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RESEARCH PAPER

Antimicrobial Effect of the Crude Phenolic, Alkaloid and Terpenoid Compounds Extracts of *Myrtus Communis L.* against Human Gram-Negative Pathogenic Bacteria

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Abstract

Objective: To reveal the effect of the crude phenol, alkaloid and torpedoed compounds extracts of Mitres Communes L. on some Human gram-negative Pathogenic Bacteria. Methods Antibacterial activities of the crude Phenol, Alkaloid and Torpedoed of medicinal plant were determined in vitro by agar well diffusion-method against some human pathogenic bacteria. Results obtained results showed that active compounds of Mitres Communes L. had wide spectrum antibacterial activity against gram- gram-negative bacteria Conclusion This study demonstrates that we can conclude that the effect of active compounds in same plant has different effect on different pathogenic organisms in different concentrations.

Keywords: *Antimicrobial, Myrtus Communis, L Pathogenic Bacteria, Gram-negative Bacteria.*

Introduction

Myrtus communis L. (Family Myrtaceae) is an aromatic evergreen perennial shrub or small tree, 1.8-2.4 m in height with small foliage and deep fissured bark (Plate 1). It is native to Southern Europe, North Africa and West Asia. It is distributed in South America, North western Himalaya and Australia and widespread in the Mediterranean region. It is also cultivated in gardens especially North-west Indian region for its fragrant flowers [1]. Myrtus, the Greek name for Myrtle and communes means common plant growing in groups. Myrtle was introduced into Britain in around 1597 and was described by Linnaeus in 1753. Myrtle occupies a prominent place in the writings of Hippocrates, Pliny, Discords, Galen and the Arabian writers [2].The plant contains fibres, sugars and antioxidants and many biologically active compounds [3]. Phenolic compounds, flavonoids and a thocyanins is the major photochemical in berries. Seeds yield 12-15% of a fatty oil (fixed oil) consisting of glycerines of oleic, linoleum, muriatic, palmitic, linolenic and lauric acid [4]. The antimicrobial activity of the crude preparation of Myrtle on Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, P. vulgaris, P. mirabilis, Klebsiella Aerogenes, Salmonella Typhi and S. shigiella was determined by [5]. Mansouri, et. al. evaluated the antibacterial activity of methanol crude extract of M. communes against 10 laboratory strains of microorganisms, including six Gram positive (Staphylococcus aureus, Micrococcus luteus, Streptococcus pneumoniae, S. pyogenes, S. agalactiae and Listeria monocytogenes) and four Gram negative bacteria (Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa and Campylobacter jejuni). The crude extract inhibited the growth of all tested bacteria except C. jejuni [6]. Akin, et. al. also assayed antimicrobial activity of M. communis against seven pathogen bacteria

(Staphylococcus aureus, Listeria monocytogenes, Enterococcus durans, Salmonella typhi, Escherichia. coli, Pseudomonas aeruginosa and Bacillus subtilis). It showed some activity on Gram positive and Gram negative bacteria. The higher efficacy of M. communis was confirmed by the agar dilution method [7]. This study aimed to assess the in vitro the possible effects of antibacterial activity of active compounds of Myrtus Communis L.against Human gram-negative Pathogenic Bacteria.

Materials and Methods

Collection of Plant Material

Myrtus Communis leaves were collected from Hillah city, middle of Iraq in December, 2016. The plant was identified by the taxonomist, Assistant Professor Dr. Huda Jasim Al-Tameme, at the College of science for women, The University of Babylon. The leaves were washed thoroughly 2-3 times with running water and once with sterile distilled water, leaf material was then air-dried on sterile blotter under shade.

Solvent Extraction

Twenty five grams of shade-dried powder was filled in the thimble and extracted successively with methanol solvent in Sechelt extractor for 24hr. The solvent extracts were concentrated under reduced pressure and preserved at 5°C in airtight bottle until further use. One gram of each concentrated solvent extracts were dissolved in 9 ml of distilled water and used for antibacterial assays.

Phenolic Extraction

The Phenolic compounds were extracted according to [8].

AlkaloidExtraction

The Alkaloid compounds were extracted according to [9].

Terpenoid Extraction

The Terpenoid compounds were extracted according to [10].

Preparation of Inoculum

The gram negative bacteria were pre-cultured in nutrient broth overnight at 37°C,

Antimicrobial Activity

The organism to be tested was inoculated into sterile nutrient agar. After incubation period of 24 h at 37°C, a loop of in oculus was transferred into 5 ml of nutrient broth and incubated for 2 h at 37°C which served as fresh suspension in oculus. Five wells (5 mm diameter) were made in sterile nutrient agar plate by using Cork borer (one in the center and four wells at the corner) and in oculus containing 106 CFU/ml of test bacteria were spread on solid plates with the help of sterile swab moistened with the bacterial suspension. Then 50 µl of extract of all the leaves were placed in the wells made in inoculated plates. The treatment also includes 50 µl of sterilized distilled water as control. All the plates were incubated for 24 hr at 37°C and zone of inhibition if any around the well were measured in millimetre (mm). For each treatment three replicates were maintained.

Results

The antimicrobial activity of Terpenoid, Alkaloid and Phenolic compounds extracts of selected plant against human gram-negative pathogenic bacteria are presented in Table (1)

Table1: Antimicrobial activity of the crude phenolic, alkaloid and terpenoid of Myrtus Communis Lextractagainst some human pathogenic bacteria

Pathogenic Bacteria	Phenolic compounds			Alkaloid compounds			Terpenoid compounds		
	Concentrations(mg/ml)								
	200	300	400	200	300	400	200	300	400
	Inhibition zone/ mm/ diameter								
Escherichia coli	R	R	R	R	18	23	R	17	22
Salmonella	R	18	22	R	R	30	R	R	22
Klebsilla	R	18	24	R	R	24	R	28	32
Shegilla	20	22	25	18	20	24	R	R	20
Proteus	10	15	18	R	R	R	R	21	25

- R= Resistant

Activity was analyzed at (200, 300 & 400) mg/ ml. There sults revealed that, Escherichia coliresistant to Phenolic compounds at different concentrations and sensitive to Alkaloid and Torpedoed compounds at high concentrations under study .

While,Salmonellaand Klebsilla resistant to all active compounds presence in Myrtus Communist low concentrations but, sensitive at high concentrations .The results also revealed that She gill asensitive to all active compounds of My rtus Communis like Phenol, Alkaloid and Torpedoed compounds especially at high concentrations. While, Proteusresistant to Alkaloids compounds at entire concentrations under this study and sensitive to Phenol and Torpedoed compounds especially, at high concentrations.

Discussion

Medicinal plants are considered new resources for producing agents that could act as alternatives to antibiotics in the treatment of antibiotic-resistant bacteria [11].On the basis of the result obtained in this present investigation, we conclude that the effect of active compounds in same plant have different effect on different pathogenic organisms in different concentrations. The Results of this study demonstrated that active compounds in Myrtus Communi sex hibited antimicrobial activity against the Gram negative bacteria. Our findings in an agreement with [12 and 13]. [14] Mention that concentration of 80 mg/ml of Myrtus Communes extract showed the greatest effect on the bacterium Staphylococcus aurous and Vibrio cholera and no effect on the bacterium Pseudomonas aeruginosa and just concentration of 80 mg/ml showed a little effect on E. coli.

This may be attributed to the presence of active compounds effect on cell wall, proteins and DNA synthesis. Alternatively, an important characteristic of plant extracts and their components is their hy drophobicity, which enables them to partition the lipids of the bacterial cell membrane and mitochondria, disturbing the cell structures and rendering them more permeable. Extensive leakage from bacterial cells or the exit of critical molecules and ions will lead to death [15].The obtained results may provide a support to use of the plant in traditional medicine. Based on this, further chemical and pharmacological investigations to isolate and identify minor chemical constituents in My rtus Communis and to screen other potential bioactivities may be recommended.

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