PHYTOCHEMICALS AND ANTIMICROBIAL ACTIVITY OF TERMINALIA SCHIMPERIANA HOSTCH (COMBRAETACEA) PLANT USED IN TRADITIONAL MEDICINE

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Abstract

This study investigated the phytochemicals and antimicrobial activity of leaves and bark of Terminalia scheamperiana Hostch,(combraetaecea) plant. Terminalia scheamperiana hostch plant is extensively used as traditional medicine in most part of Africa. It is a source of many potent biological compounds. The leaves and bark of T. Scheampriana were serially extracted with hexane, ethyl acetate, acetone, ethanol and water by soxhlet extraction method. The preliminary phytochemical analysis carried out on the different extract showed high concentration of Saponin and Tannin in the bark extract of ethanol with appreciable amount of glycoside and anthraquinone were also observed. Anthraquinone was not detected in all the leaves extract of T. Scheamperiana analysed. Anti microbial susceptibility test using disc diffusion method shows highest zone of inhibition in bark extract of ethanol with inhibition diameter of 12mm for S. typhi,14mm for S. aureus,12mm for kleb, and 11mm for E. coli at a concentration of 100 g/disc. Aqueous extract of leaves gives inhibition diameter of 14mm for S. typhi, 18mm for S. aureus at 100µg/disc concentration. 22mm inhibition zone was also observed in leaves extract of acetone against S. aureus at 100µg/disc concentration. Ciproflaxacine, 10µg/disc concentration was used as reference standard and have inhibition diameter ranging from 35 to 45 for the various specie of the bacteria tested. Little activity was observed in candida with an inhibition diameter of 11 and 8mm in leaves and bark extract of ethyl acetate respectively. Ketoconazole, 10µg/disc concentration was used as reference standard and have inhibition diameter ranging between 17 and 18mm.

Minimum inhibitory concentration (MIC), was determined using serial micro dilution assay. The micro organism tested are; Staphylococous aureus (gram positive bacteria) and Salmonela typhi (gram negative) bacteria. All the extracts were active against the selected pathogens at a concentration of 125µg/ml, except for the extract of ethanol and acetone where growth was observed at that concentration. However all the test organism exhibit growth when all the contents in the MIC test tubes were sub cultured into nutrient agar for MBC analysis. This justified the fact that the leaves and bark of T. Schempheriana is bacteriostatic and not bacteriocidal. MIC for candida was not determined as little activity is observed in susceptibility testing.

The plant can therefore be recommended for used as traditional medicine. Further research is recommended to be carried out on anti malarial activity on the plant material. Research is also recommended to be carried out on the plant to isolate the most active compounds for the development of drugs. The activity found in Terminalia schemperiana plant could be a lead in the development of antimicrobial agents.

INTRODUCTION

Back ground of the study.

Prior to the advent of orthodox medicine, traditional medicines were been used for the treatment of diseases all over the world. These traditional drugs, otherwise called herbal drugs are mainly obtained from plants origin. However, even with the advent of modern clinical drugs, plants are still in used for they are known to contain substances that can be used for therapeutic purposes. Although most of the raw materials for the modern clinical drugs are obtained from petrochemical industries, some are still synthesized from the plants origin. According to Ayepola and Adeniyi (2008), over 50% of modern drugs are of natural product origin, and as such these natural products play an important role in drugs development in pharmaceutical industries. Phytochemicals are non nutritive components of plants that have protective or disease preventive properties. It is known that plants produce these to themselves but researchers have demonstrated that they can protect humans against diseases, (Kumar et al, 2009).

The frequency of life threatening infectious disease caused by pathogenic microorganisms has increased worldwide and is becoming an important cause of morbidity and mortality in immuno-compromised patient in developing countries. There have also being reports that vast majority of the population, particularly those living in rural areas depends on herbal medicine (Gupta, 2005). The appearance of microbial resistance to antibiotics and the occurrences of fatal opportunistic infections associated with the acquired immunodeficiency syndrome (AIDS) and cancer necessitates the search for new effective antimicrobial agents,(Penna et al 2001). These therefore translate to an increased need for

scientist searching the earth for Phytochemicals to be developed for treatment of infectious diseases especially given the emergence of drugs- resistance microorganisms,(Tanaka et al; 2006). These therefore translate to an increased need to authenticate the claim that *T. schimperianahoschts* has some medicinal properties. Such medicinal plant, if authenticated can be exploited as a source of new chemical substances with potential therapeutic effect.

Terminaliaglaucescence Ex Benth commonly known as *Terminalia Schimperiana Hostch* is a family of *Combretacea.* It is a species of *Terminalia,* native to tropical Africa from Guinea and sierra Leon, east to Uganda and Ethiopia,(Abonier,M. 2004). It is a broad leave small tree that can reach up 7 to 14 meter height, variably deciduous in the dry season to semi- ever green, depending on the climate. The leaves are alternate, Simple, elliptic to obovate, entire 9 to 15 cm long and 3 to 8 cm broad, green above with pale underside. The fruit is a samara with a single wing 6 to 9 cm long, that turns brown with age. It can be found in open forest habitat with more than 1300mm rainfall per year as well as closed forest. When it is found in closed forest, it is typically part of the forest canopy. Fire and debarking by elephants can damage the trees, (Jones E. W. 1963). In part of west Africa, it is used as medicinal plant,(Sofonara, 1982). The bark is applied to wounds, and the twigs may be chewed to promote oral hygiene. In some part of western Nigeria, fresh matured root (hand full) are cooked along with one-half teaspoonful of potash in water and the concentrated decoction is taken orally for treatment of diarrhea.(Bhat, R. B. et al 1990).

Many *Terminalia* species have uses in African traditional medicine and contain a large number of compounds. (kaur et al 2002), identified polyphenols which include flavones, flavanols, phenyl-propanoid and tannins from extracts of

Terminalia plants. These compounds are claimed to treat different ailments, including fractures, ulcers, blood diseases, anemia and asthma (kaur et al 2002).

(Sabu and Kutan 2002) have also identified gallic acid, which posses' antioxidant properties, and this may be useful in the management of disease such as diabetes. *Terminalia arjuna* was found to contain cancer cell growth inhibitory constitutes which are gallic acid, ethylgallate and flavones lutelion (Petit et al 1996). Evidence exist that *Terminalia* species posses both antifungal and antibacterial activities (Silver et al, 2002, Fyhrquist et al; 2002; Fyhrquist et al 2004; Mosoko et al 2005)

MATERIALS AND METHODS

Plant Collection

Leaves and stem bark of *Terminalia shimperiana Hostch* were collected in Kaltungo local government Gombe state, Nigeria in the month of June 2017. The plant materials were kept in the biology herbarium of federal college of education (Tech) Gombe. The plant materials were identified in the department of biological sciences Gombe state university, Nigeria.

Plant storage

Leaves and bark were separated from the stems and shade dried at room temperature. The dried plant materials were milled to fine powder in a motorized miller and stored at room temperature in a closed container until used.

Extrants

When choosing the extrants the following parameters were considered; polarity, the ease of subsequent handling of the extracts, the toxicity of the solvent in the bio assay process and the potential health hazard of the extract. (Ellof, 1998), Thus the following extrants were chosen on the basis of the above parameters; N-hexane, ethylacetate, acetone, ethanol and water in order of increasing polarity, i.e N-

hexane (non polar), ethylacetate (intermediate polarity), acetone (intermediate polarity), ethanol (polar) and water (polar).

Extraction Procedure

The plant samples obtained was air-dried in the laboratory at room temperature and then pulverized using motorized miller.

The extraction was carried out using soxhlet extractor. One hundred gram of the crushed sample was weight accurately and placed in a porous thimble made up tough filter, place in the inner tube (chamber) of the soxhlet apparatus with a plug of glass wool at the base of the chamber, which act as a filter paper. The apparatus was then fitted with a round bottom flask of appropriate size (2liters) containing about 500ml of a given solvent and boiling chips and to a reflex condenser (Vogel, 1979). The set was then mounted on a heating mantle and held in place with a retort stand and clamp. The power button on a heating mantle was then switched on and the temperature adjusted to the boiling point of the solvent. The extraction process was then used for sometimes until colorless liquid was observed in the sample chamber of the soxhlet apparatus which suggest the completion of the extraction with the given solvent. Each solvent extract was concentrated on a rotary evaporator. The weight, texture, and color of each extract were recorded.

3.3.1. PHYTOCHEMICAL SCREENING OF LEAVES AND BARK EXTRACTS.

Phytochemical constituent assay for detection of alkaloids, flavanoids, anthraquinones, saponin, steroid and glycosides from leaves and bark extract of *T.Schimperiana* was carried out at the department of biochemistry laboratory Gombe state University.

Antimicrobial Test of the Extract

Each extract was reconstituted to a concentration of 10mg/ml, 5mg/ml and 2.5mg/ml in dimethyl sulfur oxide (DMSO) for the sensitivity tests against some selected microorganisms.

Sensitive Disk Preparation

Whatman No 1 filter paper was used in the preparation of the sensitive discs use in the study. Disc of 6mm in diameter were punched out of the filter paper using a puncher. Hundred discs were placed into bijou bottle and sterilized by autoclaving at 121^{o}C for 15min. the disc were then dried in an oven at 50^{o}c.

10mg each of the extract of *T. shimperiana* leaves and bark were dissolved in 1ml of dimethyle sulfoxide (DMSO) to form a stock solution. From the solution, 0.5ml, 2.5ml aliquots were taken to prepare two different concentrations for each as 5000µg/ml and 2500µ/ml respectively. Another 10mg was equally dissolved in 1ml DMSO to serve as 10,000µg/ml concentration. 100 discs were introduced to absorb the solution. Therefore, for 10,000µg, concentration each of the disc have a potency of 100µg/disc while for 5000µg/ml the disc potency was 50µg/disk and for 2500µg/ml the disc potency is 25µ/disc. The prepared disc were left in the solution for maximum absorption and kept at 4^{o}C prior to next step of analysis (Chessbrough, 2000).

Test Organisms

The test organism were bacterial isolates of Escherichia Coli, staphylococcus aureus, klebsiela pneumonia, salmonela typhi and candida species obtained from medical microbiology unit of federal teaching hospital Gombe (FTHG), Nigeria. Gram staining and biochemical test were conducted to confirm their identities. The isolates were then maintained in nutrient agar slant at microbiology laboratory of Gombe State University at 4^{0}C until analysis.

Standardization of Inoculer.

Mueller Hilton agar was the medium used for the susceptibility testing. The medium was prepared in accordance with manufacturer's instructions. The medium was sterilized by autoclaving at 121^0C for 15min, and used for the susceptibility testing. A number of colonies of each test isolates was pick-up using sterile wire loop and emulsified onto 3.4ml of sterile psychological saline to make a suspension that matched with 0.5Macfarland & turbidity standard (Chess brough, M. 2000). A 0.5 Mc farland standard was prepared by mixing 0.05ml 0f 1.17% barium chloride dehydrate ($BaCl_2$ $2H_2O$) with 9.95ml of 1% H_2SO_4.

Antibacterial Susceptibility Test

Bioassay protocol was carried out to determine the antibacterial effect of the leaves and bark extra a sterile swap stick was used to spread evenly the test organism onto the sterile Mueller Hilton agar medium. The inoculated plates were allowed to stay for about three to five minute. The prepared disc of three (3) different concentrations (25µg/disc, 50µg/disc, 100µ/disc) were aseptically dispense on to the inoculated medium within 30minute the plates were aerobically incubated in an inverted position at 37ºC for 24hrs. Ciproflexin was used for positive control while DMSO as the diluents was use as negative control on each bacterial isolates. After overnight incubation all inoculated plates were observed for zone of inhibition. Anti bacterial activity was recorded based on the mean zone of inhibition diameter > 6 using meter rule. (Vlietinck, 1995).

Antifungal susceptibility test

Potato dextrose agar was the medium used for the fungi susceptibility testing. The medium was prepared in accordance with the manufacturer's instructions and was sterilized by autoclaving at 121ºC for 15min and used for the susceptibility testing. A number of colonies of the test organism were picked up using sterile wire loop

and emulsified into 3.4ml of sterile physiological saline to make a suspension that marched with 0.5 Marc Fahland turbidity standard (Chessbrough 2000).

Another 10mg was equally dissolved in 1ml dimethyl sulfur oxide DMSO to serve as 10,000µg/ml concentration. For each concentration 100discs were introduced to absorb the solution. Therefore, for 10,000µg/ml concentration, each disc had a potency of 100 µg, while for 500µg/ml the disc potency was 50µg/disc. The prepared disc were left in the solution for maximum absorption and kept at ~~O~~4^{o}C prior to the next step of analysis. (Chessbrough, M 2000).

Determination of minimum inhibitory conc. (MIC) and minimum bactericidal concentration (MBC)

Serial doubling dilution using distilled water of the plant leaves and barks extracts was prepared to determine the minimum inhibitory concentration. Five different concentrations were prepared as 1000µg/ml, 500µg/ml, 250µg/ml, 125µg/ml, 62.5µg/ml.

A 0.1ml of the standardize inoculums of the tests organism was introduced in to the test tubes. Alongside these, two different test tubes containing plant extract plus nutrient broth (positive control) and nutrient broth plus test organism (negative control) were also prepared. All these tubes were incubated 37^{o}C for twenty four hours and the MIC was determined. Turbidity in the test tube samples indicate bacterial growth. The minimum bactericidal contraction (MBC) which is the lowest concentration of the bacterial agent required to kill a particular bacteria was determine from the broth dilution MIC test by sub culturing to agar plate that do not contain the test agent. The lowest concentration of the MIC that was sub cultured and still no growth was observes is the MBC. (Garba and Hafsat 2013)

RESULT

Total mass extracted by each solvent from 100g leaf and 100g bark material of the plant sample was determined.

Table1. Mass per 100 grams of sample.

Solvent	Mass in grams/ 100g sample	
	Leaves	Bark
Ethanol	32.8	18.6
Ethyl acetate	4.2	1.3
Acetone	9.4	5.2
nHexane	4.5	1.88
Water	15.4	5.08

The highest yield of extract was observed with methanol for both leaves and barks, with a mass of 33.7g 19.8g respectively, followed by water extract. The lowest yield for both leaves and bark is that of ethylacetate with a total mass of 4.2g and 1.39 for the leaves and barks respectively. This indicates that most of the compounds are polar in nature.

Phytochemical screening of the different extracts.

Phytochemical analysis *of T. schempherina Host* carried out using routing method described by Sofowara (1998). The best solvent system was ethanol and water because the compounds in all the leaves and bark were obtain in an appreciable amount especially in bark extract. There is high concentration of saponin and tannin in bark extract obtained from ethanol solvent and with appreciable amount of glycoside and antraquinone. Anthraquinone was not detected in all the leaves extract.

Table 2 Preliminary phytochemical Analysis (Leaves Extract)

Chemical compounds	Test	Leaves Extract				
		Ethanol	Acetone	E. acetate	Hexane	Water
Alkaloids	Wagner's reagent test	++	-	+	++	++

Saponin	Distilled water taste	+	-	-	-	++
Tannin	NaOH & Dil. acid test	+	++	++	-	++
Flavonoids	NaOH and dilute acid test	+	+	++	+	+
Anthraquinone	Born Trager's test	-	-	-	-	-
Steroids	Trease and Evans	-	+	+	++	-
Glycosides	Acid hydrolysis	+	-	-	-	++

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Table 3. Preliminary phytochemichal Analysis (Bark Extract)

Chemical compounds	Test	Bark Extract				
		Ethanol	acetone	E. acetate	Hexane	Water
Alkaloids	Meyer's reagent test	++	-	-	+	-
Saponin	Distilled water taste	+++	++	-	-	+
Tannin	NaOH & Dil. acid test	+++	++	++	-	-
Flavonoids	NaoH snd dilute acid test	-	-	++	+	-
Anthraquinone	Born Trager's test	++	+	-	-	+
Steroids	Trease and Evans	-	-	+	++	-
Glycosides	Acid hydrolysis	++	++	-	-	++

Key: + = moderate, ++ = high, +++ = very high. - = negative

Table 4.3.2 Phytochemicasl constituent assay for detection of alkaloids, flavanoids, anthraquinones, saponin, steroid and glycosides from bark extract of *T. Schimperiana*.

ANTI BACTERIAL ACTIVITY OF LEAVES AND BARK EXTRACT OF T. SCHIMPERIANA HOSTCH. CONCENTRATION (µg/disc)

Zone of inhibition was determined after 24 hours. Most of the bacteria tested are sensitive to the extracts. Kleb. Bacteria is not sensitive to extract obtain from ethyl acetate and in ethanol leaves extract at a concentration up to of 50µg/disc. This may be due to the low concentration of anthraquinone and steroids in the leaves extract. Extract with the highest zone of inhibition is that of bark ethanol and bark aqueous with inhibition diameter of 14mm, while some of the of the extract have as low as 8mm zone of inhibition. Ciproflaxicine was used as standard drug and have an inhibition diameter of ranging from 30 to 45 mm in diameter at a concentration of 10µg/disc.

Table 4 Zone of Inhibition

Zone of Inhibition					
Extract conc in µg/disc		S. typhi	S. Aureus	Kleb	E. coli
Ethanol Leaves	25	0mm	0 mm	0mm	0 mm
	50	8 mm	9 mm	0mm	9 mm
	100	10 mm	13 mm	12 mm	11 mm
	CPX	40	32mm	32 mm	40 mm
Ethanol Bark	25	0 mm	8 mm	0mm	0 mm
	50	9 mm	10 mm	10 mm	8 mm
	100	12 mm	14 mm	12 mm	11 mm
	CPX	38mm	32mm	30 mm	50 mm
E. acetate Leaves	25	0 mm	0 mm	0mm	8 mm
	50	0 mm	8 mm	0mm	9 mm
	100	8 mm	8 mm	0mm	11 mm
	CPX	38mm	30 mm	30 mm	45 mm
E. acetate bark	25	0 mm	7 mm	7 mm	10 mm
	50	8 mm	7 mm	7 mm	7 mm

	100	10 mm	9 mm	9 mm	7 mm
	CPX	38mm	32mm	30 mm	48 mm
N. hexane leaves	25	0 mm	7 mm	0mm	7 mm
	50	8 mm	10 mm	8 mm	7 mm
	100	11 mm	11 mm	9 mm	9 mm
	CPX	30mm	34mm	32 mm	40 mm
N. hexane bark	25	0 mm	00 mm	0 mm	0 mm
	50	8 mm	7 mm	0 mm	8 mm
	100	8mm	10 mm	8 mm	8 mm
	CPX	35 mm	35 mm	32 mm	34 mm
Acetone leaves	25	8 mm	22 mm	0 mm	0 mm
	50	13 mm	22 mm	8 mm	7 mm
	100	13 mm	22 mm	11 mm	9 mm
	CPX	44mm	36 mm	34 mm	44 mm
Acetone Bark	25	0 mm	7 mm	9 mm	0 mm
	50	9 mm	9 mm	9 mm	9 mm
	100	11 mm	13 mm	9 mm	9 mm
	CPX	40 mm	38 mm	34 mm	42 mm
Aqueous bark	25	9 mm	8 mm	0mm	7 mm
	50	12 mm	9 mm	0mm	9 mm
	100	14 mm	14 mm	8 mm	12 mm
	CPX	30 mm	34 mm	32 mm	45 mm
Aqueous Leaves	25	9 mm	12 mm	8 mm	8 mm
	50	11 mm	15 mm	8 mm	8 mm
	100	14 mm	18 mm	10 mm	10 mm
	CPX	32	34	34mm	32mm

Key: CPX = Ciproflexicin 10µg/disc (standard drug)

Zone of inhibition for the different extracts on different bacterial species.

ANTIFUNGAL ACTIVITY OF LEAVES AND BARK EXTRACT OF T. SCHIMPERIANA HOSTCH.

The growth of fungi was checked after 48 hours in order to determine the activity of the extract. Sensitivity of the clinical isolate reveals that the extract posses little or no activity on the candida specie of fungi. However, little activity was observed in both leaves and bark extract of ethyl acetate with an inhibition diameter of 11 and 8mm respectively. Ketokonazole was used as appositive control and have an inhibition diameter ranging between 17mm to 18mm in 10µg/disc concentration.

Table 5 Zone of Inhibition of candida specie

	Zone of Inhibition	
Extract conc. in µg/disc		Candida
Ethanol Leaves	25	0mm
	50	0mm
	100	0mm
	KTC	17mm
Ethanol Bark	25	0mm
	50	0mm
	100	11mm
	KTC	18mm
E. acetate Leaves	25	11mm
	50	9mm
	100	9mm
	KTC	20mm
E. acetate bark	25	8mm
	50	9mm
	100	9mm
	KTC	9mm
N. hexane leaves	25	18mm
	50	0mm
	100	0mm
	KTC	17mm
N. hexane bark	25	0mm
	50	0mm
	100	0mm
	KTC	0mm
Acetone leaves	25	0mm
	50	0mm
	100	0mm
	KTC	18mm
Acetone Bark	25	0mm
	50	0mm
	100	8mm
	KTC	17mm
Aqueous	25	0mm

bark	50	0mm
	100	0mm
	KTC	17mm
Leaves aqueous	25	0mm
	50	0mm
	100	8mm
	KTC	17mm

Table 4.4.2. Zone of inhibition for the different extracts on candida specie of Fungi.

DETERMINATION OF MINIMUM INHIBITRY CONCENTRATION (MIC) AND MINIMUM BACTERIOCIDAL CONCENTATION (MBC).

Minimum inhibitory concentration using macro broth dilution was determined after 24 hours. Only two isolates; gram positive bacteria (S aureus) and gram negative bacteria (S typhi) were considered. Most extracts have MIC values of 125µg/ml for both the leaves and bark extract, except the leaves extracts of acetone and that of water that shows MIC values above 125µg/ml. However all the test organism exhibited growth when the contents in MIC tubes were sub cultured onto the nutrient agar medium for the MBC analysis. Although no growth was observed in some extract at a concentration of 1000 µg/ml, however, anti bacterial agents are usually regarded as bactericidal only if the MBC is not four times the MIC (French;2006). This justifies the fact that the leaves and bark extracts of *T schemperiana* plant are bacteristatic and not bactericidal. This is because from the result, MBC is more than four times the MIC. Ciproxin was used as a positive control and there was no growth in the test tub

MIC-MBC Result (leaves)

Bacterial activity of leaves extract of T. Schimperiana using micro broth dilution
Bacteria (S. aureus).
Conc. µg/ml

	MIC					MBC				
Extracts	1000	500	250	125	62.5	1000	500	250	125	62.5
Ethanol	-	-	-	-	+	-	**	**	**	**
Aceton	-	-	-	-	+	-	**	**	**	**
E. acetate	-	-	-	-	+	-	**	**	**	**
Hexane	-	-	-	-	+	***	**	**	**	**
Water	-	-	-	-	+	-	**	**	**	**
Bacteria (S. typhi)										
	MIC					MBC				
Extracts	1000	500	250	125	62.5	1000	500	250	125	62.5
Ethanol	-	-	-	+	+	***	**	**	**	**
Aceton	-	-	-	+	+	***	**	**	**	**
E. acetate	-	-	-	-	+	-	**	**	**	**
Hexane	-	-	-	-	+	***	**	**	**	**
Water	-	-	-	-	+	-	**	**	**	**

MIC-MBC Result (bark extract)

Bacteria (S. aureus). Conc. µg/ml										
	MIC					MBC				
Extracts	1000	500	250	125	62.5	1000	500	250	125	62.5
Ethanol	-	-	-	-	+	-	**	**	**	**
Aceton	-	-	-	-	+	-	**	**	**	**
E. acetate	-	-	-	-	+	-	**	**	**	**
Hexane	-	-	-	-	+	-	**	**	**	**
Water	-	-	-	-	+	-	**	**	**	**
Bacteria (S. typhi). Conc. µg/ml										
	MIC					MBC				
Extracts	1000	500	250	125	62.5	1000	500	250	125	62.5
Ethanol	-	-	-	-	+	-	**	**	**	**
Acetone	-	-	-	+	+	***	**	**	**	**

E. acetate	-	-	-	-	+	-	**	**	**	**
Hexane	-	-	-	-	+	***	**	**	**	**
Water	-	-	-	+	+	-	**	**	**	**

Key MIC: minimum inhibitory concentration, MBC: minimum bactericidal concentration, + = turbid, - = not turbid, ** = growth observed *** = MBC above 1000µg/ml

Table 4.5.2. MIC and MBC for the bark extracts of S. aureus and S. typhi bacterial species.

4.6 Minimum inhibitory concentration. (MIC) and minimum bactericidal concentration.(MBC) for anti fungal activity.

MIC and MBC was not determined as the plant extract show little or no activity on the candida specie of fungi.

CONCLUSION AND RECOMMENDATIONS.

Terminalia Schempheriana hosth plant leaves and bark were assayed for anti bacterial activity and most of the extracts are anti bacterially promising specie. All the extract shows activity against the selected species of microorganism. This supports the use of this plant for the treatment of diseases caused by microbial infection.

Ethanol and water extract been the most active against bacterial strain. However, *T. Schemperiana Hostch* shows little activity against candida specie of fungi.

Phytochemical analysis of the plant was found to contain appreciable amount of Sapponin and Tannin in the bark extract.

The micro dilution assay is a reliable method used in the determination of anti microbial activity because it gives an idea of the concentration of the plant extract able to inhibit or stop bacterial growth. Thus the MIC and MBC values were

determined. The plant material is bacteriostatic and not bactericidal. That means it can only stop the growth of the bacteria tested but cannot kill them.

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