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# EVALUATION OF ANTIBACTERIAL ACTIVITY OF *TRICHILIA DREGEANA* SOND (MELIACEAE) CRUDE EXTRACTS AGAINST GRAM-POSITIVE AND GRAM-NEGATIVE BACTERIA

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## Abstract

Medicinal plants have been playing a crucial role in drug discovery and development against infectious diseases. The antibacterial activity of methanol crude extract of traditionally used *Trichilia dregeana* Sond was evaluated against common bacterial pathogens. Agar well diffusion and broth dilution assays were used to evaluate the antimicrobial activity and MIC of crude methanol plant extracts. The methanol crude extract of *Trichilia dregeana* Sond showed promising antibacterial activity against all tested bacterial isolates. A significant difference ($p < 0.05$) was observed in susceptibility among *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* species isolates. A higher mean susceptibility or inhibition zone diameter to crude extracts was observed in *Escherichia coli* (19.6 ± 5.9 mm) and *Pseudomonas aeruginosa* (18.4 ± 5.9 mm) compared to *Staphylococcus aureus* isolates. Significant differences were also observed in the susceptibility of tested bacterial isolates at different concentrations of crude extracts. A higher inhibition zone diameter was recorded in *Pseudomonas aeruginosa* (27.2 ± 1.5 mm), followed by *Escherichia coli* (25.2 ± 1.5 mm), and *Staphylococcus aureus* (21.1 ± 1.4 mm) at a concentration of 100 mg/mL. A comparable inhibition zone of crude extracts was observed with that of the positive control at 100 mg/mL concentration against *Staphylococcus aureus* and *Escherichia coli* isolates. The findings indicated that bacterial growth

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inhibition increased as the concentration of the crude extracts increased. All tested pathogenic bacteria species (gram-positive and gram-negative) were susceptible to plant leaf extract, even at lower levels of concentration. This showed the plant extracts' broad-spectrum activity against both gram-positive and gram-negative bacteria. The methanol crude extract of plants is an effective antibacterial agent for treating bacterial infections since the extract showed significant antibacterial potency comparable with that of the standard antibiotic disk. The findings are promising and encourage further investigation of the crude extracts' phytochemical, toxicological, and pharmacological aspects to support their potential rational use in antimicrobial therapy.

**Key words:** Antibacterial activity, crude extracts, isolates, MIC, *Trichilia dregeana* Sond

# PROCENA ANTIBAKTERIJSKE AKTIVNOSTI SIROVIH EKSTRAKATA *TRICHILIA DREGEANA* SOND (MELIACEAE) PROTIV GRAM-POZITIVNIH I GRAM-NEGATIVNIH BAKTERIJA

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## Kratak sadržaj

Lekovito bilje ima značajnu ulogu u razvijanju lekova za infektivne bolesti. Ispitivano je antibakterijsko dejstvo sirovog ekstrakta dobro poznate *Trichilia dregeana* Sond protiv uobičajenih bakterijskih patogena. Antimikrobna aktivnost i MIC sirovih biljnih ekstrakata evaluirani su pomoću agar difuzionog testa i metoda dilucije u bujonu. Sirovi metanolski ekstrakt *Trichilia dregeana* Sond pokazao je obećavajuću antibakterijsku aktivnost kod svih bakterijskih izolata. Značajna razlika ($p < 0.05$) u pogledu osetljivosti uočena je kod izolata vrsta *Escherichia coli*, *Staphylococcus aureus* i *Pseudomonas aeruginosa.* Viša prosečna osetljivost ili prečnik zone

inhibicije za sirove ekstrakte uočena je kod izolata *Escherichia coli* (19.6 ± 5.9 mm) i *Pseudomonas aeruginosa* (18.4 ± 5.9 mm) u odnosu na izolate *S. aureus*. Značajne razlike u pogledu osetljivosti testiranih bakterijskih izolata uočene su i u odnosu na različite koncentracije sirovih ekstrakata. Veći prečnik zone inhibicije pri koncentraciji od 100 mg/mL zabeležen je kod *Pseudomonas aeruginosa* (27.2 ± 1.5 mm), zatim *Escherichia coli* (25.2 ± 1.5 mm), i *Staphylococcus aureus* (21.1 ± 1.4 mm). Zona inhibicije sirovog ekstrakta uporediva je sa onom uočenom kod pozitivnih kontrola za izolate *Staphylococcus aureus* i *Escherichia coli* pri koncentraciji 100 mg/mL. Ovi nalazi ukazuju na to da se inhibicija bakterijskog rasta povećava sa povećanjem koncentracije sirovog ekstrakta. Sve testirane bakterijske patogene vrste (gram pozitivne i gram negativne) bile su osetljive na ekstrakt lista biljke, čak i na nižim koncentracijama. Ovo ukazuje na širok spektar aktivnosti biljnih ekstrakata kako protiv gram pozitivnih, tako i protiv gram negativnih bakterija. Sirovi metanolski ekstrakt biljaka je efikasan antibakterijski agens za tretman bakterijskih infekcija, s obzirom da je pokazao značajan antibakterijski potencijal koji je uporediv sa onim kod standardnih antibiotskih diskova. Ovi nalazi su obećavajući i ohrabruju dalja ispitivanja fitohemijskih, toksikoloških i farmakoloških aspekata sirovih ekstrakata u cilju njihove potencijalne racionalne primene u okviru antimikrobne terapije.

**Ključne reči:** antibakterijska aktivnost, sirovi ekstrakti, izolati, MIC, *Trichilia dregeana* Sond

## INTRODUCTION

Infectious diseases constitute a significant threat to livestock and public health worldwide due to the emergence of widespread drug resistance, particularly in developing countries (Salam et al., 2023). Many parts of the world continue to have endemic livestock diseases that have devastating effects on animal health and impact national and international trade (Tomley and Shirley, 2009). The economic losses from infectious diseases are mainly significant in Africa, including Ethiopia (Morens et al., 2008). Among infectious diseases of livestock, bacterial-caused diseases account for the most considerable economic losses in the livestock sector in many countries worldwide (Doss et al., 2012; Rathor et al., 2021).

Antibiotics are one of the most significant therapeutic discoveries for infectious diseases, even though synthetic medicines have only been used to treat one-third of infectious infections. This is due to the development of microorganisms resistant to existing chemotherapeutic drugs, as well as widespread indiscriminate and overuse of antibiotics. The widespread use of antibiotics in the treatment and control of infectious diseases has the potential to have public health effects due to drug residues in the food chain. Antibiotic resistance has skyrocketed in recent years, posing treatment challenges (Antara and Batra, 2012). Bacteria can develop a variety of resistance mechanisms to antimicrobial drugs and resistance to both old and new antibiotics is increasing in both human and veterinary medicine. Multidrug-resistant bacteria include methicillin-resistant *Staphylococcus aureus* (MRSA), penicillin-resistant *Streptococcus pneumoniae* (PRSP), and vancomycin-resistant enterococci (VRE). As a result, there is an urgent need to develop new and novel antimicrobial compounds with novel chemical structures and modes of action to combat multi-drug-resistant bacterial infections using traditionally used medicinal plants (Talib and Mahasneh, 2010; Bradley, 2002; Gootz, 2010).

Medicinal plants have been used for the treatment of infectious diseases worldwide. More than 80% of people living in Sub-Saharan Africa frequently rely on folk medical practices for their primary health needs, including humans and livestock. This is because of limited access to veterinary services, the emergence of resistant strains, and the high cost and limited affordability of commercial drugs (Beyene et al., 2015). Firm reliance on medicinal plants, mainly in rural areas, is practiced in Ethiopia. Plants have been crucial in drug discovery and development against infectious diseases (Madureira et al., 2012). About 60% of antimicrobial agents are derived from natural products, particularly plant products (Newman and Cragg, 2007). The huge structural diversity and great biodiversity make natural products an outstanding subject for drug discovery and development (Rollinger et al., 2006). Plant extracts produce primary and secondary bioactive molecules that act as a chemical defense against infection. The bioactive molecules are stored in roots, leaves, stems, fruits, and seeds (Seema et al., 2013; Ugwu et al., 2015). Plants' most important bioactive compounds are flavonoids, phenols, phenolic glycosides, saponins, cyanogenic glycosides, and glucosinolates (Tungmunnithum et al., 2018). These molecules may have different mechanisms of action than conventional drugs, which have clinical significance in health care improvement by alleviating drug-resistant issues (Eloff, 1998). Traditional medicinal plant extracts have been shown in studies to have antimicrobial activities against infectious diseases (Nayak, 2020). Many African countries, including Ethiopia and other parts of the world, encourage the screening of plants used in tradi-

tional medicine to authenticate their antimicrobial activities. Therefore, the safety and effectiveness of medicinal plants should be investigated through in vitro and in vivo assay methods. The present study investigated the claimed antibacterial properties of medicinal plants traditionally used in Ethiopia and provided scientific validation of their use. The findings were aimed at evaluating the antibacterial activities of methanol crude extracts of *Trichilia dregeana* Sond plants against some gram-positive and gram-negative bacteria pathogens through agar well diffusion and broth dilution methods. The plant assayed in this study is commonly used as a medicinal plant in different parts of Ethiopia.

## MATERIAL AND METHODS

### *Materials and Chemicals*

The chemicals used were 99.9% methanol, plant extracts, distilled water, dimethyl sulfoxide (DMSO), reference drugs, Muller-Hilton agar, Muller-Hilton broth media, and nutrient-agar media. The materials used in the study were aluminum foil, mortar and pestle, digital weighing balance, diamond pencil, syringe, What-man No. 1 filter paper, micropipettes, test tubes, Bunsen burner, incubator, lyophilizer, rotavapor, sterile lancet, spatula, flasks, and orbital mixer.

### *Study Area*

Plant materials were collected from selected study areas in the Southwestern Jimma zone of Oromia regional state, Ethiopia. Jimma town, the capital of Jimma Zone, is located in Oromia Regional Administration, 346 km southwest of Addis Ababa. The average annual rainfall is 1216.7 mm, with the main wet season from June to September. The maximum and minimum temperatures of Jimma were 27 ˚*C* and 10 ˚*C*, respectively. The longitude and latitude of Jimma are 7° 36ʼ N and 36° 50ʼ E, respectively, at an altitude of 1753 m above sea level. The study areas practice mixed farming systems for crop livestock. The area has high humidity and is rich in fauna and flora.

### *Study Design*

The study design was an experimental trial of the in-vitro antibacterial activities of *Trichilia dregeana* Sond plant against infectious diseases. All experimental tests were carried out alongside positive and negative controls.

### *Preparation and Extraction of Medicinal Plants*

Leaves of *Trichilia dregeana* Sond plant were collected from their natural habitats based on their frequent use by informants for treating and controlling infectious diseases. The medicinal plant leaves were washed in tap water, shaded dry at room temperature, and chopped into smaller pieces. The dried medicinal plant was pulverized and ground into powder using a blender machine. The material was weighed before extraction procedures. The powders were labeled and stored in an airtight container until extracted. Four hundred grams (400 g) of dried medicinal plant were macerated in a one-liter solution (800 mL methanol with 200 mL distilled water) for 72 hours at ambient temperature. The 99.9% methanol and distilled water were used as solvents. The macerated medicinal plants were squeezed twice per day for three days. After 72 hours, the macerated medicinal plants were squeezed using double-layer gauze. Then, it was strained using Whatman No. 1 filter paper to get an extract solution free of solids. The plants were again re-macerated in a one-liter solution for 72 hours and squeezed two times per day. The solution was concentrated using a vacuum rotary evaporator to remove the solvent (methanol). Then, the extract was put in a sterile glass bottle and kept in a hot, dry oven at 37˚C to evaporate distilled water and the remaining solvent. After removing both methanol and distilled water, the crude extracts were weighed using a sensitive balance and stored at 4˚C until a sensitivity test was performed.

### *Source of Bacterial Strain*

Standard bacterial strains, including gram-positive and gram-negative bacteria, were used for the study. The *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* reference bacterial strains were obtained from the Aklilu Lema Institute of Pathobiology in Addis Ababa. Prior to testing, the isolates were grown on nutrient agar slants at 4 °C and sub-cultured in nutrient broth for 24 hours. The isolates were used as test pathogens for an antibacterial assay.

### *Preparation of Crude Extracts Concentration*

Five grams (5 g) of crude plant extracts were used to prepare concentration. The crude extracts (5 g) were dissolved or reconstituted in 5 mL of 10% DMSO to prepare a stock solution. Therefore, a crude plant extract stock solution was 1000 mg/mL. From stock solutions, six (6) distinct concentrations of crude extracts (100 mg/mL, 50 mg/mL, 25 mg/mL, 12.5 mg/mL, 6.25 mg/mL, and 3.125 mg/mL) were generated for an agar-well diffusion test.

## *Antibacterial Assay*

*Agar well diffusion method*: The antibacterial activities of the crude extract of *Trichilia dregeana* Sond were evaluated using the agar-well diffusion method (CLSI, 2018). Nutrient and Mueller Hinton agar were used as the culture medium for this assay. Bacterial suspension was prepared from 24-hour subcultured colonies using 5 mL sterile saline solution. Agitate the broth culture with a vortex mixer and incubate at 37˚C for 8 hours until it achieves 0.5 McFarland turbidity standards. The molten Mueller Hinton agar (MHA) medium was poured into sterile Petri dishes and incubated overnight to check for contamination. The agar plates were homogenously inoculated with the test bacterium using sterile cotton swabs. The plates were allowed to solidify. Then, six wells (6 mm in diameter and about 2 cm apart) were punched with sterile cork borers on the surface of MHA plates. The aliquots of about 100 µL of each concentration of plant extracts were allocated into the respective wells using a sterile micropipette syringe and allowed to diffuse at room temperature for 2 hours. Trimethoprim/Sulfamethoxazole (25 µg) and 10% DMSO were used as positive and negative controls, respectively. The plates were incubated at 37 for 24 hours (Yunana et al., 2018). The plates were observed for the presence of inhibition of bacterial growth that was indicated by a clear zone around the wells following 24-hour incubation. The duplicate assay was performed in case of inhibition zone appearance. The diameters of inhibition zones were measured using a clipper. The results of antibacterial activity were interpreted as sensitive (< 14 mm), intermediate (14 - 17 mm), and susceptible (> 17 mm) (Koona and Subba Rao, 2012; Rahmoun et al., 2014). The results were interpreted as sensitive, intermediate, or resistant, depending on the range recommended by NCCLS (Yunana et al., 2018). The antibacterial activity index of crude extracts (AI) for extract was also calculated using the following formula (Rathnayake et al., 2020).

$$AI = \frac{\text{Inhibition zone diameter of the sample}}{\text{Inhibition zone of the standard}}$$

*Minimum Inhibitory concentration*: The minimum inhibitory concentration of crude extracts against tested isolates was determined by the tube broth dilution method (CLSI, 2018). MIC is the lowest concentration of crude extracts that results in a complete inhibition of visible growth of bacteria. Stock concentrations (1000 mg/ml) of the methanol extract of the plant were first prepared by reconstituting 5g of weighed dried crude extract into 5 mL of ster-

ile 10% DMSO in a sterile glass beaker. The first concentration was prepared by mixing 9 mL of distilled water with 1 mL of stock solution to get 100 mg/mL. Then, 5 ml was picked from the first concentration (100 mg/mL) and twofold serially diluted in test tubes, each containing 5 mL of distilled water, to get different concentrations ranging from 100 mg/mL to 0.195 mg/mL using sterile test tubes (Quinn et al., 1999). The test bacteria suspension was prepared in sterile normal saline, and its turbidity was adjusted to standard 0.5 McFarland. About 100 µL of bacterial suspension was added to each test tube containing different plant extract concentrations. Then, the test tubes were incubated at 37˚C for 24 hours in aerobic conditions. The lowest concentration of plant extract that inhibited bacterial growth was determined as the MIC. The turbidity that indicates bacterial growth is frequently imperceptible to the naked eye. To determine the bacterial growth in each test tube, one loopful of the solution was streaked on a nutrient agar plate and incubated at 37˚C for 24 hours. If no bacterial growth on the nutrient agar plate was observed, then a specific concentration had inhibited the bacterial growth. A tube containing bacterial suspension without plant extracts was used as a positive control, whereas a tube containing plant extracts without broth culture was the negative control.

### *Data Analysis*

The raw data was recorded and stored in the Microsoft Excel database for data management analysis. R software was used for data analysis. Results were expressed as mean ± SD. All significant levels are set at $p < 0.05$.

## RESULTS

The findings of antibacterial activity and MIC values of methanol crude extracts of *Trichilia dregeana* Sond leaves are summarized in Tables 1 and 2, respectively. The methanol crude extract of the plant showed promising antibacterial activity against all tested bacterial isolates at different concentrations. A significant difference ($p < 0.004$) was also observed in terms of susceptibility among *E. coli*, *S. aureus*, and *P. aeruginosa* species isolates (Table 2). The overall antibacterial activity index of plant crude extracts against *P. aeruginosa*, *S. aureus*, and *E. coli* was 80%, 75%, and 60%, respectively (Table 2). Significant differences were observed in the susceptibility of tested bacterial isolates at different concentrations of crude extracts (Table 1). The antibacterial activity of crude plant extract at 100 mg/mL concentration was not significantly different from that of a standard antibiotic disk (Trimethoprim/Sulfamethoxazole) against *S. aureus* and *E. coli* tested isolates. Meanwhile, the antibacterial activ-

ity of crude extracts at a concentration of 100 mg/mL showed significant differences with the positive control against *P. aeruginosa* tested isolate.

The MIC of crude extracts against tested isolates was determined using the broth dilution method. The crude extracts of plants showed different levels of MIC against all tested bacterial isolates (Table 2). The lowest MIC of extracts of *Trichilia dregeana* Sond was 0.39 mg/mL against *E. coli* and *P. aeruginosa* isolates in the present findings. In contrast, the MIC of plant crude extracts against *S. aureus* was 0.78 mg/mL. The growth of *E. coli*, *P. aeruginosa*, and *S. aureus* isolates was observed at concentrations of 0.195 mg/mL and 0.39 mg/m, respectively. The negative and positive control results revealed negative antibacterial results and the presence of bacterial growth, respectively. The absence of bacterial growth can be established by examining the turbidity of the suspension; however, to confirm the presence of bacterial growth, a loopful of the suspension was inoculated on a nutrient agar plate and incubated overnight.

Table 1. Antibacterial activities of crude extracts in agar well diffusion method

| Mean inhibition zone ± SD (mm) | | | |
|---|---|---|---|
| Concentrations | *S. aureus* | *E. coli* | *P. aeruginosa* |
| 100 mg/mL | $21.1 \pm 1.4^{a}$ | $25.2 \pm 1.5^{a}$ | $27.2 \pm 1.5^{a}$ |
| 50 mg/mL | $17.6 \pm 0.7^{b}$ | $21.5 \pm 1.9^{bc}$ | $23.3 \pm 1.6^{b}$ |
| 25 mg/mL | $17.0 \pm 1.1^{b}$ | $18.6 \pm 3.5^{cd}$ | $17.2 \pm 0.1^{c}$ |
| 12.5 mg/mL | $13.7 \pm 0.9^{c}$ | $15.1 \pm 0.1^{de}$ | $13.9 \pm 0.6^{d}$ |
| 6.25 mg/mL | $11.7 \pm 0.7^{cd}$ | $14.6 \pm 0.6^{de}$ | $12.8 \pm 0.3^{d}$ |
| 3.125 mg/mL | $9.7 \pm 0.7^{d}$ | $13.1 \pm 0.4^{e}$ | $11.4 \pm 1.8^{d}$ |
| Trimethoprim/sulphametoxazole | $20.7 \pm 0.5^{a}$ | $29.5 \pm 1.2^{a}$ | $22.8 \pm 0.3^{b}$ |
| F test | *** | *** | *** |

*** = significant at 0.001 level, means within a column with different superscripts are significantly different,

Table 2. Mean zone of inhibition and MIC of tested isolates

| Isolates | Mean +/- SD (mm) | MICs in mg/mL | Activity index % |
|---|---|---|---|
| *Escheria coli* | $19.6 \pm 5.9^{a}$ | 0.39 | 60 |
| *Staphylococcus aureus* | $15.9 \pm 4.2^{b}$ | 0.78 | 75 |
| *Pseudomonas aeurigunosa* | $18.4 \pm 5.9^{a}$ | 0.39 | 80 |
| P value | 0.004 | - | |

MIC= minimum inhibitory concentration, ZOI, zone of inhibition, means within a column with different superscripts are significantly different,

## DISCUSSION

The medicinal plant was selected for an experimental study based on its frequent use locally for treating infectious diseases like mastitis. The antibacterial activity of methanol extracts from medicinal plants was evaluated by agar-well diffusion and broth dilution methods against different bacterial isolates. The bacterial species were gram-negative and gram-positive isolates that frequently encountered infectious diseases. *S. aureus* and *P. aeruginosa are* the most common pathogens causing severe infections, while *E. coli* is an opportunistic pathogen. Inhibition zones of plant crude extracts ≥ 10 mm were considered active (Manilal et al., 2023). Significantly higher susceptibility or inhibition zone diameter to crude extracts was observed in *E. coli* (19.6 ± 5.9 mm) and *P. aeruginosa* (18.4±5.9 mm) compared to *S. aureus* isolates. This finding indicated that crude extracts of the plant are more active against gram-negative bacteria (*E. col*i and *P. aeruginosa*) than gram-positive bacterial isolates (*S. aureus*) based on the large inhibition zones produced by crude extracts. The higher antibacterial activity of methanol extracts is due to the higher solubility of the active compounds in this solvent (Geetha et al., 1994). Methanol is a polar solvent with a higher power to extract active antibacterial compounds, mainly phenolic and polyphenolic, from the plant (Do et al., 2014). All tested pathogenic bacterial species (gram- positive and gram-negative) were susceptible to plant leaf extract, even at lower levels of concentration. This showed the broad-spectrum activity of the plant extracts against both gram-positive and gram-negative bacteria. This will significantly help combat the antibiotic-resistant bacteria that have become so common in recent years. The findings also confirm the potential of plants in Ethiopian ethnoveterinary medicine for producing bioactive compounds, which are helpful for rationalizing the use of medicinal plants in primary health care. The overall antibacterial activity index of plant crude extracts against *P. aeruginosa*, *S. aureus*, and *E. coli* was 80%, 75%, and 60%, respectively. The antibacterial activity index is the relative antibacterial activity of solvent crude extracts of plants against bacterial isolates. The inhibition zone of crude extracts was comparable with positive control at 100 mg/mL concentration against *S. aureus* and *E. coli* isolates. The crude extract showed the highest inhibition zone values compared to the positive control, Trimethoprim/Sulfamethoxazole, at 100 mg/ml concentration against *P. aeruginosa* isolates. A higher inhibition zone diameter was recorded in *P. aeruginosa* (27.2 ± 1.5 mm), followed by *E. coli* (25.2 ± 1.5 mm), and *S. aureus* (21.1 ± 1.4 mm) at a concentration of 100 mg/mL. The reference drug used in the experiment showed the highest antibacterial activity against the respective

tested bacterial isolates. The findings indicated that bacterial growth inhibition increased as the concentration of the crude extracts increased. A similar finding was reported by Nigussie et al. (2021) and Bene et al. (2016), as bacterial growth inhibition increased as the concentration of extracts increased.

The MIC of crude extracts against tested isolates was determined using the broth dilution method. The antibacterial activity of plant extracts is grouped depending on the susceptibility tests that produce MIC values in the range of 500-1500 μg/mL (Popović et al., 2015). Antibacterial activity is deemed substantial when MICs are less than 500 ug/ml and moderate when MICs are between 500 and 1500 μg/mL (Kuete, 2010; Aligiannis et al., 2001). *Trichilia dregeana* Sond was shown to have high antibacterial activity against *E. coli* and *P. aeruginosa* isolates based on this scale. In addition, this plant displays moderate antibacterial activity against *S. aureus* isolates. The present study's observed minimum inhibitory concentration (MIC) values for plant crude extracts fall within the range or are less than those of other plant extracts reported from various regions (Aligiannis et al., 2001; Sama Fonkeng et al., 2015; Yusuf et al., 2022; Manilal et al., 2023). The low MIC values of the isolates indicate the efficacy of the plant extracts (Doughari, 2006). On the other hand, the higher MIC values of the isolates indicate that either the plant extracts are less effective against tested isolates, or the isolates have the potential to develop antibiotic resistance.

## CONCLUSION

The current study found that methanol extracts of the *Trichilia dregeana* Sond plant's leaves displayed high antibacterial activity against tested bacterial isolates. The extracts showed potent antibacterial activity against gram-negative and gram-positive bacteria at 0.39 mg/mL and 0.78 mg/mL MIC, respectively. This indicated that the plant could be a good source of antibacterial activity to combat drug-resistant bacterial infections. This provides validity to its ethnobotanical relevance as a broad-spectrum agent in treating infectious diseases. All tested bacterial isolates were significantly susceptible to methanol crude extracts at different concentration levels. The broad-spectrum antibacterial activities of crude extracts of *Trichilia dregeana* Sond were demonstrated. These findings are promising and encourage further investigation of the phytochemical, toxicological, and pharmacological aspects of these crude extracts to support their potential rational use in antimicrobial therapy, particularly for gram-positive and gram-negative bacteria. The study recommends further fractionation and identification of different bioactive compounds from the *Trichilia dregeana* Sond plant that contribute to its antibacterial activity.

## Limitation of the Study

Due to chemical regent limitations and infrastructure issues, phytochemical screening and compound separation were not carried out.

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## Author's Contribution

T.M. Concept and design of the study, drafting of the manuscript, data analysis, interpretation of the results, and prepared the final draft of the manuscript. T.K., B.U. and H.Y. carried out laboratory work, recording data, revising the manuscript and final approval of the paper following critical editing. All authors read and approved the final manuscript for publication.

## Competing interest

The authors declare that there is no conflict of interest.

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