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EVALUATION OF THE PHYTOCHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF *CRATEROSIPHON SCANDENS* LEAVES AGAINST SOME CLINICALLY RELEVANT PATHOGENS

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ABSTRACT

Craterosiphon scandens is a plant species traditionally used for various medicinal purposes. However, there is limited scientific evidence supporting its efficacy and safety. This study aimed to investigate the phytochemical composition, antioxidant activity, and antimicrobial properties of both fresh and dry leaves of *Craterosiphon scandens.* The phytochemical composition was analyzed in both fresh and dry leaves using qualitative and quantitative methods. Antioxidant activity was evaluated using the DPPH radical scavenging method and the ferric reducing power assay. Antimicrobial properties were assessed against various bacterial and fungal isolates. The results showed that both fresh and dry leaves contained a variety of phytochemicals, including alkaloids, flavonoids, glycosides, phenols, saponins, and tannins. The antioxidant activity was significant, with IC50 values of 1.23 ± 0.02 mg/ml and 1.56 ± 0.03 mg/ml for fresh and dry leaves, respectively. The ferric reducing power ranged from moderate to high (59.27 ± 2.2% and 60.62 ± 2.5% for fresh and dry leaves, respectively). The antimicrobial properties were more pronounced in fresh leaves ($p < 0.05$). Statistical analysis using ANOVA revealed significant differences ($p < 0.05$) in the phytochemical composition and antioxidant activity between the fresh and dry leaves. The results of this study suggest that both fresh and dry *C. scandens* leaves have potential as sources of natural antioxidants and antimicrobial agents. The findings provide scientific evidence supporting the traditional use of this plant for medicinal purposes.

Keywords: *Craterosiphon scandens*, Phytochemical, Antioxidant, Antimicrobial, Medicinal

INTRODUCTION

The emergence of antimicrobial resistance poses a significant threat to global health systems, underscoring the urgent need for innovative solutions to combat the diverse range of diseases affecting humanity. Traditional medicine has long relied on medicinal plants, offering a vast array of

therapeutic options for various ailments (WHO, 2013). *C. scandens,* a plant species belonging to the Thymelaeaceae family (WFO, 2025), is endemic to Africa and has been used in traditional medicine for its purported health benefits, boasting a rich history of applications in countries such as Nigeria, Cameroon, and the Democratic Republic of the Congo.

Research has shown that C. scandens contains a range of phytochemicals with potent antioxidant properties (Agbo *et al.,* 2015). The plant's bioactive compounds, including alkaloids, flavonoids, tannins, saponins, and phenolic compounds, are believed to contribute to its therapeutic potential and health benefits. These phytochemicals have garnered significant attention for their potential to mitigate oxidative stress, inflammation, and microbial infections associated with various diseases, including neurodegenerative diseases, cancer, cardiovascular diseases, diabetes, and chronic inflammatory diseases (Kumar *et al.,* 2023; Sherrif *et al.,* 2023; Yang & Ling, 2025).

The excessive production of reactive oxygen species (Bisso *et al.,* 2022) and free radicals has been implicated in the pathogenesis of these diseases. Antioxidants, such as those found in *C. scandens,* play a crucial role in maintaining health and preventing disease. Flavonoids, in particular, have demonstrated potent antioxidant and anti-inflammatory effects, making them potential therapeutic agents (Ullah *et al.,* 2020). Additionally, flavonoids exhibit antimutagenic properties (Gasiorowski *et al.,* 1997) and provide resistance to radiation (Fan *et al.,* 2012), while saponins can improve liver function (Wang *et al.,* 2021) and have an antifatigue effect (Yang *et al.,* 2018).

Free radicals are unstable molecules that have unpaired electrons, making them highly reactive. They can originate from normal metabolic processes in the human body or external sources such as exposure to X-rays, ozone, cigarette smoke, air pollutants, industrial chemicals, and a poor diet (Lobo *et al.,* 2010). Antioxidants help maintain health and prevent disease by neutralizing these harmful free radicals, protecting cells from oxidative damage, and reducing the risk of chronic diseases (Yang & Ling, 2025).

According to the literature survey, no studies have been conducted on the antimicrobial activity of C. *scadens* to the best of my knowledge. However, studies on the antimicrobial activity of other medicinal

plants are noteworthy, with significant susceptibility of clinically important pathogens to their extracts (Ahmed *et al.,* 2024). This activity can be attributed to the presence of alkaloids and tannins, which are also found in C. *scadens* and may contribute to the antibacterial and antifungal activity of C. *scadens*. Given the growing concern surrounding antimicrobial resistance, C. *scadens* may prove to be a valuable resource for the discovery of new antimicrobial compounds and the development of novel therapeutic agents for various health conditions.

MATERIALS AND METHODS

Plant Sample Collection

Fresh and healthy leaves of C. scandes were collected from Orba Village in the Udenu Local Government Area, Enugu State, Nigeria, and identified by Mr. Alfred Ozioko from the International Center for Ethnomedical and Drug Development (INTERCEDD). The samples were washed several times under running tap water. Some of the fresh leaves were dried at room temperature, while part of the sample was used fresh. The study was conducted at the Microbiology Laboratory of Coal City University, Enugu.

Ethical Approval and Consent:

Ethical approval was obtained from the ethics committee of the University before conducting the research.

Collection of Microorganisms for the Susceptibility test

Clinically relevant bacterial isolates of *Staphylococcus aureus, Streptococcus pyogenes, klebsiella pneumonia, E. coli, Salmonella typhi* and fungal isolates of *Curvularia verruculosa, Penicillum marneffei*, *Fusarium oxysporum*, *Aspergillus flavus* and *Candida albican*s were obtained from ESUT Teaching Hospital at Parklane, Enugu State. They were preserved as stock cultures at 4° C in the Department of Molecular Biology, National Arbovirus and Vector Research Centre, Enugu. Biochemical characterization of the bacterial isolates was performed for confirmation.

Sample Preparation/Extraction of Crude Extract

Twenty grams (20 g) of fresh leaves were blended in a Moulinex blender with 10 ml of distilled water for 5 minutes, filtered, and the filtrate autoclaved at 121 °C for 15 minutes. The sterilized extract was used to impregnate sterile paper discs (6 mm in diameter) for the susceptibility test. Control discs, which were impregnated with only distilled water, served as a negative control. The susceptibility

testing was conducted on several clinically relevant bacterial and fungal isolates.

100 g of the dried leaves was ground into a fine powder. Soxhlet extraction of the pulverized dried ground leaves was conducted on the pulverized dried sample using the method described by Horowitz (1984) and Ekwealor & Oyeka (2015), utilizing methanol as a solvent. The crude extract was concentrated using a water bath, and the components were characterized using standard methods described by Uwumarongie & Dowe (2023). It was finally stored in a freezer at -20°C for fungal and bacterial susceptibility studies.

$$Extract\ yield\ (\%) = \frac{Weight\ of\ dry\ extract}{Weight\ of\ powdered\ sample} \times 100$$

Phytochemical screening

Qualitative and quantitative analysis of the phytochemical component of the leaf extract was carried out based on the methods described by Dubale *et al*., (2023).

Qualitative Phytochemical Analysis

The confirmatory qualitative phytochemical screening of the leaf extract was conducted to identify the main classes of compounds (tannins, saponins, steroids, flavonoids, alkaloids, glycosides, and phenols) present in the extract, following standard protocols as described in the literature (Dubale *et al.,* 2023).

Test for Tannins

200 mg of the leaf extract was boiled with 10 ml of distilled water, and 0.1% Ferric chloride was added to the mixture. This was then observed for blue-black coloration, indicating the presence of tannins.

Test for Saponins

1 g of the powdered dried sample was boiled separately with 10 ml of distilled water in a water bath for 10 minutes. The mixture was filtered while hot and allowed to cool. 2.5 ml of the filtrate was diluted to 10 ml with distilled water and shaken vigorously for 2 minutes (frothing indicated the presence of saponin in the filtrate). (Ajayi *et al.,* 2011).

Test for Steroids

1 ml of the crude extract was combined with 10 ml of chloroform and 10 ml of sulfuric acid.

The formation of the bilayer (red top layer and greenish bottom layer) revealed the presence of steroids

Test for flavonoids:

1 g of the powdered dried leaf sample was boiled with 10 ml of distilled water for 5 minutes and filtered while hot. A few drops of sodium hydroxide (20%) solution were added to 1 ml of the cooled filtrate. The development of a yellow color that turned colorless upon the addition of acid suggested the presence of flavonoids.

Test for Alkaloids

The plant extract was dissolved in 100 ml of water, filtered, and heated in steam with 2 ml of the filtrate and three drops of 1% HCl. Then, 1 ml of the heated mixture was combined with 6 ml of the Mayer-Wagner reagent. The appearance of a cream or brown-red precipitate indicated the presence of alkaloids.

Test for Glycosides

1 ml of distilled water and solid sodium hydroxide (NaOH) were added to 0.5 ml of the crude extracts of the leaves. The formation of a yellowish color indicated the presence of glycosides.

Test for Phenols

1 mL of the dry leaf extract was combined with three drops of iron (III) chloride ($FeCl_3$) and 1 mL of potassium ferrocyanide (K2Fe(CN)6). The formation of greenish-blue complexes confirmed the presence of phenols.

DPPH radical scavenging and reducing power assays

The antioxidant activity of methanol extracts from the leaves was determined using the DPPH free radical scavenging assay method as described by Singh et al., 2009. The extracts' ability to reduce ferric ions (Fe^{3+}) was also assessed according to the methods published by Yen & Chen, 1995; Do *et al.,* 2014.

Antimicrobial Screening:

This was done based on the method described by Odeh & Amon (2014).

Experimental microorganisms:

Stock cultures of *Staphylococcus aureus*, *Streptococcus pyogenes*, *klebsiella pneumoniae*, *E. coli*, *Salmonella typhi*, *Curvularia verruculosa, Penicillum marneffei,* , *Fusarium oxysporum*, *Aspergillus flavus* and *Candida albicans* obtained from the Department of Molecular Biology, National Arbovirus and Vector Research Centre, ESUT Teaching Hospital in Parklane, Enugu State were used for the susceptibility study.

0.2 g of the ground leaves extract was weighed and dissolved in 10 ml of dimethyl sulphoxide (DMSO) to obtain a concentration of 20 mg/ml, each. This was the initial concentration of the extract used to assess the antimicrobial activity of the plant extracts. The agar well diffusion technique

was used for the susceptibility testing of the leaf extract to screen for antimicrobial activities against the isolates. 0.1ml innoculum of overnight broth culture of test organisms standardized at 1.5 × 10^6 sfu/ml dilution concentration was spread inoculated evenly on the Mueller-Hinton agar plate, and a 6 mm diameter well was cut at the center of the plate using a cork borer. 0.1ml of extract solution in DMS (concentration 20 mg/ml) was introduced into the agar well. The agar plate was incubated at 37 ºC for 24 h and observed for zones of inhibition (Odeh & Amon, 2014).

Determination of minimum inhibitory concentration

The MIC was carried out based on the method described by Odeh and Amon (2014). A 20 mg/ml solution of the leaf extract was serially diluted two-fold in Muller-Hinton broth to create decreasing concentrations of 20 mg/ml, 10 mg/ml, 5 mg/ml, and 2.5 mg/ml. An aliquot (0.1 ml) of overnight broth culture of the test microorganism, standardized at 1.5 × 10^6 sfu/ml dilution concentration in sterile normal saline, was introduced into the extract dilution. The mixture in the sterile test tubes was incubated at 37ºC for 24 hours and observed for turbidity (indicating growth) or its absence (indicating inhibition). Ceftriaxone (antibacterial drug) and fluconazole (antifungal drug) were used as positive controls, and sterile normal saline served as the negative control. The minimum inhibitory concentration was the lowest concentration of the extract solution that inhibited microbial growth.

Minimum bactericidal / fungicidal concentration

A loopful of the test mixture was removed from each MIC tube that showed no growth, inoculated onto an antibiotic-free Mueller-Hinton agar plate, incubated at 37 ºC for 24 hours, and inspected for the presence of colonies indicating growth. The minimal bactericidal or fungicidal concentration is the lowest concentration of extract, ceftriaxone, and Fluconazole that showed no bacterial or fungal growth.

RESULTS AND DISCUSSIONS

Table 1: Qualitative analysis of phytochemical composition of fresh and dry leaves of *Craterosiphon scandens*

Phytochemicals	Bioavailability	
	Fresh	Dry
Saponins	+	++
Alkaloid	+++	+++

Tannins	+	+
Phenol	++	+
Flavonoids	+++	+++
Glycosides	+	+++
Steroids	ND	ND

Bioavailability key: ND = Not detected, + =Present in low amount, ++ = Present in moderate amount ,+++ =Present in high amount

Table 2: Quantitative Analysis of Phytochemical Composition of Fresh and Dried leaves of *Craterosiphon scandens*

Phytochemicals present in fresh and dry leaf of *C. scandens*		
	Fresh	**Dry**
Amount (mg/g)		
Alkaloids	4.68	3.40
Tannins	0.75	0.65
Phenols	1.88	2.73
Flavonoids	4.72	4.55
Glycosides	3.92	3.50
Steroids	0.42	0.50
Saponins	3.09	2.78

The qualitative analysis of phytochemicals in fresh and dry leaves of C. scandens revealed various bioactive compounds, as shown in Table 1. Both fresh and dry leaves contained saponins, alkaloids, tannins, phenols, flavonoids, and glycosides, while steroids were not found in either. The quantitative analysis indicated differing amounts of these phytochemicals in fresh and dry leaves, as outlined in Table 2. Notably, flavonoids and glycosides were present in high concentrations, while alkaloids and saponins were also detected in significant quantities.

Craterosiphon scandens is a valuable medicinal plant with a rich phytochemical composition that exhibits potent antioxidant and antimicrobial activities. The qualitative and quantitative analyses of the phytochemical composition of the aqueous and crude methanol extracts from both fresh and dry leaves of C. scandens are presented in Tables 1 and 2, respectively. This analysis revealed that both extracts contained various bioactive compounds, including alkaloids, flavonoids, glycosides, phenols, saponins, and tannins, but not steroids. These findings differ from those of Olutayo *et al.,* 2013, who

reported the presence of only tannins and the absence of other phytochemical components.

Consistency with the works of Ugwu *et al.,* 2019, Wang *et al.,* 2023, Dubale *et al.,* 2023, and Bisso *et al.,* 2022, different classes of phytochemical compounds such as flavonoids, alkaloids, phenols, and glycosides were detected in the leaves and other parts of various plant species. However, they also noted the presence of steroids, which were not detected in this study. Bisso *et al.,* (2022) and Jakimiuk *et al.,* (2022) stated that phenolic and flavonoid compounds are considered the most important classes of phytochemicals due to their various biological properties. Their presence may be responsible for the therapeutic potential of C. *scadens*.

The relatively high concentrations of alkaloids (4.68 mg/g), flavonoids (4.72 mg/g), glycosides (3.92 mg/g), and saponins (3.09 mg/g) in the fresh aqueous leaf extract highlight their potential as promising areas for research in developing new antioxidant and antimicrobial therapies. Similarly, the dry methanolic leaf extract exhibited high levels of alkaloids (3.40 mg/g), flavonoids (4.55 mg/g), and glycosides (3.50 mg/g), along with a moderate level of saponins (2.78 mg/g). Kumar *et al.,* (2023) reported that flavonoids can act against free radicals, provide protective effects against cardiovascular diseases, cancers, and other age-related diseases, and prevent inflammation and allergies. Additionally, Wang *et al.,* (2023) reported other health benefits of flavonoids in treating various conditions, including angina pectoris, cervical lesions, chronic venous insufficiency, dermatopathy, diabetes, gastrointestinal diseases, lymphocytic leukaemia, menopausal symptoms, rhinitis, and traumatic cerebral infarction. This supports their bioactivities and usage as therapeutic agents. Furthermore, saponins (2.78 mg/g) were detected in moderate concentrations in the dry methanolic leaf extract, suggesting that C. *scandens* has utility in traditional medicine for treating infectious and certain other chronic diseases.

The qualitative and quantitative studies conducted in this research also indicated that both fresh and dry leaf extracts contain essential phytochemicals in varying quantities. This finding is in agreement with the work of Koche *et al.,* (2018), Kengne *et al.,* (2023), and Kumar *et al.,* (2023), who reported that phytochemicals present in different plants can differ both in

concentrations and types. They also noted that these differences may be based on various factors, including intrinsic and extrinsic factors such as crop type, plant parts, variety, soil, environment, climatic conditions, and extraction methods, among others.

Table 3: Antioxidant Activity of fresh leaves of *C. scandens* Using the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) Radical Scavenging Method

Concentration (mg/ml)	RESULTS OF DPPH Fresh leaves Absorbance	Blank (methanol)	positive Blank (positive control DPPH In methanol)	**% scavenging activity**
0.625	0.555	0.484	0.378	8**1.21**
1.25	0.524	0.444	0.610	86.88
2.5	0.502	0.421	0.790	89.74
5	0.478	0.412	0.820	91.95
10	0.411	0.390	0.940	97.76

Table 4: Antioxidant Activity of dry leaves of *Craterosiphon scandens* Using the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) Radical Scavenging Method

Concentration (mg/ml)	RESULTS OF DPPH Fresh leaves Absorbance	Blank (methanol)	positive Blank (positive control DPPH In methanol)	**% scavenging activity**
0.625	0.612	0.484	0.378	66.13
1.25	0.589	0.444	0.610	76.22
2.5	0.481	0.421	0.790	91.27
5	0.470	0.412	0.820	92.92
10	0.401	0.390	0.940	98.82

Table 5: Ferric Reducing power of Fresh leaves of *C. scadens*

Concentration of extract used (mg/ml)	Absorbance	Absorbance of control	% Inhibition
0.625	0.317	0.576	44.96
1.25	0.344	0.656	47.56
2.5	0.375	0.740	49.32
5	0.385	0.854	54.91

10	0.393	0.965	59.27
Gallic Acid			
0.625	0.312	0.584	46.57
1.25	0.308	0.590	47.79
2.5	0.300	0.599	49.91
5	0.284	0.612	53.59
10	0.244	0.650	62.46

Table 6: Ferric Reducing power of dry leaves of *C scandens*

Concentration of extract used (mg/ml)	Absorbance	Absorbance of control	% Inhibition
0.625	0.314	0.576	45.48
1.25	0.322	0.656	50.91
2.5	0.337	0.740	54.45
5	0.378	0.854	55.73
10	0.380	0.965	60.62
Gallic Acid			
0.625	0.312	0.584	46.57
1.25	0.308	0.590	47.79
2.5	0.300	0.599	49.91
5	0.284	0.612	53.59
10	0.244	0.650	62.46

The antioxidant activity evaluated using the DPPH radical scavenging method, as presented in Tables 3 and 4, showed significant antioxidant activity, with increasing scavenging activity observed at higher concentrations. The ferric reducing power assay also demonstrated the antioxidant potential of both fresh and dry leaves as illustrated in Tables 5 and 6.

The DPPH scavenging assay confirms the antioxidant potential of the fresh and dried leaf extracts of C. *scandens*. The antioxidant activity assessed using the DPPH radical scavenging method was significant, with lethal concentration, 50% (IC50) values of 1.23 ± 0.02 mg/ml and 1.56 ± 0.03 mg/ml for fresh and dried leaves, respectively (Tables 3 and 4). The aqueous extract of the fresh leaves demonstrated significant scavenging activity against DPPH free radicals, reaching 97.76% at the highest concentration (10 mg/ml). In comparison, the methanolic extract of the dried leaves achieved an impressive value of 98.82% at 10 mg/ml (Tables 3 and 4). These findings differ from the report of Kengne *et al.,* (2023) and Chen *et al.,* (2025), who recorded very weak DPPH radical scavenging capacity in Trevesia

palmata and Tristemma mauritianum plants, with IC50 values of 0.52±25.01 mg/ml and 19.0.52±1.11 µg/ml, respectively. This indicates that the scavenging capability of C. scandens extracts is greater than that of some medicinal plants reported in the literature (Ranjbar *et al.,* 2020). From the results, it can be inferred that the good total antioxidant capacity of the leaf extracts may be attributed to the presence of alkaloids and flavonoids. The presence of alkaloids, flavonoids, glycosides, and saponins may have contributed to the observed antioxidant activity, demonstrating its potential against inflammatory conditions and oxidative stress-related diseases.

The ferric reducing antioxidant power (FRAP) assay results from this study showed that the aqueous and methanol leaf extracts of C. *scandens* had high electron-donating power, which correlated with the sample concentration. The ferric reducing antioxidant power (FRAP) assays further supported these findings, as both extracts exhibited increasing reducing power with higher concentrations. Although gallic acid, used as the standard, demonstrated superior efficacy, particularly at 10 mg GAE/ml (62.46%), the fresh and dry leaf extracts showed 59.27% and 60.62% (Table 5 and 6), respectively, indicating that C. *scandens* possesses significant antioxidant power that can contribute to the plant's therapeutic value. In agreement with the findings of this study, Dawurung *et al.,* (2021) and Chatepa *et al.,* (2024) also reported a concentration-dependent increase in ferric reducing power absorbance of plant extracts; however, contrary to our results, the medicinal plant extracts from their studies showed high ferric reducing antioxidant power compared to the absorbance of the standard ascorbic acid at 2 mg AAE/ml. The lower value in the ferric reducing power absorbance of the standard may be a result of variance in the type of standard used in the studies.

Flavonoids have been described as excellent antioxidants (Hassanpour & Doroudi, 2023). In this study, the relatively high concentrations of flavonoids (4.72 mg/g (fresh) and 4.55 mg/g (dry)], and glycosides (3.92 mg/g (fresh) and 3.50 mg/g (dry)] in the fresh and dry leaves highlights their potential as sources of natural antioxidants. They can exhibit their antioxidant activity by scavenging free radicals and reactive oxygen species (ROS), chelating metals, and preventing the oxidation of low-density lipoproteins (LDLs) (Hassanpour & Doroudi, 2023. The result of this study is also supported by the work of Ali *et al*., (2022) and Nwozo *et al*., (2023), who evaluated the

potential antioxidant properties of many medicinal plant, *Tilia cordata, Amaranthus hybridus (Linn), Anarcadium occidentale, Allium sativu, L., Vernonia amygdalina, Mangifera indica, Monodora myristica, Uvariachae* among others. These plants recorded high FRAP and DPPH activities, which were attributed to the high phytochemical constituents of the plant parts, particularly phenolic and flavonoid contents.

Antimicrobial Sensitivity Test

Table 7: Susceptibility of bacterial isolates to *C. scandens aqueous* and methanolic leaves extract

Samples	Concentration (mg/ml)	Isolates/Zones of Inhibition(mm) 1	2	3	4	5
Aqueous Fresh	20	8.8	6.8	0.0	0.0	2.8
	10	1.4	0.0	0.0	0.0	0.0
	5.0	0.0	0.0	0.0	0.0	0.0
	2.5	0.0	0.0	0.0	0.0	0.0
Methanolic Dry	20	0.0	4.8	2.8	4.8	0.0
	10	0.0	0.4	0.0	0.0	0.0
	5.0	0.0	0.0	0.0	0.0	0.0
	2.5	0.0	0.0	0.0	0.0	0.0
Ceftriaxone	22	13	24	17	20	30

KEY: Isolate 1= *Staphylococcus aureus*, Isolate 2= *Streptococcus pyogenes*, Isolate 3= *klebsiella pneumoniae*, Isolate 4= *E. coli*, Isolate 5= *Salmonella typhi*

Table 8: Antifungal effect of the aqueous and methanolic leave extracts on pathogenic fungi

Samples	Concentration (mg/ml)	Isolates/Zones of Inhibition(mm) 1	2	3	4	5
Aqueous Fresh	20	4.8	6.8	14.8	9. 0	2.8
	10	0.0	2.8	4.8	0.0	0.0
	5.0	0.0	1.8	0.0	0.0	0.0
	2.5	0.0	0.0	0.0	0.0	0.0
Methanolic Dry	20	0.0	10.8	0.0	8.8	4.8
	10	0.0	0.0	0.0	2.8	0.0
	5.0	0.0	0.0	0.0	0.0	0.0
	2.5	0.0	0.0	0.0	0.0	0.0

Fluconazole	20	17	12	10.0	9.0	23

Key: Isolate 1= *Curvularia verruculosa*, Isolate 2= *Penicillum marnerrfei,* Isolate 3= *Fusarium oxysporum*, Isolate 4= *Aspergillus flavus,* Isolate 5= *Candida albicans.*

The antimicrobial activity of the fresh leaves extract evaluated against various bacterial and fungal isolates (Tables 7 and 8) exhibited notable inhibition zones against *Staphylococcus aureus* (8.8 mm)*,Streptococcus pyogenes,*(6.8 mm), *Fusarium oxysporum*(14.8 mm)*, Aspergillus flavus* (9.0 mm) and *Penicillum marneffei* (6.8 mm). In contrast, the dry leaves extract showed activity against *Streptococcus pyogenes*,(4.8mm)*, Klebsiella pneumoniae* (2.8 mm), *E. coli* (4.8 mm) with more activity against the fungal isolates (*Penicillum marneffei* (10.8) and *Aspergillus flavus* (8.8 mm). Ceftriaxone and Fluconazole, which served as positive controls, had significant antimicrobial activity against all bacterial and fungal isolates, respectively. The MIC, as illustrated in Tables 9-11 ranged from 50 mg/ml for both fresh and dry leaf extracts, while the MBC/MFC was 100 mg/ml for both.

Table 9: Minimum Inhibitory Concentration of aqueous and methanolic extractsof the leaves against fungal isolates

Species of fungi	Fresh	Dry
	MIC (mg/ml)	
Curvularia verruculosa	50	50
Penicillum marneffei	50	50
Fusarium oxysporum	50	50
Aspergillus flavus	50	50
Candida albicans	50	50

Table 10: Minimum Inhibitory Concentration of the aqueous and methanolic extracts of the leaves against Bacterial isolates

Bacterial Isolates	Fresh	Dry
MIC (mg/ml)		
Staphylococcus aureus	50	50
Streptococcus pyogenes	50	50
Klebsiella pneumoniae	50	50

E. coli	50	50
Salmonella typhi	50	50

Table 11: Minimum Bactericidal and Minimum Fungicidal Concentration of aqueous and Methanolic extract against bacterial and fungal isolates

Fungal Isolates	Fresh	Dry
	MIC (mg/ml)	
Curvularia verruculosa	100	100
Penicillum marneffei	100	100
Fusarium oxysporum	100	100
Aspergillus flavus	100	100
Candida albicans	100	100
Bacterial Isolates	**Fresh**	**Dry**
Staphylococcus aureus	100	100
Streptococcus pyogenes	100	100
Klebsiella pneumoniae	100	100
E. coli	100	100
Salmonella typhi	100	100

Susceptibility testing of aqueous and methanolic leaf extracts of C. *scadens* showed moderate activity against *Staphylococcus aureus, Streptococcus pyogenes,* and *Candida albicans*, with inhibition zones ranging from 2.8 mm to 8.8 mm at 20 mg/ml. The activity against the fungal isolates was particularly pronounced against *Fusarium oxysporum,* which exhibited zones of inhibition measuring 14.8 mm, and against *Penicillium marneffei,* with measurements of 10.8 mm for the fresh aqueous and dry methanolic extracts, respectively, at 20 mg/ml as shown in Tables 8 and 9. These findings align with previous studies that demonstrate the antimicrobial potential of phytochemicals present in medicinal plants (Abigail *et al.,* 2024; Chaachouay & Zidane, 2024). Similarly, Kengne *et al.,* (2024) reported *promising antifungal activity of Tristemma mauritianum, Crassocephalum boughey-yanum,* and *Lavigeria macrocarpa* plant extracts against certain fungal isolates. The

minimum inhibitory concentration (MIC) for both fresh and dry leaf extracts was found to be 50 mg/ml, as shown in Table 10. In comparison, the minimum bactericidal/fungicidal concentration (MBC/MFC) was noted at 100 mg/ml for both (Table 11). These findings suggest that the extract has potential as a natural antimicrobial agent.

In conclusion, this study demonstrates the phytochemical composition, antioxidant properties, and antimicrobial activities of C. *scandens* leaves. The findings suggest that the plant has the potential to serve as a source of natural therapeutic agents, and further research is essential to explore its possible applications.

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