Evaluation of the Broad-Spectrum Antimicrobial Activity of *Aegle marmelos* Leaves

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ABSTRACT:

Aegle marmelos is a member of the Rutaceae family of medicinal herbs. Ethanol is used as a solvent to extract various plant components, such as leaves. The *in vitro* antimicrobial activity of methanol and water extract from the leaf of medicinal plant *Aegle marmelos* L. was investigated. The antimicrobial capacity of the Aeglesmarmelous extracts was examined. Both gram-positive and gram-negative organisms were more effectively inhibited by them. Escherichia coli, and Staphylococcus aureus were among the species utilised. Accordi.ng to the findings of the current study, Aegle marmelos Ethanolic extracts have a lot of promise as antimicrobial agents against various microorganisms and can be utilised to treat infectious disorders brought on by resistant microbes.

KEYWORDS: Antimicrobial Activity, Medicinal Plant, *Aegle marmelos*.

INTRODUTION:

Medicinal plants are still a vital Medicinal tool for treating human illness.Early man explored his immediate natural environment in quest of ways to relive pain and discomfort. He used a variety of plants, animal products, mineralsand other materials to create a range of therapeutic medicines. Traditional medicine is gaining popularity again, and there is a growing need for more medications derived from plants. The general perception that ‘green medicine ’is safer and more reliable than expensive synthetic medications, many of which have negative side effects, is the primary cause of this resurgence of interest in plant-derived medications.[1]India is the world’s largest producer of medicinal herbs and is aptly referred to as the botanical garden of the world. A significant portion of the population in developing nations still uses traditional folk medicine derived from plant resources. There are numerous approaches to the search for new biologically active principles in medicinal plants.

Various varieties of plants grow wild in various sections of our nation, and nature has bestowed upon us a very rich botanical collection. [2]In India, traditional practices like ayurveda, Unani, and Siddha have relied on natural treatment to treat and cure many different kinds of physiological conditions. Indian traditional medicine uses a variety of herbal remedies to treat a wide range of ailments, including wounds,skinsores,leprosy,diarrhea,scabies,venerealillnesses,snakebites,andulcers.finding novel sources of antimicrobial chemicals has become necessary due to the fact that many contagious pathogenic germs are rapidly becoming resistant to current medications. Plants are infected throughout their life cycle by a range of bacteria, fungi, viruses, and parasites that are unique to them. [3]It is anticipated that they would produce a range of secondary metabolites that will shield them against the pathogenic agents.

Aegle marmelos is a member of the Rutaceae family as well as is used for curative purposes. As a temple tree it is grown and planted. An additionalname for it is ‘‘BEAL’’ or ‘‘WOOD APPLE’’. The tree’s fruits is used to treat intestinal parasites, diarrhea, and dry eyes. A traditional therapy for fever is a combination of leaf juice and honey. Ethanol can be used to evaluate organic solvents that include antimicrobial

substances from medicinal plants. The present research investigation aims to screen Aegle marmelos's antimicrobial abilities.[1]

METHODS AND PREPARATION:

The medicinal In the Nashik district of Ghoti plant samples were gathered in and around the Chidambaram areas. Aegle marmelos with leaves is the medicinal plant sample. Bioactive substances were extracted from Aegle marmelos leaves. Distilled water was used to wash the samples in order to remove any dust particles that had stuck to them. They were afterward dried in a shady area.Sufficient leaf Samples were divided into small pieces and put in Conical flask, 250 ml. Ethanol has been used as a solvent to remove the bioactive substances.[3] Ethanol was used to extract the bioactive components of the medicinal plants.

Extraction of Aegle marmelos leaves:

25 grams of each sample of medicinal plants were chopped into small pieces and further crushed before being put in the Soxhlet extractor. The samples had been washed twice with ethanol, an organic solvent, right before extraction. The extracted materials were then concentrated by treating them to a laminar air flow and kept at 4°C until they were needed again. [4]

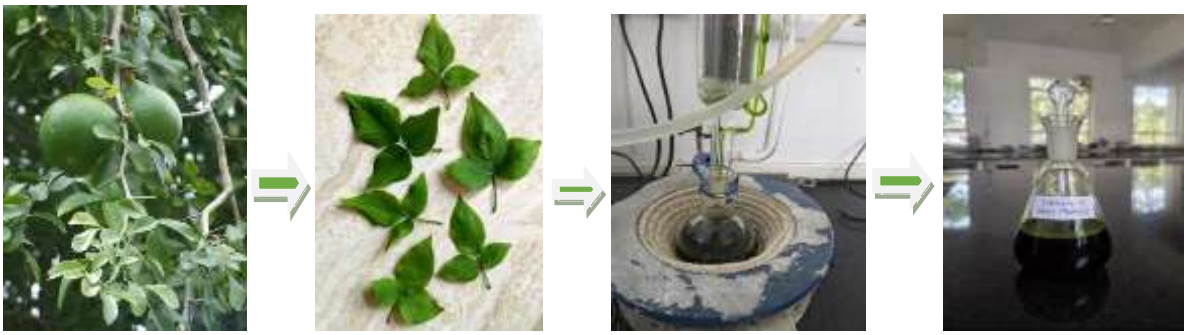

Figure.1 Extraction of Aegle marmelos leaves

BACTERIAL STRAIN:

Two Bacterial Strains were employed for the test which include.

1. Escherichia coli.
2. Staphylococcus aureus.

PREPARATION OF STERILE DISC:

Whatman filter paper No. 1 was utilized to create sterile discs with a diameter of 5 mm for the current study. The sterile disc was filled with therapeutic plant extracts. 50, 100, and 200 ppm had been added to each sterile disc separately. Laminar air flow was used to dry the discs. The extract was then administered again. Disc diffusion was used to test the medicinal plant extract's antibacterial activity. [5]

DISC DIFFUSION METHOD:

The test bacterial strain was applied to the nutrient agar surface using a sterile cotton swab once the nutrient agar plates were ready.The Nutrient Agar plates were covered with the antibiotic disc that was filled with plant extract.Controls were maintained by loading dimethyl sulfoxide on disc.Then the plates were incubated at 37°C for 12 to 18 hours.[2]

RESULT AND DISCUSSION:

The findings of studies on the antibacterial action of ethanol as a solvent on the leaves of the plant Aeglesmarmelos against clinical infections Ethanolic extracts of Aegle marmelos leaves at several concentrations (50, 100, and 200 ppm disc) have antibacterial action against various clinical pathogens with control.

Table 1.Antimicrobial activity of Ethanolic extracts of Aegles marmelos leaves

Sr.No	Organisms	Zone of inhibition (mm) concentration in ppm		
		50	100	200
1.	Escherichia coli	14	16	17
2.	Staphylococcus aureus	12	14	15

The leaves extract proved to be active against two different clinical pathogens strains such as Staphylococcus aureus, Escherichia coli.Escherichia coli was the most vulnerable bacterium in this assay, which may be explained by the presence of tannins and alkaloids, which prevent germs from growing. The extract from Aegle marmelosleaves exhibits strong antimicrobial activity. In every concentration, Staphylococcus aureus, came after E. coli.

CONCLUSION :

Medicinal plants have long served as an important source for the discovery of new drug compounds, contributing significantly to human health and well-being. Traditional healers typically use water as a solvent for preparing remedies; however, recent studies indicate that ethanol extracts of these plants exhibit greater potency. This enhanced effectiveness may be attributed to the improved solubility of active compounds in organic solvents.The leaf extracts prepared using ethanol demonstrated strong antimicrobial activity against a range of microorganisms. The findings are consistent with earlier studies, such as those involving Amry Card Power formulations containing Aegle marmelos, which demonstrated antibacterial activity against E. coli, Staphylococcus, and Streptococcus species. Based on the results of this investigation, it can be concluded that ethanol extracts of Aegle marmelos leaves possess significant in vitro antimicrobial activity. The most active extracts can be further explored for the isolation and identification of potential therapeutic antimicrobial compounds, followed by detailed pharmacological evaluation.

REFERENCES:

1. N. Shariff, et al., (2006). Antimicrobialactivity of Rauvolfiatetraphylla andPhysalis minima leaf and callus extracts.African JournalBiotechnology, 2006; 5(10): 946-950.
2. Azadirachta indica: A source of potential antibacterial activity against various bacterial strains.
3. Antimicrobial activity of pomegranate (Punica granatum L.) fruit peels.
4. Cowan, M. M. (1999) Plant products as antimicrobial agents. Clinical Microbiology Reviews, 12(4), 564–582.
5. Cowan, M. M. (1999) Plant products as antimicrobial agents Clinical Microbiology Reviews, 12(4), 564–582.