

# **Phytochemical and Biological Studies on Some Plants Belonging to Family Araliaceae**

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## List of Abbreviations

|   |   |
|---|---|
|   | Absorbance  |
| <b>OVA</b>                              | One-way analysis of variance                            |
| <b>'</b>                                | Attached proton test                                    |
| <b>ATCC</b>                             | American type culture collection                        |
|   | Column chromatography                                   |
| <b>CDCl<sub>3</sub></b>                 | Deuterated chloroform                                   |
|   | Centimeter  |
| <b><sup>13</sup>C NMR</b>               | Carbon-13 Nuclear Magnetic Resonance                    |
| <b>CNS</b>                              | Central nervous system                                  |
| <b>Conc.</b>                            | Concentrated  |
|   | Doublet   |
| <b>DCM</b>                              | Dichloromethane   |
|   | Doublet of doublet                                      |
|   | Diluted   |
| <b>DMSO-<i>d</i><sub>6</sub></b>        | Deuterated dimethylsulfoxide- <i>d</i> <sub>6</sub>     |
| <b>2D NMR</b>                           | Two-dimensional nuclear magnetic resonance spectroscopy |
| <b>ELISA</b>                            | Enzyme-Linked Immunosorbent Assay                       |
| <b>ESI-MS</b>                           | Electro-Spray Ionization Mass Spectrometry              |
| <b>EtAc</b>                             | Ethyl acetate   |
|   | Equatorial  |
|   | Figure  |
|   | Gram  |
| <b>Gen.</b>                             | Gentamicin  |
| <b>GLC-MS</b>                           | Gas Liquid Chromatography-Mass Spectrometry             |
|   | Hours   |
| <b>HCl</b>                              | Hydrochloric acid                                       |
| <b><sup>1</sup>H-<sup>1</sup>H COSY</b> | <sup>1</sup> H, <sup>1</sup> H Correlated spectroscopy  |
| <b>HMBC</b>                             | Heteronuclear Multiple-Bond Correlation Spectroscopy    |
| <b><sup>1</sup>H NMR</b>                | Proton Nuclear Magnetic Resonance                       |

|                        |  |
|------------------------|--|
| <b>HPLC</b>            | High Performance Liquid Chromatography                       |
| <b>HSQC</b>            | Heteronuclear Single Quantum Coherence                       |
| <b>Hz</b>              | Hertz  |
| <b>IC<sub>50</sub></b> | The half maximal inhibitory concentration                    |
| <b><i>J</i></b>        | Coupling constant  |
| <b>Keto.</b>           | Ketoconazole   |
| <b>Kg</b>              | Kilogram   |
| <b>KI</b>              | Kovats index   |
| <b>L</b>               | Liter  |
| <b>LC/MS</b>           | Liquid Chromatography-Mass Spectroscopy                      |
| <b><i>m</i></b>        | Multiplet  |
| <b>MeOH</b>            | Methanol   |
| <b>mg</b>              | Milligram  |
| <b>mg/mL</b>           | Milligram per milliliter                                     |
| <b>MHz</b>             | Mega hertz   |
| <b>MIC</b>             | Minimum inhibitory concentration                             |
| <b>Min</b>             | Minute   |
| <b>mL</b>              | Milliliter   |
| <b>mm</b>              | Millimeter   |
| <b>MTT</b>             | 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide |
| <b>m/z</b>             | Mass to charge ratio   |
| <b>NA</b>              | No activity  |
| <b>NT</b>              | Not tested   |
| <b><i>p</i></b>        | pentet   |
| <b>PGE</b>             | <i>Polyscias guilfoylei</i> extract                          |
| <b>ppm</b>             | Part per million   |
| <b>PTLC</b>            | Preparative thin layer chromatography                        |
| <b><i>q</i></b>        | Quartet  |
| <b>R<sub>f</sub></b>   | Retardation factor   |
| <b>RI</b>              | Retention index  |

|                      |  |
|----------------------|--|
| <b>ROS</b>           | Reactive oxygen species                          |
| <b>RPMI</b>          | Roswell Park Memorial Institute (culture medium) |
| <b>R<sub>t</sub></b> | Retention time                                   |
| <b><i>s</i></b>      | Singlet  |
| <b>S.D</b>           | Standard deviation                               |
| <b><i>T</i></b>      | Triplet  |
| <b>TLC</b>           | Thin Layer Chromatography                        |
| <b>TMS</b>           | Tetramethylsilane                                |
| <b>UV</b>            | Ultraviolet                                      |
| <b>v/v</b>           | Volume per volume                                |
| <b>μg</b>            | Microgram  |
| <b>μg/mL</b>         | Microgram per milliliter                         |

## Introduction

Throughout ages, people have resorted to nature, mostly to plants as medical and health care sources for treatment and prevention of many diseases. In recent years, there has been a great use of plant based drugs in developing and developed countries. These drugs are derived from different plant parts. Plant derived natural products hold great hope for drug discovery. Nowadays, there is great increase in medicinal plant based industries and development of new drug molecules from natural products (Paarakh, 2010).

Medicinal plants and natural products have been reported to have various pharmacological activities; antimicrobial (Weckesser *et al.*, 2007), antioxidant (Katalinic *et al.*, 2006), hepatoprotective, hypoglycemic (Singab *et al.*, 2005), cytotoxic (Nibret *et al.*, 2010), estrogenic (Ashmawy *et al.*, 2016), anti-hypertensive (Braga *et al.*, 2000). These strong pharmacological activities of plants are contributed to their content of secondary metabolites that's why the medicinal plants are the object of biotechnologists for discovering new medicine (Marczewska *et al.*, 2011).

Family Araliaceae is a large family with 43 genera and 1400 species, which are widely used in traditional medicine and phytotherapy. The family is well known for its different classes of secondary metabolites such as triterpenoids, triterpenoidal saponins, diterpenes, sterols, acetylenic lipids, cerebrosides with anti-inflammatory, anti-proliferative, antidiabetic and anti-parasitic, CNS and CVS activities (A Clement and SH Clement, 2014).

Genus *Polyscias* comprises 116 species that are widely used as ornamental plants in addition to its various medicinal purposes mainly as anti-inflammatory, antitoxin, antibacterial and diuretic (Vo *et al.*, 1998).

Plants of this genus are widely cultivated in southeastern Asia and the tropical islands of the Pacific region. In Asian countries, the leaves are used as a tonic, anti-inflammatory, antitoxin, antibacterial, and are good for digestion. The

root is also used as a diuretic, febrifuge, anti-dysentery, and is employed for neuralgia and rheumatic pains (Huan *et al.*, 1997).

To our knowledge, only few reports are available in the current literature about the chemical constituents and the biological activities of the leaves of *Polyscias guilfoylei*. It was therefore, found interesting to subject the extract of leaves of entitled plant to a biological and phytochemical investigations.

### **Work strategy**

- Collection, identification and authentication of the plant material; *Polyscias guilfoylei* and *Polyscias balfouriana* cultivated in Egypt.
- Preliminary phytochemical screening for *Polyscias guilfoylei* and *Polyscias balfouriana* leaves then phytochemical investigation of *Polyscias guilfoylei* leaves methanol extract to fractionate and separate different compounds
- Identification of the different isolated compounds using both chemical and spectroscopic methods of analysis including; IR, UV, <sup>1</sup>H-NMR and <sup>13</sup>C-NMR.
- Evaluation of the biological activities of the methanolic extract of *Polyscias guilfoylei* leaves, different fractions and compounds, including mainly; antibacterial, antifungal, cytotoxic and histamine release inhibition activities.