ANTIMICROBIAL ACTIVITY OF TELFAIRIAOCCIDETALIS AGAINST SALMONELLA TYPHI AND E.COLI

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ABSTRACT

Aims: The purpose of this research is to determine the antimicrobial activity of Telfairia occidentalis on Salmonella Typhi and E.coli .
Study design: The study made use of experimental study design.
Place and Duration of Study: The study was carried out at the Department of Microbiology Gombe State University.
Methodology: The plant was screened for the presence of phytochemicals and to determine the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of the plant extract on the test organism
Results:
The ethanolic extract of Telfairia occidentalis shows maximum activity against the bacterial isolates with the highest zone of inhibition recorded at 28mm and the least 10m, the MIC and MBC were determined at 12.5mg/ml & 6.25mg/ml and 12.5mg/ml & 12.5mg/ml respectively for both Salmonella typhi and E. coli.
Conclusion: Results obtained from this study has shown that ethanolic extracts of the plants *T. occidentalis* in varying concentrations had antimicrobial activities on almost all the test organisms that were used. This means that constituents of this plant extract may serve as a source of industrial drugs in the treatment of some infections

Keywords: Antimicrobial activity, minimum inhibitory concentration, bactericidal concentration, plant extract

1. INTRODUCTION

Plant-derived substances have recently become of great interest owing to their versatile applications. Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine, modern medicines, food supplements, folk medicines, pharmaceutical intermediatesand chemical entities for synthetic drugs [1].
About 85% of the world population uses herbal medicine for prevention and treatment of diseases, and the demand is increasing in developed and developing countries [2]. In recent years, many researchers have focused on medicines derived from natural plant products due totheir wide range of pharmacological significance [3]. *Telfairia occidentalis* is widely cultivatedfor its palatable and nutritious leaves. The leaves when compared with other tropical vegetableshave high nutritive value. Its protein content (21%) is higher than those of other commonly used leafy vegetables [4]. The leaves are rich in vitamins and minerals such as Ca, P, Fe etc. the high protein content in leaves of plants such as *Telfairia occidentalis* could have supplementary effect for the daily protein requirement of the body. In Nigeria, the herbal preparation of the plant has been employed in the treatment of several health conditions [5].

Infections caused by *salmonella* are a major public health problem in many developing countries like nigeria, with deaths from *salmonella* infections increasing in some areas with theemergence of some *salmonella* strains that are resistant to previously used antibiotics [7].

The incidence of drug resistance is on continued rise, this has led to emergencies of bacterial infections which are essentially untreatable. Especially alarming is the rapid global spread of multi- and pan-resistant bacteria (also

known as superbugs) that cause infections that are not treatable with existing antimicrobial medicines such as antibiotics. This account for the high rate of morbidity and mortality, longer hospitalization and increase in healthcare cost [6]. By considering this problem, the use of plants extracts and phytochemicals both with known antimicrobial properties can be of great significance in the treatment of some diseases. This research work was focused on finding an alternative treatment for some diseases using telfairia occidentalis (ugu). The research was aimed at evaluating the antibacterial activity of *TelfairiaOccidentalis (Ugu)* on *Salmonella Species*. By considering this problem, the use of plants extracts and phytochemicals both with known antimicrobial properties can be of great significance in the treatment of some diseases. This research work will focus on finding an alternative treatment for some diseases using telfairia occidentalis (ugu).

2. MATERIAL AND METHODS / EXPERIMENTAL DETAILS / METHODOLOGY

2.1 STUDY AREA

The samples used for this research were purchased from Gombe metropolis of Gombe State.

2.2 SAMPLE COLLECTION

Fresh leaves of *Telfairia occidentalis* were collected from Gombe State and identified by the Department of Botany Gombe State University.

2.3 SAMPLE EXTRACTION

The sample extraction was carried out according to techniques described by [7].

PHYTOCHEMICAL SCREENING OF THE PLANT EXTRACT

Test for Sapponins.

The test for tannins was carried out by similar technique as described by [7].

Test for Tannins.

To test for tannins methods as described by [8] was used.

Test for Alkaloids.

To test for alkaloids methods as described by [8] was used.

Test for Flavonoids.

To test for flavonoids, methods as described by [9] was used

Collection of Clinical Isolates.

The clinical isolates of *Salmonella species* were collected from State Specialist Hospital,Gombe

GRAM-STAINING

[10] method was used **BIOCHEMICAL TESTSBIOCHEMICAL TESTS**

The biochemical tests namely; indole test, catatlase test and citrate test were carried out according to a technique described by [10].

PREPARATION OF SENSITIVITY DISCS

The sensitivity discs were prepared according to a technique described by [11]

Standardization of the inoculum

The inoculum was standardized according to techniques described by [10].

Antibacterial susceptibility testing

The kirby-bauer (2000) method described by [10] was employed. Mueller-hinton agar was usedfor the susceptibility testing

Determination of minimum inhibitory concentration (mic)

Mic was determined to observe if the extract show inhibitory activity. The broth dilutiontechnique [10]

3. RESULTS AND DISCUSSION

Table 1: Physical properties of the plant material used

Physical Properties	Ethanolic extract of T. Occidentalis
Weight of the plant material	100g
Weight of the extract recovered	11g
Color	Dark green
Texture	Fine solid

Table 1 shows the physical properties of the extract which include the colour, texture, weight of the powdered leaves and weight of the extract recovered.

Table 2: Phytochemical components of *Telfairia Occidentalis*

Plant Phytochemicalst	Extract
Alkaloids	+
Sapponins	+
Tannins	+
Flavonoids	+
Glycosides	-

KEY
+ = Present
- = Absent

Table 2 shows the result of the phytochemical screening of the extract. Herbal medicines are beginning to gain widespread acceptance in the global herbal drug market which is estimated to worth a whooping USD 60 billion [13]. *T. occidentalis* have been reported in several scientific literatures to possess therapeutic effects which local communities take advantage of[14].

Table 3: Confirmatory results for test organisms

Characteristics	Salmonella Typhi	Eschericia Coli
Colours of colony	Light cream	Pink
Shapes	Rod	Rod
Gram reaction	Negative	Negative
Indole test	Negative	Positive
Catalase	Positive	Positive
Citrate utilization test	Negative	Negative
Oxide test	Negative	Negative

Table 3 shows the classification of the bacterial isolates based on their Gram reactions and biochemical tests. Naturally occurring substances of plant origin have been reported to inhibit the growth of microorganism. Plant extract have been used in folk and even modern medical practices for the treatment of different ailments, most of which are due to microbial activities [15]. Bacterial infections seem especially controllable due to good hygiene and the availability of effective antibacterial drugs. The development of resistance to antibiotic is an almost inevitable consequence of their application [16].

TABLE: 4 MEAN DIAMETER OF ZONES OF INHIBITION

Concentration (mg/ml)	S. Typhi	S.typhi 2	E. Coli 1	E.coli 2
Ciprofloxacin	26	27	20	19
200	28	27.5	25	25.5
100	25.5	24.5	24.5	17.5
50	18	18	15	16
25	10	10	0	0

Table 4 shows the sensitivity of the bacterial isolates to the leaves of *telfairia occidentalis* using disc diffusion method. the results obtained and presented in this study showed that the ethanolic extracts of *t. occidentalis* possess antimicrobial activities against common pathogens thus confirming the use of the plant in the treatment of common infections [1]. this observed antibacterial effect of ethanolic extracts of *t. occidentalis* on the bacteria isolates used throughinvitro appears interesting and promising. this is an indication that the plant extracts may indeedbe effective in the management of common infections, supporting its ethno medical importance[16]. this finding is in agreement with [16] who found out that the various extracts of these plants inhibited the growth of some isolates. more so, in the minimum inhibitory concentration, antimicrobial activity was more pronounced at higher concentration of *t. occidentalis* (table, 3& 4).

Table 5: Minimum Inhibitory and Minimum Bactericidal Concentrations

Bacterial Isolates	MIC	MBC
Salmonella Typhi	12.5	2.5
Escherichia Coli	6.25	12.5

Table 5 shows the minimum inhibitory and minimum bactericidal concentrations.The minimum inhibition concentration of the test organisms were 6.25mg/ml for *e. coli*, and 12.5mg/ml for *s.typhi* (table 5). this is similar to the finding of [17] who reported inhibitory effects of ethanolic extract of *t. occidentalis* on *escherichia coli*, *pseudomonas aeruginosa* and*proteus* sp. but no inhibitory effect on *salmonella typhi*. the minimum bactericidal concentration (mbc) of 0.5mg/ml and 50mg/ml appeared to be bactericidal on *s. typhi* and *e. coli* respectively. most of their result showed a higher antimicrobial activity against the organisms with their zones of inhibition: *e. coli* (0.58mm at 500mg/ml) and *salmonella typhi* (0.70mm at 50mg/ml).

4. CONCLUSION

Results obtained from this study has shown that ethanolic extracts of the plants *T. occidentalis* in varying concentrations had antimicrobial activities on almost all the test organisms that were used. This means that constituents of this plant extract may serve as a source of industrial drugsin the treatment of some infections

5.3 RECOMMENDATIONS

It is recommended that, further research should be carried out to determine the antibacterial activity of the separate phytochemical compound for the plant (*T.Occidentalis*), and also various solvents for extraction is also recommended to extract more phytochemicals of the plant. Due to resistance mechanisms developed by the test organism (*E. coli* and *Salmonella typhi*), this plant can be used as an alternative to synthetic drugs.

To prevent any outbreak of diseases, tomatoes should be thoroughly washed with clean water before use or properly cooked before consumption.
If possible, consumption of raw or partially cooked tomatoes in the form of sandwich or saladsshould be avoided, since it can predispose consumers to bacterial infections.

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