Environmental Evaluation of Antibacterial and antifungal properties of Amaranthus Dubius Plant Extracts

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Abstract

Antimicrobial resistance has necessitated the search for novel bioactive compounds from natural materials. Amaranthus Dubius it's a leafy vegetable traditionally used in herbal medicine has shown for antimicrobial properties. This study evaluates the antibacterial and antifungal activities of Amaranthus Dubius leaf extracts against selected pathogenic microorganisms. Ethanolic, Methanolic and aqueous extracts of the leaves were prepared and tested again common bacterial and fungal strains using the method of agar well diffusion. This study highlights the potential of Amaranthus Dubius as a natural source of antimicrobial agents and supports its traditional uses.

1. Introduction

The global importance in antibiotic resistant microorganisms has emerged as a various role in public health concern, prolonged hospital stays, increased mortality and resurgence of previous controlled infections. A conventional antibiotics lose effectiveness is a renewed interest in plant based antimicrobial agents due to their structural diversity. Medical plants have long served as reservoirs of the some compounds with various extract demonstrating antibacterial, antifungal and antiviral activities. Amaranthus Dubius is one of the plants available abundantly. Amaranthus Dubiusis also called as red spinach or chinise spinach. Amaranthus Dubius is not a poisonous plant. This plant will help to cure in stomach cancer, blue babies and other health problems. This study is evaluating the antifungal and antibacterial activities of Amaranthus Dubius extracts using methanol, ethanol and water solvents.

Key Words: Amaranthus Dubius Leaves, Antibacterial, Antifungal, Plant Herb Extraction.

2. Identification of Plant

The Amaranthus Dubius plant belongs to the family of amaranthacae. These types of greens are located in local places of Asia, France and Germany & also in sub – tropical regions of United States, Australia, and Pacific. It will also grow in waste places and disturbed habitants. The color of Amaranthus Dubius leaves dark green. It is found in tropical areas. This plant will start to grow in 3 to 5 days after sowing and flower within 4 – 8 weeks after sowing. Amaranthus Dubius is a large plant usually about 90 to 130 cm higher. The green leaves will grow up to 2 to 4" long. The flowers of this plant will start to grow summer or autumn season. The seed of

Amaranthus Dubius are Yellow, White, Red, Brown and Pink. The lifespan of this plant is one year and its annual plant.

Figure 1 - Amaranthus Dubius Plant

3. Medicinal Use

The Amaranthus Dubius has diverse uses as a medicinal plant with included Leaves, seeds and whole plant employed for conditions for, anemia, hemorrhages, fever, constipation, kidney and lung disorders. Amaranthus Dubius herb also used to create poultices for boils & inflammation agents.

Medicinal Use Amaranthus Dubius Plant (Table – 1)

General Health	Leaves are recommended for patients with anemia, fever, constipation and kidney issues.
Skin Health	It's used for hydrating; soothing properties and detoxifying with reduce to wrinkles and improve skin elasticity.
Respiratory Issues	Plants are used as a remedy for Lung disorders, and prevent colds and flu.
Gynecological & Blood Disorders	Indian traditional medicine is used to treat blood disorders and menorrhagia.
Digestive and Liver health	It's used for stomach ulcers, constipation and diuretic. Amaranthus Dubius also known for hepatoprotective properties due to squealing content.

4. Extraction Process

Take 20 grams of Amaranthus Dubius leaves & Flowers were pull out with 100 ml of solvent consuming soxhlet removal apparatus. The acquired liquid remove was evaporated to dryness with rotary flash evaporator. The dried leaves and flowers extracts remained fought and powdered to quality using pestle and mortar. The fine milled leaves and flowers extracts be there stored in a sterile air tight amber l bottle at 4'C. Each solvent extracts were disjointedly examined to occurrence of photochemical combinations.

5. Antibacterial Activity

The antibacterial of Amaranthus Dubius plant extraction solution minimum inhibitory concentration defined as lowest concentration of antimicrobial agent. Inhibits growth of a microorganism after overnight incubation was determined by monitoring the growth of bacteria in a micro-plate reader at 630 nm by micro dilution method. The bactraial test cultures used in the study were Escherichia Coli, Klebsiella pneumonia & Enterococcus faecalis. Amaranthus Dubius studies show it possesses antimicrobial activity against the gram positive and gram negative bacteria's. Natural antimicrobials or nanoparticle synthesis shows the extracts can serve as a source of bioactive compounds like bstalains and alkaloids are responsible for its antimicrobial activity for potential use.

6. Antifungal Activity

The antifungal of Amaranthus Dubius plant extract are demonstrated an ability to inhibit the growth of certain fungi properties. The ethanol extract of Amaranthus Dubius demonstrated antibacterial activity with higher concentration of phenolic and flavonoids compounds. The aqueous extract was low effective indicating that water may not be an optimal solvent for extracting the bioactive compounds.

Variable Effects - Amaranthus Dubius have shown that their plant leaf extracts exhibit selective and short term antifungal effects against to the certain phytopathogenic fungal.

Potential as a Bio stimulant – Direct anti-fungal action of Amaranthus Dubius extracts can act as elicitors of plant defense reactions and may indirectly protect plants by stimulating their self defense mechanisms.

Strain and Species Specificity – Antifungal potency variations between Amaranthus Dubius species and depends on the specific fungal being tested.

7. Results

The antibacterial activity of the Amaranthus Dubius plant extracts is shown in table 2. The evaluation is with inhibition zones greater than the negative control. The antifungal activity of the Amaranthus Dubius plant extracts is shown in table 3 & MIC values shown in the table 4.

Antibacterial Activity of Amaranthus Dubius Plant (Table – 2)

Microorganism	Aqueous	Ethanol
E.Coli	12	18
S.Aureus	14	20

Antifungal Activity of Amaranthus Dubius Plant (Table – 3)

Fungal Species	Aqueous	Ethanol
Candida Albicans	11	21
Aspergillus Niger	9	18

Minimum Inhibitory Concentration of Amaranthus Dubius Plant (Table – 4)

Organism	Ethanol Extract	Methanol Extract
S. Aureus	2.25	3.5
E.Coli	3.5	3.5
C.Albicans	2.25	3.5

To establish the antibacterial and antifungal of an Amaranthus Dubius plant, researchers customarily used more number of evaluation method. Remarkable success has been made using different evaluation methods in establishing the antibacterial and antifungal activities of some Amaranthus Dubius plant species. The results alight with earlier studies the Amaranthus Dubius as natural antimicrobial agents. The microbial strain sensitivity, Extraction methods and environmental condition variation in activity.

Conclusion

Medicinal plants have more attracted environmental considerable global demand in recent scenario. Research of traditional medicine is very important for the welfare of tribal & rural communities for the conventional illness treatments. The survey of literature collections that Amaranthus Dubius its shown plant with diverse pharmacological spectrum. The antibacterial and antifungal activity of the Amaranthus Dubius plant family has been reported to contribute largely to the various medicinal values. The study review further outlined the antibacterial and antifungal properties of Amaranthus Dubius species their health benefits. An antibacterial and antifungal property of Amaranthus Dubius was present in high rate value in ethanol extracts method. This study supports the traditional medicinal use and suggests potential for development in natural antimicrobial agents.

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