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

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APPROVAL SHEET

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SUPERVISION SHEET

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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 $DPPH^{\bullet}$, $ABTS^{\bullet+}$, reducing power and Fe^{2+} chelating were evaluated. The best IC_{50} values to quench the $DPPH^{\cdot}$, $ABTS^{\bullet+}$ and Fe^{2+} 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.*

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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)-1β	Interleukin 1 beta
TNF-α	Tumor necrosis factor-alpha
TGF-β	Transforming growth factor-Beta

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