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Mariam Ibrahim Gamal El-Din

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List of abbreviations

AcOH-6%	6% acetic acid
$AlCl_3$	Aluminium chloride
ALT	Alanine transaminase
AST	Aspartate aminotransferase
BAW	*n*-Butanol/ acetic acid/ water
^{13}C-NMR	Carbon-13-Nuclear Magnetic Resonance
C_6H_6	Benzene
CC	Column Chromatography
CCl_4	Carbon tetrachloride
CoPC	Comparative paper chromatography
Cpd.	Compound
d	doublet
δ	Chemical shift
dd	doublet of doublet
dil.	Diluted
2D-PC	Two dimensional paper chrompatography
DMEM	Dulbecco's Modified Eagle's Medium
DMSO-d_6	Deutrated Dimethylsulfoxide-d_6
EcTI	Enterolobium contortisiliquum Trypsin Inhibitor
EDTA	Ethylenediaminetetraacetic acid
ELISA	Enzyme-linked immunosorbent assay
Fig.	Figure
g	Gram
g/L	Gram / liter
GC-MS	Gas Chromatography / Mass Spectrometry
^{1}H-NMR	Proton Nuclear Magnetic Resonance
HPLC	High performance liquid chromatography

Hz	Hertz
IC_{50}	Inhibitory concentration by 50 %
IU/ml	International unit per milliliter
***J* value**	Coupling constant
KIO_3	Potassium iodate
MDA	Malondialdehyde
Mg	Magnesium
mol/L	Mole/ liter
NADH	Nicotinamide adenine dinucleotide
NBT	nitroblue tetrazolium
nm	Nanometer
No.	Number
OD	optical density
ODS	Octadecylsilanized
PC	Paper Chromatography
PMs	Phenazine methosulphate
PPC	Preparative paper chromatography
ppm	Part Per Million
s	Singlet
SGOT	serum glutamic oxaloacetic transaminases
SGPT	serum glutamic pyruvic transaminases
sh	Shoulder
SOD	Superoxide dismutase assay
SRB	Sulphorodamine B
TBA	Thiobarbituric Acid
TBARS	Thiobarbituric acid reactive substance
TFA	Trifluoroacetic acid
TLC	Thin Layer Chromatography

TMS	Tetramethylsilane
Tris-HCl	Tris (hydroxymethyl) aminomethane hydrochloride
UV	Ultraviolet
xg	Multiples of gravity
λ	Wave length

Introduction

Natural products from plants are a rich resource used for centuries to cure various ailments. They symbolize safety in contrast to the synthetics that are regarded as unsafe to human and environment **(Singab, 2012)**. Phenolic compounds form one of the main classes of secondary metabolites. They display a large range of structures and contribute to the nutritional qualities of fruits and vegetables. Among these compounds, flavonoids constitute one of the most ubiquitous groups of plant phenolics. Due to the variety of their pharmacological activities in the mammalian body, flavonoids are more correctly referred as “nutraceuticals”. Plant polyphenols have drawn increasing attention due to their potent antioxidant properties and their marked effects in the prevention of various oxidative stress associated diseases such as cancer. In the last few years, the identification and development of phenolic compounds or extracts from different plants have become a major area of health- and medical-related research **(Tapas, *et al.,* 2008)**.

Family Fabaceae which is commonly known as Leguminosae, the legume family, pea family or bean family is a large and economically important family of flowering plants. The name 'Fabaceae' comes from the defunct genus *Faba*, now included into *Vicia*. Leguminosae is an older name still considered valid, and refers to the typical fruit of these plants which are called legumes. The legume family (Fabaceae) is the third largest family of flowering plants after the sunflower family (Asteraceae) and the orchid family (Orchidaceae). According to a recent account, there are approximately 19,325 species in 727 genera, although these figures can be expected to change slightly as a result of taxonomic revisions or the discovery of new taxa **(Lewis *et al.*, 2005**). The Leguminosae and products derived from them contribute to many areas of human activity, including medicine, agriculture, horticulture, nutrition, industry, manufacturing, and construction. Some of these applications are dependent on, or associated with the great diversity of natural products produced by this family, in which phenolics are particularly prominent **(Stevens, 2008)**.

Enterolobium, an important genus of family Fabaceae belongs to subfamily Mimosoideae. It comprises 12 species of flowering plants native to tropical and warm-temperate regions of the Americas. They are medium-sized to large trees. Some of these *Enterolobium* species, including, *Enterolobium timbouva* are cultivated in Egypt. Since nothing could be traced in literature concerning the phenolic content of the various parts of *Enterolobium timbouva* and as part of an ongoing study to discover potential bioactive phenolics from terrestrial plant sources **(Ayoub *et al.,* 2009; Ayoub 2010)**, the present study was directed to investigate the phenolics present in the methanol soluble fraction of the aqueous extract obtained from the leaves of *Enterolobium timbouva* and to investigate the possible biological activities of the extract as well as its constitutive phenolics.

Aim of the work:

The work presented in this thesis is summarized into these points:

1. Collection, identification, authentication and drying of the plant material.
2. Preparation of the methanol soluble fraction of the aqueous extract of the plant leaves.
3. Phytochemical investigation of the methanol soluble fraction of the aqueous extract.
4. Chromatographic fractionation of the the methanol soluble fraction of the aqueous extract for isolation and characterization of the bioactive compounds in each fraction.
5. Physico-chemical identification of the different isolates using both chemical and spectroscopic methods of analysis.
6. Bilogical screening of the extract and correlating the activity with the isolated chemical compounds.