Research Article

Antimicrobial Activity and Chemical Composition of Essential Oil from *Pittosporum eugenioides*

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ABSTRACT

Medicinal and aromatic plants (MAPs) have been explored for their essential oil along with the past few decades. Essential oil considered as a complex volatile compounds, synthesized naturally in different parts of the plant during the secondary metabolism process. The chemical composition and antimicrobial activity of essential oil isolated by hydrodistillation from the aerial parts of Pittosporum eugenioides (Pittosporaceae), were evaluated. The chemical composition was investigated by Gas chromatography/Mass spectrometry (GC-MS). Thirteen volatile components were identifying in essential oil, corresponding to 99 % of the total oil. Essential oil was rich in Butylated hydroxytoluene (58.79%), 5,11,17,23-tetrakis(1,1-dimethylethyl)-28-methoxypentacyclo-[19.3.1.1(3,7).1(9,13)-1(15,19)]octacosa 1(25),3,5,7(28),9,11,-13(27),15,17,19(26),21,23 dodecene-25,26,27-triol (30.73%), Stigmast-5-en-3-ol, (3á,24S)-(CAS) (2.63%) and Mebutamate (2.04%) as the major components most of them are phenolic compounds. The antimicrobial activity was studied by the well diffusion method. The antimicrobial activity was tested against six pathogenic microbial strains including Gram +ve (Staphylococcus aureus and Methicillin-Resistant Staphylococcus aureus), Gram –ve (Escherichia coli and Salmonella typhimurium) bacteria and fungi (Aspergillus fumigatus and Candida albicans). The essential oil from P. eugenioides exhibited a very good antimicrobial activity against Aspergillus fumigatus with inhibition zone 14 mm compared to Ketoconazole which exhibited inhibition zone 17 mm. These findings will benefit for researchers who wish to explore essential oil potential in the development of novel broad-spectrum key molecules against a broad range of drug-resistant pathogenic known microbes.

Keywords: Pittosporum eugenioides, Antimicrobial activity, Drug-resistant, Essential oil.

INTRODUCTION

The use of medicinal plants and herbs with therapeutic properties is as old as human civilization. Various written records about medicinal plants that date back at least 5000 years support the use of mineral, plant and animal products as source of drugs since antiquity. The secondary metabolites are sought after because they are known to exhibit numerous biological activities that promote positive health effects, such as antibacterial, anticancer, antifungal, antioxidant and antiviral activities that can be used in the food, agricultural and pharmaceutical industries.[1-4] In recent years, a number of studies have been conducted in various countries to prove such efficiency. Many plants have been used because of their antimicrobial traits, which are due to the secondary metabolites synthesized by the plants. However, very little information is available on such activity of medicinal plants and out of the 4, 00, 000 plant species on earth, only a small number has been systematically investigated for their antimicrobial activities.[5] Essential oil from plants have been widely used in pharmaceutical, agricultural, cosmetic and food industries due to their antimicrobial, antioxidant and other biological properties.[6-7] Due to undesirable health effects of synthetic additives, interest has considerably increased for finding naturally occurring antioxidant and antimicrobial compounds suitable for use in food and medicine.[8,9] The stem bark of P. dasycaulon has been used in folk medicine as an antibacterial and antifungal agent to treat infection.[10] Essential oil obtained from the stem bark of this plant shows an antibacterial activity.[11] Several diseases, including human colon cancer, can be treated by administration of medicinal plant extracts.[12]

Our study, aimed to determination of the essential oil chemical composition of P. eugenioides and assessment of its antimicrobial activity against different strains.

MATERIALS AND METHODS

Plant Material

Pittosporum eugenioides Leaves (Family Pittosporaceae) was collected from Kasr Mohamed Ali Garden, Cairo, Egypt in July. The plant was identified by Dr. Threase Labib consultant of plant taxonomy at the Ministry of Agriculture; formerly, The Head of Taxonomist Specialists at the garden, a voucher specimen (No. P 3) was kept at the herbarium of the Medicinal Chemistry Department, Theodor Bilharz Research Institute.

Volatile Oil Separation

Fresh plant leaves (1 kg) were extracted by hydro-distillation using a modified Clavenger apparatus for two hours. Essential colorless oil obtained from hydro-distillation was dried using sodium sulfate, filtered and

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