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Comparison of Antımicrobial Activity of Methanol and Ethanol Extracts of *Abelmoschus Moschatus* Dry Flowers

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Abstract: Today, many antimicrobial studies are made from herbal products. Plants products have been shown to inhibit the growth of pathogenic microorganisms. A number of these agents appear to have structures andmodes of action that are distinct from those of the antibiotics in current use, suggesting that cross resistance with agents already in use may be minimal. *Abelmosclus moscchatus* is in family Malvaceae. *Abelmoschus moschatus* leaves and seeds are considered as valuable traditional medicine. In this study; was aimed to compare the antimicrobial activity of methanol and ethanol extracts of *Abelmoschus moschatus* dry flowers. We used the following microorganisms in this study: *Staphylococcus aureus* COWAN 1, *Escherichia coli* ATCC 25922, *Candida albicans* FMC 17. Plant samples 2/10 ($g.mL^{-1}$) ratio were extracted with methanol and ethanol. Microorganisms were grown in culture medium. Antimicrobial activity was determined by disk diffusion method. In this study, the methanolic extract had a comparable activity against the standard; while *E.coli* showed identical activity against the standard, the other species being of higheractivity than the standard. Ethanolic extracts showed lower antimicrobial activity according to extracted obtained with methanol. They showed lower activity values exceptfor *S. aureus*.

Keywords: Antimicrobial Activity, *Abelmoschus Moscchatus*

1. Introduction

Plants and plant-related products posses significant reactivity against resistant microorganisms [1]. *Abelmosclus moscchatus* is in family Malvaceae. Synonymous *Hibiscus abelmoschus* L., *Abelmoschus moschatus* is a delightful, soft, herbaceous trailing plant, 0.5- 2.5 meters high with soft hairy stems and a long slender tap root.It has leaves best characterized as beingalternate, rough, hairy,heart-shaped or 3-5 palmate lobed with serrated margins and linear-oblong or triangular lobes, 4-10cm x 4-9 cm. Flowers regular, bisexual, hibiscus-like, usually watermelon pink but sometimes white or cream - always with a dark center.

In India, roots, leaves (rarely), and seeds of ambrette are considered valuable traditional medicines. The bitter, sweet, acrid, aromatic seeds are used as a tonic and are consideredwith the following explanation: "Cooling, aphrodisiac, opthalmic, cardiotonic, digestive, stomachic, constipating, carminative, pectoral, diuretic, stimulant,

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antispasmodic, deodorant". They are effective against intestinal complaints, stomatitis; and diseases of the heart, reduces thirst, and control vomiting. According to *Unani* system of medicine, seeds reduce thirst, cure stomatitis, dyspepsia, urinary discharge, gonorrhea, leucoderma and itch. For gonorrhea, the roots and leaves are also considered as cures [2].

They are even reportedly to be used against venomous reptiles [3]. In addition, it has someantioxidant [4] and antibacterial [5].

2. Materials and Methods

The plant samples were obtained from an herbalist in Elazig. Plant samples 2/10 ($g.mL^{-1}$) ratio were extracted with methanol and ethanol. In the study, we used *Staphylococcus aureus COWAN 1, Escherichia coli ATCC 25922, Candida albicans FMC 17* in Firat university, Faculty of Science, Department of Biology, Laboratory of Microbiology and the microorganisms were obtained from culture collections. Antimicrobial activity was determined by disc diffusion method [6, 7]. Microorganisms were grown in culture medium.Results were evaluated as inhibition zone (Mean of inhibition zone diameter, including the disc diameter of 6 mm). Clavulanic acid (CAS RN = 58001-44-8) was used as a standard for *E. coli* and *S. aureus,* while for *Candida albicans FMC17,* mycostatin (CAS RN= 1400-61-9) was employed.

a) plant extraction

A littleamount of dried herb was milled. Its 2-gram samples were put into each tubes. 10 mL volumes of methanol and ethanol were added to the tubes. The solutions were stirred. Then they were centrifuged for 10 minutes at 3000 rpm, and the supernatant was isolated and filtered.

b) Microorganism Culture Preparation and Inoculation

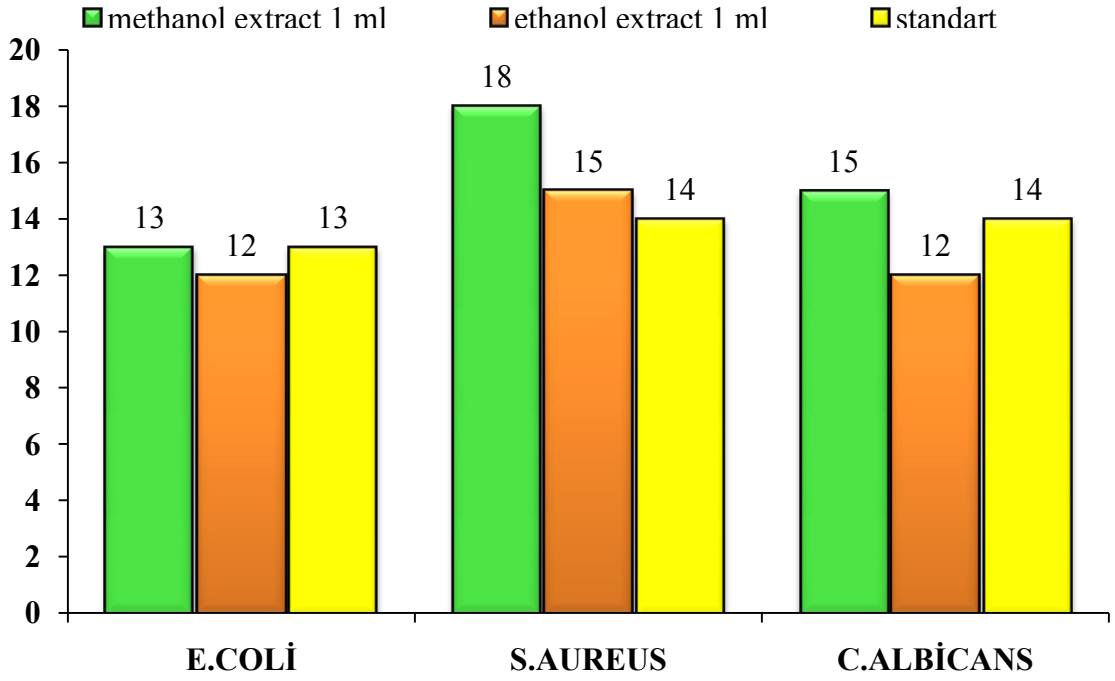
Bacterial strains of *Staphylococcus aureus Cowan 1, Escherichia coli ATCC 25922*, nutrient broth (35 ± °C for 24 hours), the yeast *Candida albicans* FMC 17, Yeast Malt Extract broth to (25 ± 1 °C for 48 hours) were inoculated and incubated. Growing cultures in media, after density adjustment according to the standard Mcfarland (0.5), was transferred to broth the tube. Mueller Hinton Agar and Yeast Extract Malt Erlenmeyer were sterilized and cooled to 45-50 °C. These solutions, was inoculated at 1% in the culture broth (10^6 bacteria/ml, 10^4yeast/ml).Suspension was poured into sterile petri dish (9 cm).

c) Disc diffusion method

Onto the solidified agar, impregnated disks were placed by pressing gently. Thus prepared petri dishes were stored at 4 °C 1.5-2 hours. Plates inoculated with the bacteria were incubated at 37 ± 1 °C for 24 hours, whereas the yeast and dermatophyte samples were inoculated onto the plates and they were incubated for 3 days at 25 ± 1 °C. After the predetermined period, the media were evaluated according to the formed zones of inhibition as millimeters.

3. Results

Results in present table



The results were presented in the Table for clarity. The obtained inhibition zone diameter; in methanolic extracts respectively; *E. coli* 13mm, *S.aureus* 18 mm, *C. albicans*, 15 mm, in ethanolic extract, respectively for *E. coli, S. aureus, C. albicans,* were 12, 15, and 12 mm, while the obtained diameters standard were 13, 14, and 14 mm, respectively for the mentioned microorganisms.

4. Discussion

Antimicrobials of plant origin have enormous therapeutic potential and have been used since time ancient. They have been proved effective in the treatment of infectious diseases. Simultaneously, they are used to as synthetic antibiotics [8]. An antimicrobial is an agent that kills microorganism or inhibits their growth. Agents that kill microbes are called microbicide, while those that merely inhibit their growth are called *microbiostatic* [9].

According to a work published in 2011; the seed and leaf powder of *A. moschatus* were subjected to different modes of extraction using ethanol, water and aqueous mixtures of ethanolin order to find out the suitable extract with maximum biological activities (antioxidant, antimicrobial, anti- proliferative effect, etc.). Antimicrobial activity using micro-dilution method and use *Bacillus subtilis ATCC 5740, Staphylococcus aureus ATCC 25923, Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 27853, Proteus vulgaris ATCC 6380, Salmonella enterica paratyph (Salmonella paratyphi) ATCC 9150 and Candida albicans ATCC 10231*species. Consequently;water extract of seeds and aqueous ethanolic extract of leaves exhibited higher degrees of antimicrobial activity than the other type of extracts [4].

In a work publish determined that antimicrobial activity of *A. moschatus* were *S. aureus (*causative agent of hospital acquired surgical wound infections)*, B. megaterium* (causative agent of diseases like meningitis, endocarditis, conjunctivitis and acute gastroenteritis)*, S. flexneri* (common pathogen for diarrhea)*, Proteus species (*urinary tract and wound infections)*, C. diphtheria* etc. [10]

Dokka and Davuluri are doing their work evaluation of Antimicrobial activity of a trypsin inhibitor (AMTI-II) from the seeds of *Abelmoschus moschatus.* L Consequently; they suggested that AMTI-II may serve as an antimicrobial agent active against pathogenic microbes [11].

From isolated essatial oil of *Abelmoschus moschatus* and other plants determined of antifungal effect. In results; findings show that these essential oils could arise as promising alternative antimicrobial compounds to be inserted in pharmaceutical formulations used to treat mycoses of different clinical severities caused by dematiaceous yeasts [12].

In a work publish determined that antibacterial activity of *H. Abelmoschus* of aqua extract. Consequently; inhibition zone were determined as, for *B. megatarium,* 10±0.58, for *E. Aerogenes* 12±0.58 [13].

In this study, we aimed to compare the antimicrobial activity of methanolic and ethanolic extracts of *Abelmoschus moschatus* dry flowers. Consequently, the methanolic extract seemed to be at the same level against the standard, while for *E.coli,* its activities had the same value, the other species are found to be higher than the standard values. Ethanolic extracts showed lower antimicrobial activity than the corresponding the methanolic extracts. The former extracts also showed lower values exceptfor *S. aureus*.

5. Conclusion

The antimicrobial compounds generated by these medicinal plants are active against plant and human pathogenic microorganisms. *Abelmoschus Moschatus* is strong an antimicrobial agent and it can be protective in the treatment of infectious diseases.

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