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| RESEARCH ARTICLE

Antimicrobial Activity Of *Gongronema Latifolium* (Utazi) Leaves Sold In Elele Against Selected Pathogenic Microorganisms

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| ABSTRACT
The increasing emergence of antimicrobial resistance among pathogenic microorganisms has intensified the search for alternative antimicrobial agents from medicinal plants. This study evaluated the antimicrobial activity of *Gongronema latifolium* (Utazi) leaves sold in Elele, Rivers State, Nigeria, against selected pathogenic microorganisms. Fresh leaves of *Gongronema latifolium* were collected from Elele Market and processed using ethanol and aqueous extraction methods. The antimicrobial activity of the extracts was tested against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella* species using the agar well diffusion technique, while the Minimum Inhibitory Concentration (MIC) was determined using the broth dilution method. Phytochemical screening of the plant extracts was also carried out using standard laboratory procedures. The results revealed that both ethanol and aqueous extracts possessed antimicrobial activity against all tested organisms, although the ethanol extract demonstrated significantly higher inhibitory effects. *Staphylococcus aureus* showed the highest susceptibility with an inhibition zone of 22.1 ± 0.4 mm for the ethanol extract, whereas *Pseudomonas aeruginosa* exhibited the least susceptibility. The MIC results further confirmed the stronger antimicrobial potency of the ethanol extract, with the lowest MIC value of 12.5 mg/mL recorded against *Staphylococcus aureus*. Phytochemical analysis revealed the presence of alkaloids, flavonoids, tannins, saponins, glycosides, terpenoids, and phenolic compounds, which are known for their antimicrobial properties. The study concluded that *Gongronema latifolium* leaves sold in Elele possess appreciable antimicrobial activity against selected pathogenic microorganisms and may serve as a potential source of natural antimicrobial agents for therapeutic and pharmaceutical applications.

| KEYWORDS
Gongronema latifolium, antimicrobial activity, phytochemicals, pathogenic microorganisms, medicinal plants

| ARTICLE INFORMATION

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1. Introduction

Medicinal plants have continued to play a fundamental role in healthcare delivery and disease management across the world, particularly in developing countries where access to conventional medicines may be limited. Over the past few decades, scientific attention has increasingly focused on medicinal plants because of the rising incidence of antimicrobial resistance among pathogenic microorganisms. The widespread misuse and overuse of antibiotics have contributed significantly to the emergence

of multidrug-resistant bacteria, thereby reducing the effectiveness of many synthetic antimicrobial agents. This global health challenge has stimulated renewed interest in plant-derived bioactive compounds as safer, cost-effective, and environmentally friendly alternatives for the treatment and control of infectious diseases (World Health Organization [WHO], 2022; Akinyemi et al., 2021).

Plants are naturally endowed with numerous phytochemical constituents such as alkaloids, flavonoids, tannins, saponins, terpenoids, glycosides, and phenolic compounds, many of which possess potent antimicrobial, antioxidant, anti-inflammatory, and therapeutic properties. These bioactive compounds contribute significantly to the medicinal value of plants and their ability to inhibit the growth of pathogenic microorganisms. Recent studies have demonstrated that several medicinal plants commonly consumed as vegetables or spices also possess remarkable antimicrobial activities against clinically important bacteria and fungi (Okagu et al., 2022; Ezeorba et al., 2021).

Among the numerous medicinal plants widely utilized in West Africa is *Gongronema latifolium*, commonly known as Utazi. The plant belongs to the family Asclepiadaceae and is extensively distributed in the tropical regions of Nigeria, Cameroon, and Ghana. In Nigeria, *Gongronema latifolium* is highly valued both as a culinary spice and as a medicinal herb due to its distinctive bitter taste and rich therapeutic potential. The leaves are frequently used in soups, salads, and traditional herbal preparations for the management of several ailments including diabetes mellitus, hypertension, malaria, gastrointestinal disorders, cough, and microbial infections (Adebayo et al., 2023). In many southeastern communities such as Elele in Rivers State, Utazi leaves are commonly sold in open local markets where they are purchased daily for nutritional and medicinal purposes.

Scientific investigations conducted in recent years have confirmed that *Gongronema latifolium* possesses several pharmacological activities, including antimicrobial, antidiabetic, anti-inflammatory, hepatoprotective, antioxidant, and immunomodulatory effects. These biological properties have been attributed to the plant's rich phytochemical profile, particularly its abundance of flavonoids, saponins, tannins, essential oils, and phenolic compounds (Nwobodo et al., 2021; Ibrahim et al., 2024). Extracts obtained from the leaves of *Gongronema latifolium* have shown inhibitory effects against important pathogenic microorganisms such as *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella* species, and *Klebsiella pneumoniae*, organisms frequently implicated in wound infections, gastrointestinal diseases, urinary tract infections, and other public health concerns (Okeke et al., 2022; Chukwu et al., 2023).

Despite the growing recognition of medicinal plants as potential sources of antimicrobial agents, concerns remain regarding the microbiological quality and safety of herbal materials sold in local markets. Medicinal plants displayed in open markets are often exposed to environmental contaminants during harvesting, transportation, processing, storage, and handling. Poor sanitary practices, dust exposure, contaminated water, and inadequate preservation methods may compromise the quality, safety, and therapeutic efficacy of these plant materials (Omemu et al., 2021). Consequently, medicinal plants intended for therapeutic use may harbor pathogenic microorganisms capable of causing infections or reducing the effectiveness of the herbal products.

Although several studies have evaluated the phytochemical and pharmacological properties of *Gongronema latifolium*, there remains limited recent information on the antimicrobial activity of Utazi leaves specifically sold in local markets within Rivers State, Nigeria. Furthermore, few studies have focused on assessing the therapeutic potential of market-sourced *Gongronema latifolium* against selected pathogenic microorganisms associated with human infections. This knowledge gap underscores the need for continuous scientific evaluation of medicinal plants commonly consumed by the public.

Therefore, this study was undertaken to evaluate the antimicrobial activity of *Gongronema latifolium* (Utazi) leaves sold in Elele against selected pathogenic microorganisms. The findings from this research are expected to contribute valuable scientific information regarding the medicinal efficacy of the plant and support the development of alternative antimicrobial agents derived from natural plant sources.

2. Literature Review

2.1 Overview of Medicinal Plants

Medicinal plants have been widely utilized for centuries in the treatment and prevention of various human diseases (Harborne, 2021; Okagu et al., 2022). They contain numerous bioactive compounds such as alkaloids, flavonoids, tannins, saponins, phenols, and terpenoids which possess therapeutic properties (Adebayo et al., 2023; Ezeorba et al., 2021). In many developing countries, medicinal plants remain an important source of healthcare due to their affordability, accessibility, and perceived safety (WHO, 2022). The increasing resistance of pathogenic microorganisms to conventional antibiotics has renewed scientific interest in medicinal plants as alternative antimicrobial agents (Akinyemi et al., 2021; Okagu et al., 2022). Researchers have therefore focused on evaluating the antimicrobial potential of various plant species against pathogenic bacteria and fungi (Ezeorba et al., 2021).

2.2 Botanical Description of Gongronema latifolium

Gongronema latifolium commonly known as Utazi, is a tropical climbing shrub that belongs to the family Apocynaceae (formerly Asclepiadaceae) (Adebayo et al., 2023). It is widely distributed in West African countries such as Nigeria, Ghana, and Cameroon (Ibrahim et al., 2024). The plant is characterized by broad green leaves, soft stems, and a slightly bitter taste (Adebayo et al., 2023). Gongronema latifolium is commonly consumed as a vegetable and spice in soups and traditional dishes (Ibrahim et al., 2024). The leaves are rich in nutrients and phytochemicals which contribute to its medicinal importance (Nwobodo et al., 2021). Different parts of the plant, especially the leaves, are traditionally used for the treatment of cough, malaria, hypertension, diabetes, stomach disorders, and microbial infections (Ibrahim et al., 2024).

2.3 Phytochemical Constituents of Gongronema latifolium

The medicinal properties of Gongronema latifolium are attributed to its phytochemical constituents (Adebayo et al., 2023). Studies have reported the presence of alkaloids, flavonoids, tannins, saponins, glycosides, steroids, terpenoids, and phenolic compounds in the leaves of the plant (Harborne, 2021; Adebayo et al., 2023). These compounds possess antimicrobial, antioxidant, anti-inflammatory, and anticancer activities (Ezeorba et al., 2021). Flavonoids and phenolic compounds are known for their ability to inhibit microbial growth by disrupting microbial cell walls and interfering with enzyme activity (Okagu et al., 2022). Tannins can precipitate proteins in bacterial cells, while saponins are capable of increasing membrane permeability leading to cell destruction (Harborne, 2021). The synergistic activities of these phytochemicals contribute significantly to the antimicrobial effectiveness of the plant (Nwobodo et al., 2021).

2.4 Traditional and Medicinal Uses of Gongronema latifolium

Gongronema latifolium has long been used in traditional medicine for the management of several ailments (Ibrahim et al., 2024). In many African communities, the leaves are chewed fresh or prepared as decoctions for the treatment of cough, sore throat, stomach pain, dysentery, and intestinal infections (Adebayo et al., 2023). The plant is also believed to possess antidiabetic and antihypertensive properties (Ibrahim et al., 2024). Traditional healers frequently use Utazi in herbal preparations aimed at boosting immunity and improving digestion (Nwobodo et al., 2021). The medicinal relevance of the plant has encouraged scientific investigations into its pharmacological and antimicrobial properties (Okeke et al., 2022).

2.5 Concept of Antimicrobial Activity

Antimicrobial activity refers to the ability of a substance to inhibit the growth or destroy microorganisms such as bacteria, fungi, and viruses (CLSI, 2022). Antimicrobial agents may be bactericidal, meaning they kill microorganisms, or bacteriostatic, meaning they inhibit microbial growth (Cheesbrough, 2021). Plant-derived antimicrobial agents are gaining importance due to the emergence of antibiotic-resistant pathogens (Akinyemi et al., 2021; WHO, 2022). The antimicrobial effectiveness of plant extracts is influenced by factors such as the type of solvent used for extraction, concentration of extract, plant part utilized, and the susceptibility of the test microorganisms (Okagu et al., 2022).

2.6 Selected Pathogenic Microorganisms and Their Public Health Importance

Pathogenic microorganisms are disease-causing microbes capable of infecting humans and animals (Cheesbrough, 2021). Common pathogenic bacteria frequently associated with infections include Escherichia coli infection, Staphylococcal infection, Salmonellosis, and Pseudomonas aeruginosa infection (Cheesbrough, 2021). These organisms are responsible for food poisoning, urinary tract infections, wound infections, respiratory infections, and gastrointestinal diseases (WHO, 2022). The increasing resistance of these pathogens to antibiotics poses serious public health challenges worldwide (Akinyemi et al., 2021; WHO, 2022). Consequently, there is a need to explore alternative antimicrobial substances from medicinal plants such as Gongronema latifolium (Okagu et al., 2022).

2.7 Antimicrobial Activity of Medicinal Plants

Several medicinal plants have demonstrated significant antimicrobial activities against pathogenic microorganisms (Ezeorba et al., 2021). Plant extracts from leaves, roots, stems, and seeds have been reported to inhibit both Gram-positive and Gram-negative bacteria (Okeke et al., 2022). The antimicrobial effects of medicinal plants are often associated with their phytochemical constituents which interfere with microbial metabolism, protein synthesis, and cell membrane integrity (Harborne, 2021). Research findings have shown that plant extracts may serve as potential sources of novel antimicrobial drugs with fewer side effects compared to synthetic antibiotics (Okagu et al., 2022).

2.8 Antimicrobial Activity of Gongronema latifolium Leaves

Numerous studies have investigated the antimicrobial activity of Gongronema latifolium leaves against different pathogenic microorganisms (Chukwu et al., 2023; Okeke et al., 2022). Both aqueous and ethanol extracts of the leaves have shown inhibitory

effects against organisms such as Staphylococcus aureus, Escherichia coli, Klebsiella species, Salmonella species, and Pseudomonas aeruginosa (Nwobodo et al., 2021; Chukwu et al., 2023). Ethanol extracts are often reported to exhibit stronger antimicrobial activity due to their ability to extract more bioactive compounds (Adebayo et al., 2023). The antimicrobial effect is commonly determined using methods such as agar well diffusion and minimum inhibitory concentration tests (CLSI, 2022). These studies suggest that Gongronema latifolium possesses promising antimicrobial properties that could be useful in pharmaceutical and therapeutic applications (Okeke et al., 2022).

2.9 Factors Affecting the Antimicrobial Activity of Plant Extracts

The antimicrobial activity of plant extracts can be affected by several factors including extraction method, solvent type, concentration of extract, environmental conditions, and microbial species tested (Harborne, 2021). Solvents such as ethanol and methanol are generally more effective in extracting active phytochemicals than water (Okagu et al., 2022). The age of the plant, geographical location, storage conditions, and processing methods may also influence the potency of the extracts (Omemu et al., 2021). Furthermore, differences in the cell wall structure of Gram-positive and Gram-negative bacteria can affect their susceptibility to plant-derived antimicrobial agents (Cheesbrough, 2021).

2.10 Research Gap

Although several studies have examined the medicinal properties of Gongronema latifolium, limited information exists regarding the antimicrobial activity of Utazi leaves specifically sold in Elele against selected pathogenic microorganisms (Chukwu et al., 2023; Okeke et al., 2022). Variations in environmental conditions, handling practices, and storage methods may influence the phytochemical composition and antimicrobial effectiveness of the leaves (Omemu et al., 2021). Therefore, this study seeks to evaluate the antimicrobial activity of Gongronema latifolium leaves sold in Elele against selected pathogenic microorganisms in order to contribute to existing knowledge and provide scientific evidence for its medicinal use.

3..Materials And Methods

3.1: Study Area

This study was carried out in Elele, Rivers State, Nigeria. Elele is located in the Ikwerre Local Government Area and is known for its active commercial activities, including the sale of medicinal plants and vegetables in local markets. The area experiences a tropical climate characterized by high temperature, humidity, and seasonal rainfall, environmental conditions that may influence the microbial quality of medicinal plant materials sold in open markets. The choice of Elele was based on the widespread consumption and medicinal use of *Gongronema latifolium* (Utazi) within the community.

3.2: Collection and Identification of Plant Samples

Fresh leaves of *Gongronema latifolium* (Utazi) were purchased from different vendors at Elele Market, Rivers State, Nigeria. The samples were collected aseptically in sterile polythene bags and transported immediately to the Microbiology Laboratory for analysis. Proper identification and authentication of the plant samples were carried out by a qualified botanist in the Department of Plant Science and Biotechnology. The leaves were carefully sorted to remove damaged and contaminated portions before processing.

3.3: Preparation of Plant Extracts

The collected leaves were washed thoroughly with sterile distilled water to remove dust and surface contaminants and then air-dried at room temperature for approximately two weeks until a constant weight was obtained. The dried leaves were pulverized into fine powder using a sterile electric blender. The powdered plant material was stored in sterile airtight containers until required for extraction. A measured quantity of the powdered leaves was extracted using ethanol and aqueous solvents following standard extraction procedures described by Harborne (2021). About 100 g of the powdered sample was soaked separately in 500 mL of ethanol and distilled water for 72 hours with intermittent shaking to ensure proper extraction of bioactive compounds. The mixtures were filtered using sterile muslin cloth followed by Whatman No. 1 filter paper. The filtrates obtained were concentrated using a water bath at low temperature to obtain crude extracts, which were stored in sterile containers at 4°C until use.

3.4: Test Microorganisms

Selected pathogenic microorganisms used in this study included *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella* species. These organisms were obtained from previously characterized clinical isolates maintained in the Microbiology Laboratory culture collection unit. The isolates were selected because of their clinical importance and their frequent association with human infections such as gastrointestinal diseases, wound infections, urinary tract infections, and

septicemia (Cheesbrough, 2021). The bacterial isolates were subcultured onto Nutrient Agar and incubated at 37°C for 24 hours to obtain fresh pure cultures before use.

3.5: Preparation of Inoculum

Standardized inocula of the test organisms were prepared using the turbidity standard equivalent to 0.5 McFarland standard. Pure bacterial colonies were inoculated into sterile normal saline and adjusted visually to match the turbidity of the McFarland standard, corresponding approximately to 1.5×10^8 CFU/mL (Clinical and Laboratory Standards Institute [CLSI], 2022).

3.6: Antimicrobial Susceptibility Testing

The antimicrobial activity of the plant extracts was determined using the agar well diffusion method as described by CLSI (2022). Sterile Mueller-Hinton Agar plates were prepared and inoculated uniformly with the standardized bacterial suspensions using sterile cotton swabs. Wells of approximately 6 mm diameter were aseptically bored into the agar using a sterile cork borer. Different concentrations of the plant extracts were introduced into the wells using sterile micropipettes, while sterile distilled water and ethanol served as negative controls. Standard antibiotic discs were used as positive controls for comparison. The inoculated plates were allowed to stand for proper diffusion of the extracts and then incubated at 37°C for 24 hours. After incubation, the antimicrobial activity was evaluated by measuring the diameter of zones of inhibition around each well using a transparent ruler calibrated in millimeters. The presence of clear zones around the wells indicated antimicrobial activity of the extracts against the test organisms.

3.7: Determination of Minimum Inhibitory Concentration (MIC)

The Minimum Inhibitory Concentration (MIC) of the plant extracts against the test organisms was determined using the broth dilution method according to standard microbiological procedures (CLSI, 2022). Serial dilutions of the extracts were prepared in sterile nutrient broth, and equal volumes of standardized bacterial inocula were added. The tubes were incubated at 37°C for 24 hours and observed for turbidity. The lowest concentration of the extract that showed no visible growth was recorded as the MIC.

3.8: Statistical Analysis

All experiments were carried out in triplicate, and the results obtained were expressed as mean ± standard deviation. Data generated from the study were analyzed using appropriate statistical tools such as Analysis of Variance (ANOVA) to determine significant differences between treatment groups at a confidence level of 95% ($p < 0.05$).

3.9: Antimicrobial Activity of Gongronema latifolium Leaf Extracts Against Selected Pathogenic Microorganisms

The ethanol extract of *Gongronema latifolium* demonstrated higher antimicrobial activity against all tested organisms compared to the aqueous extract. *Staphylococcus aureus* showed the highest susceptibility with a mean inhibition zone of 22.1 mm, while *Pseudomonas aeruginosa* exhibited the least susceptibility. The standard antibiotic control produced greater inhibition zones than both plant extracts.

Table 1: Antimicrobial Activity of *Gongronema latifolium* Leaf Extracts Against Selected Pathogenic Microorganisms

Test Organism	Ethanol Extract (mm)	Aqueous Extract (mm)	Standard Antibiotic control (mm)
Escherichia coli	18.4 ± 0.5	13.2 ±0.4	24.6±0.3
Staphylococcus aureus	22.1±0.4	16.5±0.6	28.3±0.2
Pseudomonas aeruginosa	15.3 ±0.3	11.4 ±0.5	21.7±0.4
Salmonella sp	19.6 ±0.6	14.8 ±0.3	25.1±0.5

Values are presented as Mean ± Standard Deviation of triplicate determinations.

3.9.1:Minimum Inhibitory Concentration (MIC) of Gongronema latifolium Leaf Extracts against Selected Pathogens

The ethanol extract exhibited lower MIC values compared to the aqueous extract, indicating stronger antimicrobial potency. *Staphylococcus aureus* was the most sensitive organism with the lowest MIC value of 12.5 mg/mL for the ethanol extract, whereas *Pseudomonas aeruginosa* showed the highest resistance.

Table 2: Minimum Inhibitory Concentration (MIC) of *Gongronema latifolium* Leaf Extracts against Selected Pathogens

Test Organism	Ethanol Extract MIC(mg/mL)	Aqueous Extract MIC (mg/mL)
Escherichia coli	25.0	50.0
Staphylococcus aureus	12.5	25.0
Pseudomonas aeruginosa	50.0	100.0
Salmonella sp.	25.0	50.0

3.9.2: Phytochemical Constituents Detected in Gongronema latifolium Leaves

Phytochemical screening revealed the presence of several bioactive compounds in *Gongronema latifolium* leaves, including flavonoids, tannins, alkaloids, saponins, and phenolic compounds. These phytochemicals may be responsible for the antimicrobial activity observed against the tested pathogenic microorganisms.

Table 3: Phytochemical Constituents Detected in *Gongronema latifolium* Leaves

Phytochemical Components	Presence
Alkaloids	Present (+)
Flavonoids	Present (+)
Tannins	Present (+)
Saponins	Present (+)
Glycosides	Present (+)
Terpenoids	Present (+)
Phenolic Compounds	Present (+)

4.Discussion

The present study evaluated the antimicrobial activity of *Gongronema latifolium* (Utazi) leaves sold in Elele against selected pathogenic microorganisms. The findings revealed that both ethanol and aqueous extracts of the plant possessed antimicrobial activity against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella* species. However, the ethanol extract demonstrated greater inhibitory activity when compared with the aqueous extract. This observation suggests that ethanol was more effective in extracting the bioactive compounds responsible for antimicrobial activity from the plant leaves.

The higher antimicrobial activity observed in the ethanol extract agrees with the findings of previous researchers who reported that organic solvents such as ethanol and methanol are more efficient in extracting phytochemicals including flavonoids, alkaloids, tannins, and phenolic compounds from medicinal plants (Okeke et al., 2022; Chukwu et al., 2023). Similar observations were reported in studies where ethanolic extracts of *Gongronema latifolium* exhibited stronger antibacterial activity against pathogenic bacteria than aqueous extracts because ethanol dissolves more non-polar and moderately polar bioactive compounds than water.

Among the test organisms, *Staphylococcus aureus* showed the highest susceptibility to the plant extracts, particularly the ethanol extract, while *Pseudomonas aeruginosa* exhibited the least susceptibility. The high sensitivity of *Staphylococcus aureus* may be associated with the structural characteristics of Gram-positive bacteria, which possess a relatively less complex cell wall compared to Gram-negative bacteria. Gram-negative organisms such as *Pseudomonas aeruginosa* possess an outer membrane rich in lipopolysaccharides that limits the penetration of antimicrobial substances into the bacterial cell (Akinyemi et al., 2021). The observed resistance of *Pseudomonas aeruginosa* in the present study is consistent with earlier reports describing the organism as naturally resistant to several antimicrobial agents due to its intrinsic resistance mechanisms, efflux pumps, and low membrane permeability (Ibrahim et al., 2024).

The antimicrobial activity recorded against *Escherichia coli* and *Salmonella* species further supports the medicinal importance of *Gongronema latifolium* in the treatment of gastrointestinal infections and foodborne diseases traditionally managed with herbal remedies in many African communities. Similar antibacterial effects against enteric pathogens have been documented in earlier studies involving *Gongronema latifolium* extracts (Ezeorba et al., 2021). The slight differences observed between the inhibition zones obtained in this study and those reported by other researchers may be attributed to variations in extraction methods, solvent type, concentration of extracts, geographical location of the plant, environmental conditions, maturity of the leaves, and differences in the strains of microorganisms tested.

The Minimum Inhibitory Concentration (MIC) results obtained in this study also demonstrated that the ethanol extract had lower MIC values compared with the aqueous extract, indicating stronger antimicrobial potency. The lowest MIC value was observed against *Staphylococcus aureus*, suggesting that the organism was highly susceptible to the plant extract. This finding corroborates previous studies which reported that medicinal plants rich in phenolic compounds and flavonoids often exhibit low MIC values against Gram-positive bacteria due to their ability to disrupt bacterial cell membranes and interfere with essential metabolic processes (Okagu et al., 2022).

Phytochemical screening carried out in the present study revealed the presence of alkaloids, flavonoids, tannins, saponins, glycosides, terpenoids, and phenolic compounds in *Gongronema latifolium* leaves. These phytochemicals are widely recognized for their antimicrobial and therapeutic properties. Flavonoids and phenolic compounds are known to inhibit microbial enzymes and damage bacterial cell membranes, while tannins can precipitate microbial proteins and interfere with bacterial metabolism. Saponins may also contribute to antimicrobial activity by increasing membrane permeability and causing leakage of cellular components (Nwobodo et al., 2021). The presence of these compounds therefore explains the inhibitory effects observed against the tested pathogens.

The findings of this study are also supported by reports on the biological activities of *Gongronema latifolium*, including its antibacterial, antioxidant, anti-inflammatory, and therapeutic potentials. Recent investigations have shown that the plant contains bioactive constituents capable of inhibiting clinically important pathogens and enhancing medicinal efficacy. The slight variation in phytochemical composition reported across studies may result from environmental factors such as soil composition, climate, harvesting season, storage conditions, and post-harvest handling practices.

Overall, the present study has demonstrated that *Gongronema latifolium* leaves sold in Elele possess appreciable antimicrobial activity against selected pathogenic microorganisms. The results validate the traditional use of the plant in herbal medicine and suggest that the plant may serve as a potential source of natural antimicrobial agents for pharmaceutical and therapeutic applications.

5.Conclusion

The present study demonstrated that Gongronema latifolium (Utazi) leaves sold in Elele possess significant antimicrobial activity against selected pathogenic microorganisms, including Escherichia coli infection, Staphylococcal infection, Pseudomonas aeruginosa infection, and Salmonellosis. The findings revealed that both aqueous and ethanol extracts of the leaves were effective in inhibiting the growth of the tested microorganisms, although the ethanol extract showed greater antibacterial activity and lower minimum inhibitory concentration values. This suggests that ethanol was more efficient in extracting the bioactive compounds responsible for the antimicrobial effects of the plant.

The antimicrobial activity observed in this study may be attributed to the presence of important phytochemical constituents such as alkaloids, flavonoids, tannins, saponins, terpenoids, and phenolic compounds found in Gongronema latifolium leaves. These phytochemicals are known to possess antimicrobial and antioxidant properties capable of disrupting microbial cell walls, inhibiting enzyme activity, and interfering with the growth and survival of pathogenic organisms. The effectiveness of the plant extracts against both Gram-positive and Gram-negative bacteria further highlights the broad-spectrum antimicrobial potential of the plant.

The study therefore provides scientific evidence supporting the traditional medicinal use of Gongronema latifolium in the treatment of microbial infections and other health conditions in many African communities. In addition, the results indicate that Utazi leaves could serve as a promising natural source of antimicrobial agents for pharmaceutical and therapeutic applications, especially in the fight against antibiotic-resistant pathogens. However, further studies are recommended to isolate and characterize the specific active compounds responsible for the antimicrobial activity, determine their mechanisms of action, and evaluate their safety, toxicity, and clinical effectiveness for possible drug development and commercial utilization.

6.Recommendations

1. Further studies should be carried out to isolate, purify, and characterize the specific bioactive compounds responsible for the antimicrobial activity of *Gongronema latifolium*.
2. Toxicological and pharmacological evaluations should be conducted to determine the safety, efficacy, and therapeutic dosage of the plant extracts for possible clinical application.
3. The use of *Gongronema latifolium* as a natural antimicrobial agent should be encouraged in the development of herbal formulations and alternative treatment strategies against resistant bacterial infections.

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