“Experimental Assessment of Antibacterial Properties of *Commelina Diffusa* Whole Plant Extract”

Rohit S Patil[1] Suraj G Patil[2] Rohit A Patil[3] Sanyukta S Patil[4] Pooja A Patil[5] Mr. Harshal S Bhandari[6]

[1] Affliation Institute : Student of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005 (Email id : rohitpatil2314@gmail.com)

[2] Affliation Institute : Student of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005 (Email id : surajpatils129@gmail.com)

[3] Affliation Institute : Student of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005

[4] Affliation Institute : Student of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005

[5] Affliation Institute : Student of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005

[6] Affliation Institute : Assistant Professor of DCS’s ARA College of Pharmacy, Nagaon, Dhule 424005 (Email id : harshalbhandari7@gmail.com)

Department of Microbiology, Dhule Charitable Society Anasaheb Ramesh Ajmera College of Pharmacy Nagaon, Dhule. 424005

ABSTRACT :

Commelina Diffusa L arecontent essential sources of bioactive compounds with potential therapeutic applications. , commonly known for its ethnomedicinal uses, has been traditionally employed in the treatment of microbial infections. The present study investigates the antibacterial potential of a methanolic extract prepared from the entire plant of against Staphylococcus aureus. Fresh plant material was collected, washed thoroughly, shade-dried, and powdered. Extraction was performed using methanol in a 1:3 ratio, and the resulting solution was filtered and concentrated using a water bath. The extract was tested using the paper disc diffusion method. The zones of inhibition observed ranged from 7 to 10 mm, indicating moderate antibacterial activity. These findings reinforce the traditional uses of Commelina diffusa and highlight its potential as a natural source of antimicrobial agents.

KEY WORDS:

Commelina diffusa, Antibacterial activity, Methanolic extract, Medicinal plants, Staphylococcus aureus, disc Diffusion method

INTRODUCTION :

Medicinal plants have long been used in traditional healthcare systems worldwide. Their healing properties have been recognized for centuries, particularly in rural communities where modern medicine is often inaccessible or unaffordable. In Bangladesh, India, Afghanistan , Pakistan as in many developing countries, a large portion of the population still depends on plant-based treatments. Herbal remedies, prepared in the form of infusions, decoctions, powders, or extracts, remain an essential part of healthcare, especially in treating common infections and inflammatory conditions. The increasing resistance of pathogenic microorganisms to conventional antibiotics has become a major global health concern. Overuse and misuse of antibiotics have led to the evolution of drug-resistant strains, reducing the effectiveness of existing treatments. This challenge has driven researchers to seek alternative antimicrobial agents, particularly from natural sources. Plants, with their rich biodiversity and history of therapeutic use, offer promising solutions in the development of new antimicrobial drugs. The family Commelinaceae includes many herbaceous plants commonly found in tropical regions. One such plant is ,also known as the spreading dayflower. This herb is widely distributed across Asia, Africa, and the Americas. It has been used in traditional medicine for treating a variety of ailments such as urinary tract infections, respiratory issues, eye infections, sore throat, skin

problems, and inflammation. The plant is also believed to have antipyretic, diuretic, and wound-healing properties. Previous phytochemical studies have indicated that Commelina diffusa contains several bioactive compounds, including alkaloids, flavonoids, terpenoids, glycosides, tannins, and saponins. These phytochemicals are known to exhibit antimicrobial, antioxidant, and anti- inflammatory effects. However, scientific investigations into the antimicrobial activity of this plant, especialy in its crude whole-plant form, remain limited.

MATERIALS AND METHODS

Collection and Preparation of Plant Material The whole plant of Commelina diffusa was collected from an agricultural farm near the DCS's A. R. A. College of Pharmacy Nagaon Dhule . The specimen was washed thoroughly under running water to remove soil and debris. The cleaned plant material was shade-dried for 5–6 days to preserve its active constituents. Once dried, the material was ground into a coarse powder using an electric grinder and stored in airtight containers for further analysis.

- **Preparation of Methanolic Extract**

A total of 34 grams of the dried powder was placed into a clean, stoppered conical flask. 100 ml Methanol was added in a 1:3 ratio (plant material to solvent), and the mixture was allowed to soak for 48 hours with intermittent shaking. After maceration, the extract was filtered using Whatman No. 1 filter paper. The filtrate was then concentrated using a water bath maintained at 45° C to evaporate the solvent and obtain the concentrated plant extract.

- **Microorganism Used**

The bacterial strain selected for the study was Staphylococcus aureus, a Gram-positive bacterium that is frequently implicated in skin infections, respiratory tract infections, and foodborne illnesses. The culture was developed in the microbiology department of the institution and maintained on nutrient agar slants.

- **Antibacterial Testing– Disc Diffusion Method :-**

The antibacterial potential of the methanolic extract was assessed using the standard paper disc diffusion method. Nutrient agar plates were inoculated with a fresh suspension of Staphylococcus aureus. Sterile paper discs were soaked with the plant extract and placed on the surface of the inoculated agar plates. The plates were incubated at 37° C for 24 hours. Zones of inhibition were measured in millimeters using a ruler to evaluate antibacterial activity.

- **Results**

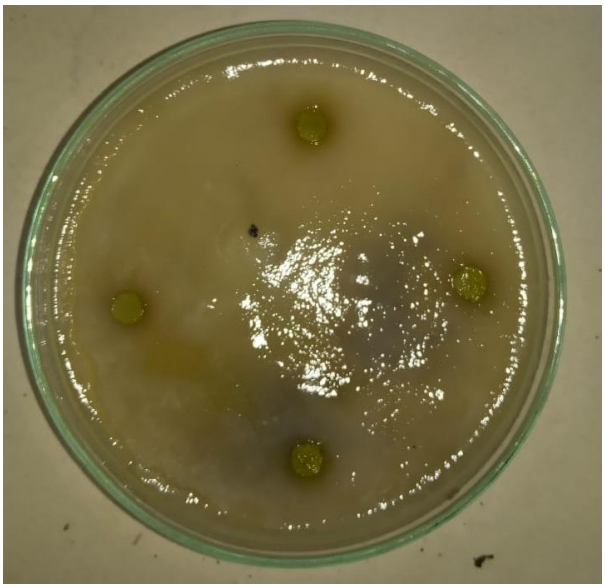
The antibacterial activity of Commelina diffusa methanolic extract was determined by measuring the diameter of the zones of inhibition against Staphylococcus aureus.

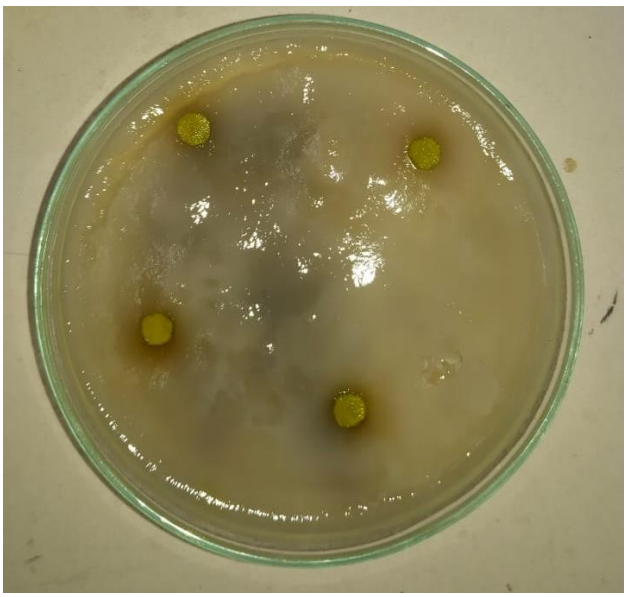
The inhibition zones observed in two sets of plates were as follows:

Plate 1: 7mm, 9mm, 9mm, and 8mm

Plate 2: 8mm, 9mm, 10mm, 9mm

The average zone of inhibition recorded was approximately 8.8 mm, indicating moderate antibacterial activity





DISCUSSION

The findings of this study offer valuable insights into the antibacterial potential of Commelina diffusa. The observed zones of inhibition against Staphylococcus aureus confirm that the methanolic extract possesses compounds capable of exerting antimicrobial effects. These results validate, to some extent, the traditional use of the plant in treating infections and inflammatory conditions. The variability in the inhibition zones could be influenced by several factors, including the concentration of the extract, the diffusion capacity of its constituents, and the bacterial strain's sensitivity. Compared to synthetic antibiotics, natural extracts often exhibit slower or less potent activity, but they carry the advantage of reduced toxicity and resistance buildup. Future work should include testing with other solvents such as ethanol, chloroform, or aqueous mediums, and performing phytochemical screening to isolate and identify the specific compounds responsible for the antimicrobial effect. Additionally, testing the extract against other bacterial strains, both Gram-positive and Gram-negative, could broaden the understanding of its spectrum of activity Conclusion This study demonstrates that the methanolic extract of Commelina diffusa possesses moderate antibacterial activity against supporting its traditional use as an antimicrobial agent. While the crude extract was not as potent as standard antibiotics, it provides a basis for further phytochemical investigation and compound isolation. The findings highlight the potential of Commelina Diffusa, as a source of new, natural antimicrobial agents, which could be particularly useful in an era of rising antibiotic resistance. Further studies involving advanced extraction techniques, dosage standardization, and in vivo validation are necessary to explore its full pharmacological potential.

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