragement and personal guidance provided a good basis for the present thesis.*

*In addition, many thanks to **Dr. Ayman Abdel aziz** and to **Dr. Fathy Mehaya**, Researchers of Food Technology, National Research Center, for their help me all the time.*

Also, Grateful appreciation to all staff members of Biochemistry Department, Faculty of Agriculture, Cairo University, and to all staff members of Plant Biochemistry, National Research Center.

LIST OF ABBREVIATIONS

FW	Fresh weight
DW	Dry weight
GAE	Gallic acid equivalent
CE	Catechin equivalent
QE	Quercetin equivalent
TAE/TE	Tannic acid equivalent
rt	Retention time
MIC	Minimum Inhibitory Concentration
MFC	Minimal Fungicidal Concentration
MCF7	Michigan Cancer Foundation-7
HepG2	Hepatoma
TL	Total lipid
TG	Triglyceride
TC	Total cholesterol
HDL-C	High density lipoprotein-cholesterol
ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
ALP	Alkaline phosphatase
GSH	Reduced glutathione
NO	Nitric oxide
GPX	Glutathione peroxidase
GST	Glutathione-s-transferase
MAD	Malondialdehyde
CAT	Catalase
ICAM	Intercellular adhesion molecules
VCAM	Vascular cell adhesion molecules
(IL)-1 β	Interleukin 1 beta
TNF- α	Tumor necrosis factor-alpha
TGF- β	Transforming growth factor-Beta

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