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Original Research Article

Phytochemical Screening and Antimicrobial Activity of *Mangifera indica* Leaves Extract on Some Isolates from Dental Cavities

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Abstract: The increased rates of microbial resistant to synthetic drugs have paved way for the use of medicinal plant extracts for treatment. Phytochemical screening and antimicrobial activity of *Mangifera indica* leaves extract on some isolates from dental cavities was studied. The leaves were randomly collected from a local farm in Agbani Nkanu West L.G.A Enugu State Nigeria. The leaf samples were morphologically identified, washed, air dried at room temperature for 48 days and milled into powder with a milling machine in Chemistry Department, Enugu state University of Science and Technology. The solvents used for extraction were ethanol, methanol, N-hexane and water. Ethanol and methanol extracted most of the bioactive ingredients, followed by water and N-Hexane. The phytochemicals screened were; terpenoids, steroids, glycosides, phenols, saponins, tannins and alkaloids. The extracts were divided into dialyzed and undialyzed fractions. The dialyzed fraction was done for 48 hours in a refrigerator. Organisms isolated from dental cavities were; *Streptococcus mutans*, *Escherichia coli*, *Staphylococcus aureus*, *lactobacillus* spp, *Candida albicans.* The antimicrobial activity was determined using agar well diffusion method and the result showed that the dialysed extracts of ethanol and methanol had higher sensitivity against the dental isolates than the undialyzed extracts. *Streptococcus mutans* was the most inhibited organism with inhibition zones of 12mm and minimum inhibitory concentration of 6.25mg/ml. Hence, dialysed ethanol and methanol leaf extracts of *Mangifera indica* can be used as an adjunct therapy for dental cavities.

Keywords:*Mangifera indica*, ethanol, methanol, N-hexane, water, extraction, phytochemical, dental cavities.

INTRODUCTION

Cavities are the breakdown of tooth due to acids produced through bacteria (Laudenbach and Simon, 2014). The organisms act by dissolving the hard tissues of the teeth enamel, dentin and cementum. Simple sugars in meals are those bacteria's number one electricity supply and hence a food plan excessive in sugar is a danger factor. The earliest signal of a brand new carious lesion is the arrival of a chalky white spot at the floor of the tooth, indicating a place of demineralization of enamel (Schwendicke *et al.,* 2015). As the lesion maintains to demineralize, it is able to flip brown however will in the end become a "cavity. Before the hollow space forms, the manner is reversible, however as soon as a hollow space forms, the misplaced enamel shape can't be regenerated. Active decay is lighter in colour and dull in appearance (Marsh *et al.,* 2015). As the teeth and dentin are destroyed, the hollow space will become greater noticeable. The affected regions of the teeth alternate colour and grow to be gentle to the touch and as the decay gradually continue from the enamel to the dentinal tubules that connects to the nerve of the tooth, which emerge and exposed, resulting in pain that can be transient, temporarily worsening with exposure to heat, cold, or sweet foods and drinks (Marsh *et al.,* 2015). When the decay has stepped forward sufficient to permit the micro-organism to weigh down the pulp tissue in the middle of the tooth, a toothache can end result and the ache becomes greater constant. Death of the pulp tissue and contamination are not unusual place consequences. The teeth will now not be touchy to warm or bloodless however may be very soft to pressure. Dental caries also can reason horrific breath and foul tastes. Prevention of dental caries consists

of normal cleansing of the teeth, a food plan low in sugar, and small quantities of fluoride. Brushing one's enamel two times in step with day and flossing among the enamel as soon as an afternoon is recommended. Fluoride can be obtained from water, salt or toothpaste amongst different sources. The micro-organisms related to dental cavities are the *Streptococcus mutans* and *Streptococcus sobrinus*, and *lactobacilli.*spp (Schwendick, *et al.*, 2015). Herbalism is a traditional or folk medicine practice based on the use of plants and plant extracts. Many of the herbs and spices used by humans to season food yield useful medicinal compounds (Oluwakemi, 2019). For many years, medicine had deepened exclusively on leaves, flowers and barks of plants; only recently have artificial pills come into use and in lots of instances, those are carbon copies of chemical compounds diagnosed in plants (Harbone, 2008). Most of the phyto-medicines and drugs employed for the treatment of human ailments are obtained by extraction both through infusion or decoction system the usage of water, herbal gin or palm wine as solvent (Remington, 2006). There is a need for careful choice of solvent for extraction of bioactive principle of medicinal plants as most organic solvents are toxic and lethal, thus leading to as biased view of the efficacy of the plant extract as to whether the microbial inhibition was due to the bioactive ingredient or toxicity of the solvent for extraction (Nenaah, 2013). Mangoes are believed to have originated from the place among north western Myanmar, Bangladesh, and north India. Since their domestication in south japanese Asia, mangoes were brought to different heat areas of the world. It has important property especially activity against wide range of infectious microorganism. *Mangifera indica* contain phenols, flavonoids, tannins, alkaloids and so many active ingredients that were effective in reducing the activities of microorganisms. The health benefits of these leaves are; treating tooth gum problems, diabetes, controlling blood pressure and anxiety, Asthma, bronchitis and cough, sore throat, kidney stone and digestion. Apart from the leaves, the stem of *Mangifera indica* can also be used in combination with Citrus sinensis leaves to prepare decotion that can be taken against malaria parasite. Photochemical present in the leaf extracts of *Mangifera indica* have been noted to have high antimicrobial effect especially those that causes tooth decay (Marsh, *et al.*, 2015).

MATERIALS AND METHODS

Collection and Transportation of the Leaves Samples

Fresh leaves of *Mangifera indica* from a local farm in Agbani Nkanu West L.G.A Enugu State Nigeria were collected by plucking the leaves together with their stalk from the tree using a stainless clipper that was sterilized in the hot air oven, this was followed by washing the leaf samples in distilled water to reduce the microbial load present on the leaves surfaces and were transferred into a sterilized stainless cylinder plates with lids which was sealed immediately. The samples was transported to Microbiology laboratory of Enugu State University of Science and Technology Enugu Nigeria immediately after collection and the leaf samples was identified by a plant taxonomist Prof. J. C. Okafor of Enugu State University of Science and Technology.

Collection and Transportation of the Test Organisms

The test organisms were collected from Dental Ward Enugu State University of Science and Technology, Teaching Hospital Enugu State Nigeria. The organisms collected were*; Streptococcus mutans*, *Escherischia coli, Candida albicans, Lactobacillus, and Staphylococcus aureus.* The organisms were transported to Microbiology laboratory of Enugu State University of Science and Technology immediately after collection for identification.

Isolation of the Test Organisms

This was carried out as described by (Marsh, *et al.*, 2015). The organisms collected from Dental Ward Enugu State University of Science and Technology, Teaching Hospital was serial diluted in 10-fold and cultured on Nutrient agar and incubated for 24 to 48 hours at 37^{o}C.After incubation, discrete colonies were sub cultured on Nutrient Ager, Sabouraud Dextrose Agar, MRS agar,MacConkey agar and Eosin Methylene Blue agar (EMB). The sub-culturing of the isolates was done by placing each colony in the middle of the agar plate and streaked up and down and across the plate and incubated for 24 to 48 hours at 37^{o}C.

Morphological Identification of the Isolates

The identification was done using a method described by (Cheesbrough, 2000) to confirm their authenticity and viability. The isolates were identified and characterized based on the morphological and biochemical test which include. Sub-culturing on selective and differential media, Gram staining, Indole test, Catalase, test and Oxidase test, Urease test, Citrate Utilization test, Methyl red test, Glucose fermentation test, Lactose fermentation test and Voges-proskaur test.

Extraction of Bioactive Ingredients from *Mangifera indica*Leaf Samples

The extraction was carried out as illustrated by (Asfere, *et al.*, 2020).The leaf samples were dried at room temperature, for 48 days. The dried leaves were grinded into fine powder using a milling machine in the chemistry department in Enugu State University of Science and Technology. Four solvents was used for the extraction; Ethanol, Methanol, N-hexane and Water. This was done in order to trap the bioactive ingredients present in the leaves.100g of the powdered leaves was weighed for each of the solvents and poured into an air tight containers. 300mls of each solvents was measured and introduced into each containers, and was labelled for easy identification. The containers were tightly

sealed by wrapping with a masking tape. The set up was allowed to stand for 48 hours, and then filtered using what-man No.1 filter paper in order to concentrate the extract. The four extracts from different solvents (Ethanol, Methanol, N-Hexane, and Water) were divided into two portions. The first portion was to be used directly for phytochemical screening and antimicrobial activity on some dental isolates, this portion was stored with a phosphate buffer solution of pH 6.8.While the second portions were dialyzed to further concentrate the extracts, and also used for antimicrobial activity on some dental isolates.

Phytochemical Screening of the Plant Extracts

The phytochemical screening of the plant extracts was carried out as illustrated by (Avato, *et al.,* 2006) to determine which solvents extracted more of the bioactive ingredients from the leaf samples of *Mangifera indica*. The presence of alkaloids, saponins, tannins, phenols, steroids, glycosides, terpenoids, and flavonoids, was determined.

Test for Alkaloids

Three reagents were used to determine the presence of alkaloid, hence extracts was divided into three in the test tubes.

For the first reagent; Dragendroff reagent,

1 ml of the leaf extracts was dissolved in dilute Hydrochloric acid and filtered.

The filtrates were treated with Dragendroff's reagent and stirred. Turbidity or precipitate indicated the presence alkaloids.

For the second reagent; Wagner's reagent,

1 ml of the leaf extracts was dissolved in dilute Hydrochloric acid and filtered.

The filtrates were treated with Wagner's reagent and stirred. Precipitation indicated the possible presence of alkaloids.

For the third reagent; Mayer's reagent,

1 ml of the leaf extracts was dissolved in dilute Hydrochloric acid and filtered.

The filtrates were treated with Mayer's reagent and stirred. Turbidity indicated the possible presence of alkaloids (Preshant *et al.,* 2011).

Test for Saponins

1 ml of the extracts was boiled with 5 ml of distilled water and filtered. About 3 ml of distilled water was added further and shaken vigorously for about 5 minutes. Frothing which persisted on warming was observed which indicated the presence of saponins (Preshant *et al.,* 2011).

Test for Tannins

1 ml of extracts was added into a test tube containing 10 ml of distilled water which was stirred and then filtered. Few drops of 1% ferric chloride solution were added to the filtrate. The presence of a blue-green precipitate indicated the presence of tannins (Preshant *et al.,* 2011).

Test for phenols

1 ml of the plant extract was boiled with distilled water and then filtered. Few drops of 10% ferric chloride solution were added to 2 ml of the filtrate. A blue colouration indicated the presence of a phenolic hydroxyl group (preshant *et al.,* 2011).

Test of Steroids

2 ml of acetic acid was added to 1 ml of the plant extract. The solution was cooled well in ice after which conc. H_2SO_4 was added carefully. A colour change from violet to bluish-green indicated the presence of steroidal ring (Preshant *et al.,* 2011).

Test for Glycosides

1 ml of the plant extract was mixed with 30 ml of distilled water and heated on a water bath for 5 minutes. To 5ml each of the filtrates 0.2ml of Fehling's solution A and B was added until it turns alkaline. The solutions were heated on a water bath for 2minutes. No brick-red precipitate was formed indicating the absence of glycosides (Preshant *et al.,* 2011).

Test for Terpenoids

1ml of the extract was dissolved in ethanol. 1ml of acetic anhydride was then added, followed by the addition of conc H_2SO_4. Change in colour from pink to violet was not observed hence indicating the absence of terpenoids (Preshant *et al.,* 2011).

Test for Flavonoids

1ml of the extract was dissolved in water and filtered. To 5ml of the filtrate, 3ml of lead ethanoate was added. Appearance of a buff-pale yellow precipitate indicated the presence of flavonoids (Preshant *et al.,* 2011).

Dialysis Determination of the Extracts

This was carried out as illustrated by (Prashant, *et al.,* 2011).Thedialysis bags were provided by Dr. (Mrs.) C. J. Aneke Department of Applied Microbiology and Brewing, Enugu State University of Science and Technology. 100ml of each extracts from individual solvents (Ethanol, methanol, N-Hexane and water extracts) were poured into the dialysis bags and was sealed using sterilized hair-thread. 5 molar concentrations of sucrose solution was prepared, then the sealed bags were suspended inside the solution in such a way that they were made to stand upright in the containers by hanging them to a bridge (stick) made across the vessel containing the 5 molar concentrations of sucrose solution. This was allowed to dialyze for three days, after which the concentrates were collected in an air tight containers and equal volumes of phosphate buffer solution pH 6.8 was added and kept in a refrigerator.

Antimicrobial Activity of Dialyzed and Undialyzed Leaf Extracts of *Mangifera indica* on Dental Isolates

This was carried out according to Kabir *et al.,* (2005). A general purpose media, Mueller Hinton agar was used for this test. 20ml of the media was carefully poured into 10 plates, 5 plates for dialyzed portion and 5 plates for the undialyzed portion with the different extracts and the 5 microorganisms for each plate. After drying the plates, by passing it through frame, Agar well was made using a cork borer of diameter 6mm. The extracts were diluted to different concentrations 100, 50, 25, 12.5, 6.25 percent, using serial dilution method. 1ml of each concentration was carefully introduced in the well labelled agar wells made on every plate, while observing all the aseptic techniques. After that, the plates were incubated for 24 hours for bacteria and 48 hours for the fungi specie. After which readings were taken using venier caliper and meter rule for measuring the inhibition zones diameter.

Preparation of control

A positive control was set up. Five separate plates were also provided and agar wells were made on each plate, the organisms were inoculated. The solvents used for extract was used as control 0.5ml of each was added to the agar well and incubated for 24 hours.

RESULTS

The morphological characteristics of *Streptococcus mutans, Escherischia coli, Candida albicans, Lactobacillus* spp. *and Staphylococcus aureus* from dental cavity are shown in Table 1.

Table 1: Morphological Characteristics of the Dental Isolates

Dental Isolates	Macroscopic Characteristics	Microscopic Characteristics
Streptococcus mutans	Consisted of rough colonies on Mitis Salivarius-bacitracin Agar medium.	Consisted of Gram-positive cocci which appeared purple.
Escherichia coli	Consisted of thick, metallic green sheen on Eosin Methylene Blue Agar and also appeared mucoid bright pink colonies on MacConkey Agar medium.	Consisted of Gram negative single short rods which appeared pink.
Candida albicans	Consisted smooth cream colonies on Sabouraud Dextrose Agar Medium.	Consisted of thread-like structure which appeared purple.
Lactobacillus spp.	Consisted of creamish tan colonies on deMan, Rogosa, and Sharpe Agar medium.	Consisted of Gram positive rods which appeared lightpurple.
Staphylococcus aureus	Consisted of smooth, golden yellow colonies on nutrient agar and also appeared yellow on Manitol Salt agar medium.	Consisted of Gram positive cocci in clusters which appeared purple.

The biochemical characteristics of *Streptococcus mutans, Escherischia coli, Candida albicans, Lactobacillus* spp. *and Staphylococcus aureus* from dental cavity are shown in Table 2.

Table 2: Biochemical Characteristics of the Dental Isolates

Dental Isolates	Gram Stain	Indole test	Catalase test	Oxidase test	Urease test	Citrate Utilization test	Methyl red test	Glucose fermentation test	Lactose fermentation test	Voges proskaur test
Streptococcus mutans	+	*NA*	-	-	-	-	*NA*	+	+	+
Escherichia coli	-	+	+	-	-	-	+	+	+	-
Candida albicans	+	*NA*	*NA*	-	-	*NA*	*NA*	+	-	*NA*
Lactobacillus spp	+	-	-	-	-	-	-	+	+	-
Staphyloco ccus aureus	+	-	+	-	+	+	+	+	+	+

KEYS, -Negative, +Positive, *NA* Not Applied

Phytochemical Screening of *Mangifera indica* leaf extractsare shown in Table 3.

Table 3:Phytochemical Screening of *Mangifera Indica* Leaf Extracts

Extract Constituents	Methanol	Ethanol	N-hexane	Water
Alkaliods	-	-	-	-
Flavonoids	+++	++	-	++
Terpenoids	++	++	++	++
Steroids	+++	+++	+	+
Glycosides	+++	+++	-	++
Phenols	++	++	-	++
Saponins	++	+++	+	+++
Tanins	++	+++	+	++

KEYS, -: Absent, +: Scanty, ++: Moderate, +++: Abundant

Antimicrobial activity of undialyzed concentration of methanoic leaf extracts of *Mangifera indica* on dental isolates are shown in Table 4.

Table 4: Antimicrobial Activity of Undialyzed Concentration of Methanoic Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	100	50	25	12.5	6.25	+ Control(100mg)
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	20	14	14	12	5	10
Escherichia coli	26	16	14	12	7	5
Candida albicans	17	14	10	4	3	6
Lactobacillus Spp.	-	-	-	-	-	10
Staphylococcus aureus	29	28	24	20	9	3

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of dialyzed concentration of methanoic leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 5.

Table 5: Antimicrobial Activity of Dialyzed Concentrations of Methanoic Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	100	50	25	12.5	6.25	+Control(100mg)
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	26	20	14	12	12	10
Escherichia coli	15	14	10	4	3	5
Candida albicans	24	16	13	11	10	6
Lactobacillus Spp.	20	20	15	5	5	10
Staphylococcus aureus	25	23	17	14	9	3

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of undialyzed concentration of ethanolic leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 6.

Table 6: Antimicrobial Activity of Undialyzed Concentrations of Ethanolic Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	26	21	20	18	7	8
Escherichia coli	12	12	10	6	4	5
Candida albicans	8	5	-	-	-	9
Lactobacillus Spp.	16	7	6	4	1	10
Staphylococcus aureus	26	23	21	10	9	5

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of dialyzed concentration of ethanolic leaf extracts of *Mangifera indica* on dental isolates are shown in Table 7.

Table 7: Antimicrobial Activity of Dialyzed Concentrations of Ethanolic Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+ Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	23	21	16	12	12	8
Escherichia coli	14	10	6	5	6	5
Candida albicans	16	15	12	12	4	9
Lactobacillus Spp.	21	18	14	13	11	10
Staphylococcus aureus	26	17	13	9	10	5

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of undialyzed concentration of N-Hexane leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 8.

Table 8: Antimicrobial Activity of Undialyzed Concentrations of N-Hexane Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+ Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	10	6	4	4	1	2
Escherichia coli	4	-	-			4
Candida albicans	-	-	-	-	-	6
Lactobacillus Spp.	9	7	6	6	5	3
Staphylococcus aureus	-	-	-	-	-	4

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of dialyzed concentration of N-Hexane leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 9.

Table 9: Antimicrobial Activity of Dialyzed Concentrations of N-Hexane Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+ Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	20	14	4	2	2	2
Escherichia coli	27	16	-	12	-	4
Candida albicans	5	-	-	-	-	6
Lactobacillus Spp.	8	7	4	4	6	3
Staphylococcus aureus	28	18	16	13	-	4

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of undialyzed concentration of crude water leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 10.

Table 10: Antimicrobial Activity of Undialyzed Concentrations of Crude Water Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+ Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	18	14	10	8	4	-
Escherichia coli	16	14	13	10	7	-
Candida albicans	15	10	9	6	4	-
Lactobacillus Spp.	10	6	4	2	2	-
Staphylococcus aureus	-	-	-	-	-	-

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

Antimicrobial activity of dialyzed concentration of crude water leaf extracts of *Mangifera indica* on the dental isolates are shown in Table 11.

Table 11: Antimicrobial Activity of Dialyzed Concentrations of Crude Water Leaf Extracts of *Mangifera indica* on Dental Isolates

Conc. (mg/ml)	**100**	**50**	**25**	**12.5**	**6.25**	**+ Control(100mg)**
Log conc.	2.00 IZD (mm)	1.6980 1ZD (mm)	1.3979 IZD (mm)	0.961 IZD (mm)	0.7958 IZD (mm)	
Streptococcus mutans	16	14	12	12	10	-
Escherichia coli	17	14	12	11	9	-
Candida albicans	15	10	9	6	6	-
Lactobacillus Spp.	15	13	9	5	3	-
Staphylococcus aureus	28	21	20	16	4	-

KEYS, IZD (mm): Inhibition Zone Diameter (millimeter)

DISCUSSION

Studies were conducted on phytochemical screening and antimicrobial activity of *Mangifera indica* leaves extract against some isolates collected from Dental Ward Enugu State University of Science and Technology Teaching Hospital Enugu State Nigeria. The isolates were morphologically and biochemically identified as *Streptococcus mutans*, *Escherischia coli, Candida albicans, Lactobacillus* spp, *and Staphylococcus aureus,* using standard identification techniques (Tables 1, 2). These are in accordance with the work of Cheesbrough, (2000).

Phytochemical screening of Methanol, Ethanol, N-Hexane, and Water extracts of *Mangifera indica* leaf were conducted, and results showed that Ethanol and methanol extracted most of the bioactive ingredients, followed by water and N-Hexane. The ethanol extracts showed abundant steroids, glycosides, saponins and tannins and the methanolic extract showed abundant quantities of flavonoids, steroids and glycosides. Water extracts showed abundant quantities of saponins only while N-hexane showed little or no presence of bioactive ingredients, alkaloids was absent in all the extracting solvents (Table 3). These results relates with the work of (Avato *et al.,* 2006). Antimicrobial activity of undialyzed concentration of methanoic leaf extracts of *Mangifera indica* on dental isolates was evaluated, and the results showed that all the dental isolates are resistant to the undialyzed methanolic extract. *Saphylococcus aureus, Escherichia coli, Streptococcus mutans* and *Candida albicans* had inhibition zone diameter (IZD) of 3, 7, 5 and 3mm respectively at minimum inhibitory concentration of 6.25mg/ml. There was no inhibition zone on *lactobacillus* spp. (Table 4). These relates with the work of (Avato *et al.,* 2006). Antimicrobial activity of dialyzed concentration of methanoic leaf extracts of *Mangifera indica* on the dental isolates was carried out and the results showed that the dialyzed methanolic extract had the highest sensitivity against *Streptococcus mutans* with inhibition zone diameter (IZD) of 12 mm at minimum inhibitory concentration of 625mg/ml while *Candida albicans,* showed moderate level of sensitivity of 10mm. *Staphylococcus aureus, Escherichia coli,* and *lactobacillus* spp. had IZD of 9, 3 and 5mm respectively at MIC of 6.25mg/ml (Table 5). These relates with the work of (Handa *et al.,* 2008). Antimicrobial activity of undialyzed concentration of ethanolic leaf extracts of *Mangifera indica* on the dental isolates was determined and the results showed that all the dental isolates are resistant to the undialyzed methanolic extract. *Streptococcus mutans, Escherichia coli, lactobacillus* spp., and *Staphylococcus aureus* had IZD of 7, 4, 1 and 9mm respectively at MIC of 6.25mg/ml. There was no inhibition zone on *Candida albicans* (Table 6). These are in relation with the work of (Handa *et al.,* 2008). Antimicrobial activity of dialyzed concentration of ethanolic leaf extracts of *Mangifera indica* on dental isolates were evaluated and the results showed that the dialyzed ethanolic extracts had the highest sensitivity against *Streptococcus mutans* with inhibition zone diameter (IZD) of 12 mm at minimum inhibitory concentration of 625mg/ml, while *lactobacillus* spp., and *Staphylococcus aureus* showed moderate level of sensitivity of 11 and 10mm. *Escherichia coli,* and *Candida albicans* had IZD of 6 and 4mm respectively at MIC of 6.25mg/ml (Table 7). This corresponds with the work of (Nenaah, 2013).

Antimicrobial activity of undialyzed concentration of N-Hexane leaf extracts of *Mangifera indica* on the dental isolates was evaluated, and the results showed that all the dental isolates are resistant to the undialyzed N-Hexane leaf extracts. *Streptococcus mutans* and *lactobacillus* spp., had IZD of 1 and 5mm respectively at MIC of 6.25mg/ml while *Escherichia coli, Candida albicans* and *Staphylococcus aureus* had no inhibition zone diameter (Table 8). This also corresponds with the work of (Nenaah, 2013). Antimicrobial activity of dialyzed concentration of N-Hexane leaf extracts of *Mangifera indica* on the dental isolates was determined, and the results showed that all the dental isolates are resistant to the dialyzed N-Hexane leaf extracts. *Streptococcus mutans* and *lactobacillus* spp., had IZD of 2 and 6mm respectively at MIC of 6.25mg/ml while *Escherichia coli, Candida albicans* and *Staphylococcus aureus* had no inhibition zone diameter (Table 9). This corresponds with the work of (Nenaah, 2013). Antimicrobial activity of undialyzed concentration of crude water leaf extracts of *Mangifera indica* on the dental isolates was carried out and the results showed that all the dental isolates are resistant to the undialyzed concentration of crude water leaf extracts. *Streptococcus mutans, Escherichia coli, Candida albicans* and *lactobacillus* spp., had IZD of 4, 7, 4 and 2mm respectively at MIC of 6.25mg/ml while *Staphylococcus aureus* had no inhibition zone diameter (Table 10). These results are in relation with the work of (Akinyemi *et al.,* 2012). Antimicrobial activity of dialyzed concentration of crude water leaf extracts of *Mangifera indica* on the dental isolates was evaluated and the results showed that the dialyzed concentration of crude water leaf extracts had moderate level of sensitivity against *Streptococcus mutans* with inhibition zone diameter (IZD) of 10 mm at minimum inhibitory concentration of 625mg/ml, while *Escherichia coli, Candida albicans,lactobacillus* spp., and *Staphylococcus aureus* had IZD of 9, 6, 3 and 4mm respectively at MIC of 6.25mg/ml (Table 11). This corresponds with the work of (Irobi, 2003).

CONCLUSION

This study showed that the phytochemical screening of *Mangifera indica* leaf extracts contain enough quantities of bioactive ingredients and these ingredients are high in antimicrobial contents, especially the dialyzed fractions which had lethal effects on some dental isolates . The N-Hexane used for extraction yielded insignificant quantity of the ingredients, because of its low extracting power.

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