Ain Shams University

Faculty of Pharmacy

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Phytochemical and Biological Investigation of *Phoenix roebelenii* (Family Arecaceae)

A Thesis
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ANOVA	Analysis of variance
bp	base pairs
C	Carbon
^{13}C-NMR	Carbon-13 Nuclear Magnetic Resonance
δ	Chemical shift relative to a standard (e.g. TMS)
CC	Column Chromatography
CoPC	Comparative Paper Chromatography
J value	Coupling constant
DL	Day Light
DNA	Deoxyribonucleic acid
DMSO-d_6	Deutrated dimethoxysulfoxide
DPPH	2,2-diphenyl-1-picryl hydrazyl
EI-MS	Electron Impact –Mass Spectroscopy
ESI-MS	Electron Spray Ionization–Mass Spectroscopy
EDTA	Ethylene diamine tetra acetic acid
GC/MS	Gas Chromatography Coupled with Mass Spectrometry
g	gram
IC_{50}	Half maximal inhibiting capacity
SC_{50}	Half maximal scavenging capacity
Hz	Hertz
HPLC	High Performance Liquid Chromatography
m/z	Mass to charge ratio
MHz	Mega Hertz
µg	Micro grams
mM	milli Mole
mg	milligram
min.	minute
nm	Nanometer
NRC	National Research Centre
-ve	negative
NR	Neutral Red
1D	One-dimensional
PC	Paper Chromatography
ppm	Part per million
P.	*Phoenix*
PCR	Polymerase Chain Reaction
+ve	positive
PPC	Preparative Paper Chromatography
^{1}H-NMR	Proton Nuclear Magnetic Resonance

RAPD	Random Amplified Polymorphic DNA
R_f	Rate of flow
R_t	Retention time
rpm	rotation per minute
S.D	Standard deviation
SRB	Sulforodamine B
TIC	Total Ion Chromatogram
2DPC	Two Dimensional Paper Chromatography
UV	Ultraviolet
λ	Wave length (nm)

I. Introduction

Plants are used medicinally in different countries and are a source of many potent and powerful drugs **(Srivastava *et al*., 1996)**. A wide range of medicinal plant parts are used as extracts for raw drugs and they possess varied medicinal properties.

Palms in general possess many economic uses, the fruits of some species can be considered as an important crop used as nutrient, other species are used in the production of sugar, starch, fiber, wax, timber and oil which can be used in many pharmaceutical and food products. Palms have become increasingly important in commercial horticulture **(Bolombery and Tony, 1982)**.

Palms "the princess of the plant Kingdom", represents the third most important plant family with respect to human use. Coconut and palm kernel oils were recognized as health oils in Ayurvedic medicine almost 4000 years ago **(Hedrick, 1972 and Jones, 1995)**.

Numerous edible products are obtained from palms, including the familiar date palm fruits, coconut palm nuts and various palm oils. More than 800 uses have been recorded for the date palm alone, for it is the very foundation of life for several cultures **(Johnson, 1998)**.

Despite the economic importance of palm family, it has been chemically neglected, probably because of the difficulty of collecting fresh material and getting it authenticated. Most work has been carried out on economically important plants cultivated for their oils. Among the species which was neglected is *Phoenix roebelenii* O'Brien **(Litchfield, 1970)**.

Aim of work

Members of the family Arecaceae are characterized by different classes of phenolic compounds (Tricin, luteolin and quercitin glycosides) constituting the major leaf components **(Williams *et al.*, 1973)**. Phenolic compounds have diverse beneficial biochemical effects on human health. They show antioxidant **(Kähkönen *et al.*, 1999)**, hepatoprotective **(Chen *et al.*, 2004)**, anticancer **(Mukhtar *et al.*, 1988)** and anti-inflammatory **(Yamamoto and Gaynor, 2001)**.

Reviewing the current literature, nothing has been reported about neither the biological activity nor phytochemical constituents of *Phoenix roebelenii* O'Brien.

The authors carried the responsibility to carry out the investigation of this plant in order to fulfill this gap of information.

This study includes:

1. **Chemical investigation:**
   - 1.1. Phytochemical screening.
   - 1.2. Quantitative estimation of phenolic content.
   - 1.3. Isolation and structural elucidation of the isolated compounds.
2. **Biological investigation:**

   In vitro study:

   1. Assay of the antioxidant activity.
   2. Assay of the cytotoxic activity.
   3. Assay of the hepatoprotective activity.