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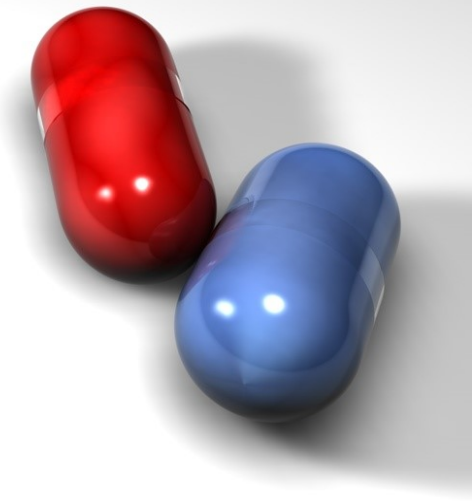

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Letter to the Editor

Antibacterial activity of *Calathea roseopicta*

Sir,

Calathea roseopicta, also known as the rose-painted calathea, is a member of the Marantaceae plant family and is native to northwest Brazil. It is a perennial and grows in bunches. The large, rounded leaves are scarlet below and dark green above. The margins are feathery, and the veins and midrib are beautifully "painted" with cream or pink stripes. *C. roseopicta* hybrids are distinguished by their feathery border pattern as well as potentially unique leaf shapes, patterns, and colors.

The antibacterial effects of other plants of this family, *Calathea anulque* (Segaran et al., 2023) and *Calathea insignis* (Shankar et al., 2023) have been reported. The objective of this study is to assess the antibacterial activity of *C. roseopicta* utilizing the agar well diffusion method (Shankar and Sathiavelu, 2021).

Fresh and healthy leaves from *C. roseopicta* were collected from the Thota Kalai nursery garden in Chennai, Tamil Nadu, India. To remove dust and unwanted particles, the leaves were washed twice with tap water before being allowed to air dry for two weeks. Using an electric blender, the dried leaves were made into a fine powder. Solvents with different polarities, such as methanol and ethyl acetate, were used to extract the metabolites. About 0.5 g of dry leaf powder was soaked in 100 mL of each solvent in a 250 mL conical flask and kept in a shaker incubator for 48 hours at 120 rpm. After 48 hours, the contents were filtered through a Whatman filter paper No. 1 to obtain concentrated methanolic and ethyl acetate extracts. A rotary vacuum evaporator was employed to collect crude extracts. The agar-well diffusion method was performed to assess the antibacterial activity of the leaf's crude extracts against pathogenic organisms such as *Staphylococcus aureus, Streptococcus pneumonia, Klebsiella pneumonia,* and *Escherichia coli.*

The stock culture was prepared with nutrient broth, and the test plates were prepared using Muller-Hinton agar for anti-bacterial assay. The sterile cork borer of 8mm was used to create the wells after the suspended organisms were inoculated into the agar plates. The 100 µL extract was loaded into the wells at various concentrations (100, 50, and 25 µg/mL). Streptomycin disc (antibiotics) was used as a positive control. Then the plates were kept for incubation at 37°C for 24 hours. After the incubation period, the zone of inhibition was measured around the well (Abew et al., 2014).

The phytochemical constituents of the *C. roseopicta* leaf extracts, when analyzed, confirmed the presence of phenol, flavonoids, tannins, terpenoids, and saponins. About 2 mL of a 2% ferric chloride solution was added to the plant extract. The presence of phenol is confirmed by the appearance of color changes from blue-green to black (Kancherla et al., 2019). The plant extract was treated with 2 mL of a 2% sodium hydroxide solution. After adding diluted acid, the dramatic color change from yellow to colorless indicates the presence of flavonoids (Hossain et al., 2013). The plant extract was heated in addition to 2 mL of concentrated sulfuric acid. The presence of terpenoids is confirmed by the development of gray color. The test tube containing the plant extract with 5 mL of distilled water was shaken vigorously to analyze the presence of saponins (Hossain et al., 2013).

This is the first investigation into the phytochemical content and antibacterial activity of *C. roseopicta* leaves. A qualitative phytochemical analysis was conducted on both crude extracts to determine the existence of the plant's active ingredients. The phytochemical analysis showed the presence of saponins and terpenoids in the leaves, whereas tannins, flavonoids, and phenol showed negative results (Table I).

The highest inhibition zone of 25 mm was found for ethyl acetate extract against *S. aureus* at a 50 µg/mL concentration. A similar inhibition of 25 mm was observed in *S. aureus* and *E. coli* for methanol extract at 100 µg/mL (Table II). The growth of *K. pneumonia* and *S. pneumonia* was not suppressed by the extracts. Previous reports demonstrated that aqueous and ethanolic extracts from hibiscus flowers strongly inhibited

Table I

Phytochemical screening

Phytochemicals	Methanol	Ethyl acetate
Tannins	-	-
Terpenoids	++	+
Flavonoid	-	-
Phenol	-	-
Saponin	+	+

Table II

Antibacterial activity of *Calathea roseopicta* leaves extracts

Extracts	Concentration (µg/mL)	Zone of inhibition (mm)			
		Staphylococcus aureus	*Klebsiella pneumoniae*	*Escherichia coli*	*Streptococcus pneumoniae*
Methanol	25	-	-	15	-
	50	20	-	23	-
	100	23	-	25	-
Ethyl acetate	25	-	-	-	-
	50	-	-	-	-
	100	25	-	-	-
Streptomycin	10 mg disc	11	28	25	25

the development of *S. typhimurium* and *S. aureus* at 100 and 50 mg/mL concentrations, respectively (Mak et al., 2012).

The study showed that terpenoids were present and that they were effective at killing *Bacillus subtilis* with a clear zone of inhibition (Gebrewbet et al., 2023). *Symphonia globulifera* and *Allophyllus abyssinicus* had terpenoids in all concentrations of water extract and were more effective at killing Gram-positive bacteria (Lukubye et al., 2022). The ethanolic extract of *Acacia nilotica* demonstrated antibacterial activity against all test organisms in the presence of terpenoids (Banso, 2009). *Ipomoea asarifolia* showed positive terpenoids and higher antibacterial activity in an aqueous extract against *E. coli* (Aliyu et al., 2011).

C. analque has potent antibacterial properties against *S. aureus*. Its methanol and ethyl acetate extracts have terpenoids and saponins (Segaran et al., 2023). *C. insignis* contains phenols, saponins, and tannins and has effective antibacterial properties against *E. coli* and *S. aureus* (Shankar et al., 2023). Similarly, *C. roseopicta* from the genus Calathea demonstrated prominent antibacterial activity against tested bacterial pathogens.

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Ethical issue: The protocol of the study was approved by the Institutional Ethical Committee

Conflict of interest: The authors declare that they have no conflict of interest

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