

ETHNOBOTANICAL SURVEY ON PLANTS USED BY TRADITIONAL HEALERS AND HERBAL SELLERS TO TREAT ORAL THRUSH INFECTION IN IBADAN, OYO STATE, NIGERIA

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Abstract

Oral thrush, also known as oral candidiasis is yeast or fungal infection of the genus *Candida* that develops on the mucous membrane of the mouth, the *candida albicans* causes oral thrush, a small amount of the fungus normally lives in our mouth without causing harm. The most common symptoms of oral thrush are white patches or plaques on the tongue and other oral mucous membrane. Other symptoms include difficulty in swallowing and cracking at the corner of the mouth. Oral thrush is commonly seen in toddlers and a lesser degree in older children and occasionally adults. Oral thrush diagnosed in an adult should lead to a search for an underlying medical condition such as diabetes, use of immunosuppressive therapy.

In view of the importance of oral hygiene to overall wellness of man, this study documented plants used in the treatment of oral thrush. The study areas were five major herbal markets in Ibadan, namely Ojoo, Oje, Molete, Oranyan and Bode. A total number of forty five (45) respondents who are herb sellers and with vast knowledge of ethnomedicine were interviewed in Yoruba language. The respondents are familiar with oral thrush called “efu” in Yoruba language. The names of plants and recipes were recorded, the preparation of the recipes, administration and dosage were also recorded. Furthermore, the anticandidal plants in oral thrush are; *Acacia nitotica*, *Piper guineense*, *Curcuma domsestica*, *Aframomum melegueta*, *Capsium frutiscens*, *Eugenia carophyllus*, *Bridelia ferruginea*, *citrus medica var. acida*. The anticandidal activities of some of the plants have been reported, this study provides potent remedies for the management of oral thrush with no side effects.

Keywords: Mouth, infection, candida, herbal remedies and botanicals.

INTRODUCTION

The oral cavity is home to many different microorganisms, including bacteria, viruses, fungi, and sometimes protozoa (Olsen, 2010). The different tissues and fluids in the oral cavity, as well as the range of foods that pass through, provide a unique environment that allows various microorganisms to thrive (Olsen, 2010). Sometimes the organisms live in complete harmony with their host, other times they can cause harm in the form of dental caries, periodontitis, and other infections. *Candida* species, commonly *Candida albicans* (Castellote 2013), can be present in the mouth of healthy individuals without causing disease to its host (Lalla *et al.*, 2013). Bacteria and fungi can be part of the natural oral microflora, and with bacteria, a shift in the balanced microflora can lead to infection and disease. Oral candidiasis is one term used to describe such an infection, and other names are oral candidosis, oral thrush (specifically pseudomembranous candidiasis), and candidal stomatitis. It is also referred to as a biofilm disease (Rautemaa *et al.*, 2013). Candidiasis is defined as an infection caused by a fungi of the genus *Candida*, and the term oral candidiasis is only used when describing a clinically visible lesion in the oral cavity (Lalla *et al.*, 2013). The lesion can vary in size, shape and colour, largely dependent on the predisposing factors behind the disease (Lalla *et al.*, 2013). The patient's complaints can vary from none, to extremely painful and completely disabling (Samaranayake *et al.*, 2009). Candidiasis of the mouth and throat, also known as a "thrush" or oropharyngeal candidiasis (OPC), or oral moniliasis, is a fungal infection that occurs when there is over growth of *Candida albicans*. It is normally found on skin or mucous membranes. However, if the environment inside the mouth or throat becomes imbalanced, *Candida* can multiply (Bologna *et al.*, 2003). When this happens, symptoms of thrush can appear. Thrush may appear as white or pale yellow spots on the inner surfaces of the mouth and throat, the tongue, and the lips. It may resemble cottage cheese or milk curds. Thrush may be accompanied by a burning sensation in the mouth or throat. Further, diabetes or other glandular (endocrine) disorders, genetic disorders such as, Down syndrome, a course of oral antibiotics, chemotherapy, leukemia or lymphoma, malnutrition, immunodeficiency such as HIV/AIDS, use of inhaled steroids for certain lung conditions may also cause thrush (Rippon, 1988; Freedberg *et al.*, 2003). Thrush may make eating and drinking uncomfortable, and children with thrush may lose water in their body tissues and become dehydrated (Freedberg *et al.*, 2003). *C. albicans* is a fungal pathogen that, when growing in the yeast form, is morphologically similar to *Saccharomyces cerevisiae* (Enjalbert *et al.*, 2003). *C. albicans* has a commensal relationship with warm blooded organisms and thus would be expected to live in a relatively stable environment in terms of temperature and osmotic conditions (Enjalbert *et al.*, 2003). Brewer's yeast, also known as *S. cerevisiae*, is commonly used in baking and fermentation of alcoholic drinks; hence, the common name. Brewer's yeast is rich in nutrients like chromium, vitamin B, protein, selenium, potassium, iron, zinc and magnesium. Brewer's yeast, along with its closely related species *Saccharomyces boulardii*, is considered a probiotic. Probiotics are foods or dietary supplements that contain organisms, like bacteria or yeast, which provide health benefits for humans. Newborns can get thrush during birth, children can get it from sharing toys with other children, and adults can pass it back and forth through the saliva. When healthy adults and children are diagnosed with oral thrush, an antifungal medication is commonly prescribed or recommended. Antifungal medications may cause liver

damage and affect estrogen levels; they may also cause allergic reactions and drug interactions. In addition to this, antifungal creams and medications only treat the symptoms and do not address the environment that allows candida to flourish. The candida fungus is resistant to the medication which is common in adults with weakened immune systems and a prime example of our modern problem of antibiotic resistance the drug called amphotericin B may be prescribed.

Amphotericin B is an antifungal medication that is added to an intravenous fluid that drips through a needle or catheter in the vein for 2–6 hours once a day. It can cause serious side effects, including fever, fast breathing, blurred vision, fainting, vomiting and changes in heartbeat. It should only be used for the treatment of life-threatening fungal infections; however, people with a weakened immune system, which can be due to stress, medications and illnesses, are prescribed with a stronger medication like amphotericin because of drug-resistant microorganisms that have grown in the body. Oral candidiasis is a mycosis (fungal infection). Traditionally, oral candidiasis is classified using the Lehner system, originally described in the 1960s, into acute and chronic forms, where the condition is confined to the mouth and perioral tissues, and *secondary oral candidiasis*, where there is involvement of other parts of the body in addition to the mouth. The global human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) pandemic has been an important factor in the move away from the traditional classification since it has led to the formation of a new group of patients who present with a typical form of oral candidiasis (Scully, 2008).

This study was carried out in Oyo state, in the southwestern region of Nigeria. Ethnobotanical information on medicinal plants found to be useful in the treatment of oral thrush infection were obtained through interviews conducted within the study area. Such interviews were conducted with the herb sellers, aged couples, and other individuals who have deep knowledge about the use of plants around them or have inherited the knowledge from their forefathers. Generally, respondents were selected randomly. The study areas were five major herbal markets in Ibadan, namely Ojoo , Oje, Molete, Oranyan and Bode, which was based on their knowledge about the subject matter and its traditional management systems that have been found to be effective. Some of the interviewees, particularly the herb sellers, were remunerated, thus encouraging them to give out relevant information. Some of the areas covered in the administered questionnaire include: causes, symptoms and treatment of oral thrush infection as well as the plants and plant part used for management, method of preparation, and mode of administering the herbal recipes.

Table 1: Distribution of respondents according to their age group in the five major markets in Ibadan, Oyo state, Nigeria.

Age Group	Categories			Total
	Aged couple	Herb sellers	Others	
26-30	-	2	3	5
31-35	4	3	1	9
36-40	4	8	2	14
41-45	1	5	-	5
45 and above	2	8	2	12
Total	11	26	8	45

RESULTS

A total number of 45 people were interviewed and their responses were carefully recorded on the questionnaires, most of the people interviewed could not read nor write. Table 2 also shows their local names in Yoruba, plant habitat and the plant parts used and the species name of each plant, the number of species in each plant family while Table 3 highlights some of the recipes and their method of preparation and administration. Seventeen (17) plant species belonging to sixteen families (Table 2) were reported as being useful in the treatment of oral infection within the study area. Results obtained from this work showed that Zingiberaceae and Euphorbiaceae have the highest numbers of species. Priority medicinal plant species identified have higher frequencies in prescriptions (Table 2). These plants were *Capsium frutescens*, *Citrus medica*, *Eugenia carophyllus*. The use of various plant-parts in prescriptions is presented in Table 2. Seeds, fruits and bark are most commonly used being found in 60% of prescriptions. Table 2 shows the habitats of plants used for the treatment of oral infection. Furthermore, the respondents disclosed that medicinal plants are either purchased from local markets or collected from near-by forests for use.

Table 2: Profile of plant used traditionally in the treatment of oral infection in Ibadan

Plant name	Family	Local name	Plant habitat	Plant part	Frequency
<i>Acacia nilotica</i>	Fabaceae	Booni	Herb	Stem	2(4%)
<i>Piper guineense</i>	Piperaceae	Iyere	Herb	Seed	2(4%)
<i>Curcuma domsestica</i>	Zingiberaceae	Ata ile pupa	Herb	Seed	1(2%)
<i>Bridelia ferruginea</i>	Euphorbiacea	Ira	Tree	Stem	1(2%)
<i>Aframomum melegueta</i>	Zingiberaceae	Ataare	Herb	Fruit	2(2%)
<i>Capsium frutiscens</i>	Solanaceae	Ata wewe	Herb	Seed	4(8%)
<i>Citrus medica</i>	Rutsaceae	Osan lakuregbe	Shrub	Fruit	2(4%)
<i>Eugenia carophyllus</i>	Myrtaceae	Kanafuru	Herb	Fruit	2(4%)
<i>Allium sativum</i>	Alliaceae	Aayu	Herb	Fruit	1(2%)
<i>Combretum molle</i>	Combretaceae	Anragba	shrub	Bark	1(2%)
<i>Balanites Aegyptiaca</i>	Balanitaceae	Teji	Shrub	Bark	1(2%)
<i>Curtisa molle</i>	Bignoniaceae		Shrub	Bark	
<i>Kigelia Africana</i>	Bignoniaceae	Pandoro	Tree	Bark	1(2%)
<i>Securidaca longepedunculata</i>	Polygalaceae	Ipeta	herb	Stem	1(2%)

<i>Terminalia sambesiaca</i>	Combretaceae	Ataye	Tree	Bark	1(2%)
<i>Jatropha curcas</i>	Euphorbiaceae	Lapalapa	Shrub	Stem	1(2%)

Column2

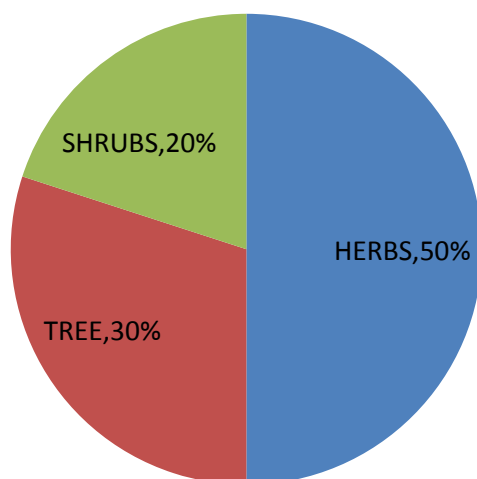


Figure 1: Percentage of plant habitats of plants used in prescriptions for oral infection in Ibadan,

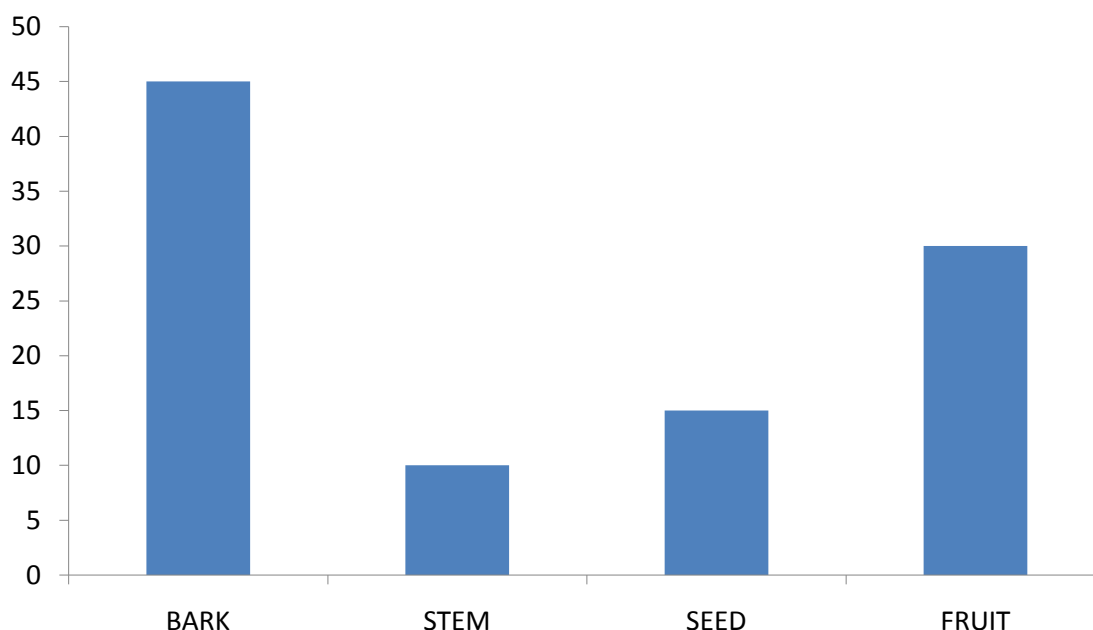


Figure 2: Percentage of plant parts used in prescriptions of oral infection in Ibadan, Nigeria

DISCUSSION

Table 3: Some of the recipes and their method of preparation and administration.

Herbal recipes	Methods of preparation	Prescription usage
<i>Acacia nilotica</i> <i>Piper guineense</i>	Plant materials are boiled together with sterile water into decoction for 10 minutes.	One teaspoonful should be used twice daily for a week and it used be used to gaggle the mouth and not to be swallowed
<i>Aframomum melegueta</i> <i>Citrus medica</i>	The plant materials are used as decoction, soaked together for a day	Two teaspoonfuls should be used to gaggle the mouth and should be used for 2 weeks.
<i>Eugenia carophyllus</i> <i>Capsium frutiscens</i>	Plant materials are prepared as decoction ,both plant material are used as decoction	One teaspoonful is mixed with dry gin. Small glass of cup to be taken one or twice a day for 7 days.
<i>Bridelia ferruginea</i>	Plant material is used as chewing stick, the juice from it should not be swallowed.	It should be used every morning before breakfast
<i>Eugenia carophyllus</i> <i>Capsium frutiscens</i>	Plant materials are prepared as decoction	One teaspoonful is mixed with dry gin. Small glass of cup to be taken one or twice

		a day for 7 days. It should be used to gaggle the mouth not to be swallowed.
<i>Curcuma domsestica</i> <i>Bridelia ferruginea</i>	plant materials is prepared with sterile distilled water to gaggle the mouth for 5 days	Two teaspoonful should be taken in the morning for two weeks and not to be swallowed.
<i>Allium sativum</i> , <i>Aframomum melegueta</i> and <i>Citrus medica</i>	The whole fruit are soaked in sterile distilled water for 12 hours. It is prepared as infusion.	Two teaspoonful should be used to gaggle the mouth and should be used for 2 weeks
<i>Balanites Aegyptiaca</i> , <i>Terminalia sambesiaca</i> and <i>Citrus medica</i> .	Plant materials are prepared as decoction. One teaspoonful is mixed with dry gin	Small glass of cup to be taken one or twice a day for 7 days. It should be used to gaggle the mouth not to be swallowed.
<i>Kigelia Africana</i> , <i>Acacia nilotica</i> and <i>Curcuma domsestica</i>	Plant materials are boiled together with sterile water into decoction for 10 minutes.	One teaspoonful should be used twice daily for a week and it used be used to gaggle the mouth and not to be swallowed
<i>Jatropha curcas</i>	Plant material is used as chewing stick; the juice from it should not be swallowed.	It should be used every morning before breakfast
<i>Terminalia sambesiaca</i> , <i>Allium sativum</i> .	Plant materials are prepared as decoction. One teaspoonful is mixed with dry gin	Small glass of cup to be taken one or twice a day for 7 days. It should be used to gaggle the mouth not to be swallowed.
<i>Eugenia carophyllus</i> , <i>Balanites Aegyptiaca</i> and <i>Allium sativum</i> .	The plant materials are used as decoction, soaked together for a day	Two teaspoonful should be used to gaggle the mouth and should be used for 2 weeks

Medicinal plants play an essential role in primary healthcare as they are used to treat wide varieties of oral diseases because they possess antibiotic and anti-inflammatory properties. However, the main drawbacks of tradition health practices endogenous uses include incorrect diagnosis, imprecise dosage, low hygiene standards, the secrecy of some healing methods, and the absence of written records about the patient (Ndenecho, 2009). There is a common perception that traditional healers do not have any equipment for the diagnoses of oral pain or evaluate post treatment pain assessment thereby depending on the signs and symptoms. However, Ndenecho had observed that the diagnosis of disease by traditional healers is not limited to direct observation and tests. Preservation and storage of medicinal plants products is

a major problem facing traditional medicine in many developing countries like Nigeria. In this study, only 26 (24.0%) of the traditional healers were trained on medication preservation. This invariably means that the postharvest storage and processing technologies are poor and need to be developed to produce the value added to finished products that may be directly utilized by the industry. The establishment of training to facilitate the production of good quality, safe, and efficacious therapeutic is therefore necessary. The secondary metabolites of plants possess medicinal properties and these medicinal qualities of plants have influenced their price for centuries (Joy *et al.*, 2001). This study documented seventeen plants used in the management of various forms of oral problems and dental extractions. The majority of the identified plants were used in the management of oral pain mainly toothache. This may not be unconnected with the fact that attention-seeking for toothache is very high; thereby every care provider equips their arsenal with best and effective treatment option. Laboratory analyses of several medicinal plants have been showing that they have antimicrobial and anti-inflammatory components as primary or secondary metabolites. This study confirms why most of the oral diseases treated were related to pain and infections secondary metabolites. The resolution of toothache from pulpitis occurs because many medicinal plants cause pulp necrosis and mummification of the pulp tissue. However, this resolution is temporary because further dental caries leads to reinfection of dental pulp tissues and consequent reoccurrence of pain. Other studies in Nigeria have indicated that, apart from their specific uses for dental treatments, some of these plants are used for other medical treatments and as food (Ntie-Kang 2013). Most of the plants in this study are used as food or as food additives and they include: *Acacia nilotica*, *Piper guineense*, *Curcuma domstestica*, *Bridelia ferruginea*, *Aframomum melegueta*, *Capsium frutescens*, *Citrus medica*, *Jatropha curcas*, *Allium sativum*, *Combretum molle*, *Balanites Aegyptiaca*, *Securidaca longepedunculata*, *Terminalia sambesiaca*, *Eugenia carophyllus* and *Terminalia sambesiaca*.

Aframomum melegueta appears to have some anti-diabetic and anti-obese mechanisms, although neither is remarkable (the one human study conducted in humans has confirmed an increase in metabolic rate, but required both cold exposure as well as brown fat on the person in question as prerequisites). The aphrodisiac and testosterone boosting properties are both preliminary (with the former not appearing too potent, relative to other herbs) and the anti-estrogen mechanisms are still fairly preliminary and of unknown practical relevance. *Aframomum melegueta* may be promising for a spice to add to a diet in hopes of body recomposition and particularly for men, but there is overall a lack of evidence to support its usage as a supplement and higher oral doses may still have some toxicity associated with them (which needs to be more thoroughly investigated) (Palombo 2011). Clove has historically been used for its antiseptic and analgesic effects. Clove and clove oils are used safely in foods, beverages, and toothpastes. Clove oil cream has been used in the treatment of anal fissures and an extract has exhibited aphrodisiac action in rats; however, there are limited studies supporting clinical applications for clove oil (Tichy and Novak 1998).

Citrus medica from ancient through medieval times, the citron was used mainly for medical purposes: to combat seasickness, pulmonary troubles, intestinal ailments, scurvy and other

disorders. The essential oil of the flavedo (the outermost, pigmented layer of rind) was also regarded as an antibiotic. Citron juice with wine was considered an effective antidote to poison, as Theophrastus reported. In the Ayurvedic system of medicine, the juice is still used for treating conditions like nausea, vomiting, and excessive thirst.

The juice of the citron has a high Vitamin C content and used medicinally as an anthelmintic, appetizer, tonic, in cough, rheumatism, vomiting, flatulence, haemorrhoids, skin diseases and weak eyesight (*Matulunga, 2013*). There is an increasing market for the citron for the soluble fiber (pectin) found in its thick albedo (Dalia and Abdul, 2000).

Piper guineense can be used in the treatment of intestinal disorders like indigestion, flatulence, dysentery, diarrhea and cholera. Sumathykutty et al. (1999) agree that *P. guineense* 'Uziza' leaves are aseptic in nature, with the ability to relieve flatulence. Plants that contain tannins as their primary component are astringent, thus very beneficial for the management of diarrhea, dysentery, inflammation of the mucous membrane. *Piper guineense* contains alkaloids. Alkaloids are one of the most efficient therapeutically significant bioactive substances in plants. Alkaloids are being used as CNS stimulant, powerful pain relievers, topical anesthetic in ophthalmology among others. The leaves and seeds have antibacterial, antifungal, antiseptic, larvicidal and antiparasitic actions. Uziza leaves and seeds possess antihyperlipidemic property, they lower blood fat and as such, indirectly normalise blood flow and heart function.

Capisum frutiscens cream has been introduced into dermatologic therapy and proven useful in preventing chronic pain associated with post-herpetic neuralgia, diabetic neuropathy, and other pain syndromes. It has been used traditionally as an antiseptic to treat cuts and bruises. Turmeric is used as an anti-aging herb because of its excellent anti-oxidant properties, which can prevent free radical damage. Turmeric also acts as an anti-inflammatory as it reduces histamine levels. It is used as a dietary supplement as it is believed to cure stomach ailments such as flatulence, bloating and appetite loss. Some studies and clinical research show that the herb may be effective as a treatment for hepatitis. Curcumin, the active ingredient found in turmeric, has a positive effect on the liver tissue. Even liver tissue that has been damaged by excessive exposure to alcohol or other damaging drugs can be positively affected by turmeric. Internally it can be used in the form of boiled powder or fresh juice. Its use as a condiment in many South Asian cuisines helps in its internal application (*Meena, 2011*). Externally, it can be used in paste form, as an oil, ointment or lotion. The paste form can be applied topically to treat psoriasis, ulcers, warts and scabies. Turmeric root can be squeezed to extract juice which is then mixed with water which can be used to clear sinuses and for ear ache.

Garlic is one of the oldest plants to be widely used as a medicine. In most corners of the world, it is regarded as an aphrodisiac. Its medical qualities have been recognised since ancient times and feature widely in traditional remedies (Bekele-Tesemma, 2007). The bulbs are the most frequently used part of the plant. In India, they are prepared in several ways including extracting the juice or pulping the bulb to a paste. This has been taken to relieve problems such as coughs and fevers or applied externally to prevent greying of hair and to improve skin

conditions such as eczema and scabies. Extracts of bulbs have been widely used in folk medicine. Whooping cough in children has been treated by administering a drink made with a hot water extract of the dried bulb mixed with honey or by wearing a necklace of bulbs. Hot water extracts are also taken to kill intestinal worms. In Nigeria, an extract is traditionally taken orally to settle the stomach, treat coughs and reduce fever (McGaw *et al.*, 2008). Garlic bulbs have sometimes been combined with other plants to make medicines. Mixed with the leaves of the ivy gourd (*Coccoloba grandis*) it is used as a treatment for rabies. An infusion of the entire plant has been combined with sugar and taken to treat fevers. Garlic has also been used in traditional Indian veterinary medicine to treat tetanus and inflammatory disorders of the lungs (Steenkamp *et al.*, 2007).

Combretum molle is widely used in African traditional medicine in the treatment of various ailments and diseases. An infusion or decoction of the roots, stem bark or leaves is taken to treat a large variety of intestinal problems, including abdominal pain, colic, constipation, intestinal worms and dysentery, and further to treat fever, malaria, jaundice, oedema, headache, backache, leprosy, HIV infections, cough, angina, tuberculosis and other chest complaints (Ponou *et al.*, 2008). It is also taken to induce abortion and to treat post-partum bleeding. Sometimes a fruit decoction is taken after a difficult delivery. A decoction of the roots, mixed with roots of several other plant species, is drunk to treat impotence, syphilis and female sterility and also as an aphrodisiac. Crushed fresh leaves, gum from the bark or powdered inner part of the root is applied as a wound dressing (Hedberg *et al.*, 1982). A leaf decoction is used to wash wounds and to treat itch and skin infections. The crushed fresh roots or leaves, alone or mixed with other plants, are applied to snakebites, and an infusion of the pounded root or stem bark is taken to treat the same. The breasts are washed with a root extract as a galactagogue. A leaf decoction or dried leaves in food is taken to treat dropsy. In veterinary medicine, leaves are fed to sheep to treat intestinal worms (Ali *et al.*, 2002). *Jatropha curcas* has been reported to have a lot of health benefits because of its wide range of medicinal uses (Agbogidi *et al.*, 2013). The medicinal uses of this species range from external, internal and even teeth (Agbogidi and Ekeke, 2011). Different parts of the plant including the leaves, fruits, latex and bark contains glycosides, tannins, phytosterol, flavonoids and steroidal saponins that exhibits wide range of medicinal properties. The plant is rich in many phytochemicals including xylose (seeds), vitex (bark), sovitexin (leaf), and curcusones (whole plant) (Nayak *et al.*, 2010). The plant is used as a natural pesticide because of its toxicity (Okoli *et al.*, 2007). The milking sap is used for the treatment of dermatomucosal diseases. An alkaloid known as jatrophine is believed to have anti-cancerous properties. The seeds are also used as insecticides. *Jatropha* has also been known to display certain anti-tumor properties, anti-malaria properties and studies are also advancing in area of HIV/AIDS and urine system response enhancement.

The kigelia plant have medicinal properties not only because of its perceived characteristics such as bitterness, astringent taste or smell but also because of forces that it seems to emit in connection with its location, orientation and association with other plants. It has a long history of use by rural and African countries particularly for medicinal properties. Several parts of the plant are employed for medicine.

The root and bark of *S. longepedunculata* are taken orally either powdered or as infusion for treating chest complaints, inflammation, abortion, ritual suicide, tuberculosis, infertility, venereal diseases and for constipation (Okoli *et al.*, 2005). Toothache can also be relieved by chewing the roots. Powdered roots are used to treat headache by rubbing them on the forehead. Infusions of the root are used for washing topical ulcers. In Limpopo, the Venda take roots for mental disorders and against children's illness during breast feeding. The Venda people mix the powdered root with maize and sorghum beverages for men being sexually weak. In Zimbabwe, the roots are given to people who are believed to be possessed by evil spirits. Pounded with water and salt they are used against snake bites and cough (Mouzou 1999).

CONCLUSION

The study provides comprehensive information on therapeutic methods employed by traditional healers for the treatment of oral diseases in Ibadan. The identification of the active ingredients of the plants used by these traditional healers and assessment of their efficacy in the treatment may provide some useful leads for the development of new effective drugs in oral disease treatment. The local people use herbs for the treatment of candidiasis and other ailments, this should not be discouraged but the practitioners should be helped to standardize their methods.

REFERNCES

- Ademola, I. O. and Eloff, J. N. 2010. In vitro anthelmintic activity of *Combretum molle* (R.Br. ex G.Don) (Combretaceae) against *Haemonchus contortus* ova and larvae. *Veterinary Parasitology* 169(1–2):198–203.
- Agbogidi, O. M. and Ekeke, E. A. 2011. *Jatropha curcas*: Linn an important but neglected plant species in Nigeria. *Journal of Biological and Chemical Research* 28 (1):52–62.
- Agbogidi, O. M., Mariere, A. E. and Ohwo, A. 2013 . Metal concentration in plant tissues of *Jatropha curcas* L grown in crude oil contaminated soil. *Journal of Bioinnovation* 2 (3):137-145.
- Agbor, A. M. and Naidoo, S. 2011. Knowledge and practice of traditional healers in oral health in the Bui Division, Cameroon. *Journal of Ethnobiology and Ethnomedicine* 1: 38–49
- Akpan, A. and Morgan, R. 2002. Oral candidiasis. *Postgraduate medical Journal* 78(922):455-459.
- Ali, H., König, G. M., Khalid, S. A., Wright, A. D. and Kaminsky, R. 2002. Evaluation of selected Sudanese medicinal plants for their in vitro activity against hemoflagellates, selected bacteria, HIV-1 RT and tyrosine kinase inhibitory, and for cytotoxicity. *Journal of Ethnopharmacology* 83: 219–228.
- Badria, F. A. and Zidan, O. A. 2004. Natural products for dental caries prevention. *Journal of Medicinal Food* 1: 381–384.
- Bailey, A. and Reade, P. C .1995. Adherence of *candida albicans* to human buccal epithelial cells Host- induced protein synthesis and signalling events. *Infection and immunity* 63: 569-572.
- Bekele-Tesemma, A. 2007. Useful trees and shrubs for Ethiopia: identification, propagation and management for 17 agroclimatic zones. *Technical Manual RELMA in ICRAF Project, Nairobi, Kenya* Pg 552
- Birhan, W., Giday, M. and Teklehaymanot, T. 2011. The contribution of traditional healers' clinics to public health care system in Addis Ababa, Ethiopia: a cross-sectional study. *Journal of Ethnobiology and Ethnomedicine* 7: 21–22.
- Bologna, J. L., Jorizzo, J. L and Rapini, R. P. 2003. *Dermatology* mosby London Pg.837, 1095, 1096, 1185.
- Cannon, R. D., Holmes, A. R., Mason, A. B. and Monk, B. C. 1995 .Oral *candida* clearance colonization. *Journal of dental research* 74 (5):1152- 1161.

- Dalia A. Abdul. 2000 "Preparation and Characterization of Pectin from Peel of Kabad (Citrus Medica) Fruit in Sulaimani City, Iraqi Kurdistan Region". *International Journal of Current Research in Chemistry and Pharmaceutical Sciences* 1 (7): 142–146.
- De benardis, F., Molinar, A., Boccaanera, M., Stingaro, A., Robert, R. and Scent, J. M. 1994. Modulation of cell surface associated mannoprotein antigen expression in experimental cansidal vaginitis. *Infection and immunity* 62:509-519.
- De Rosa, F.G., Garazzino, S., Pasero, D., Di Perri, G and Ranieri, V.M. 2009. Invasive candidiasis and candidemia a new guidelines. *Minerva anesthesiologica* 75(7-8):453-458
- Diamond, R. D. 1993. International of phagocytic cells with candida and other opptunistic fungi. *Archvies of medical research* 24:361-369.
- Enjalbert, B., Nantel, A. and Whiteway, M. 2003. Stress-induced gene expression in *Candida albicans*. *Absence of a general stress response in Molecular Biology Cell* 14:1460-1467.
- extracts of root bark of *S. longipedunculata* Fres (Polygalaceae). *Africa Journal of Traditional medicine* 2 (3):54-63
- Farah, C.S., Lynch, N. and McCullough, M. J. 2010. Oral fungal infections an update for the general practitioner. *Australian dental journal* 1:48-54.
- Freedberg, I. M., Eiser, A. Z., Wolff, K., Austen, K. F., Goldsmith, L.A and Katz, S. I. 2003. *Fitzpatrick's Dermatology in General Medicine 6th edition* , McGraw-Hill: New York Pg 301.
- Giannini, P. J. and Shetty, K.V. 2011. Diagnosis and management of oral *candidiasis*. *Otolaryngologic clinics of North America* 44(1):231-240
- Hazen, K. C, and Glee, P. M. 1994. Hydrophobic cells wall protein glycosylation by pathogenic fungus *candidal albican*. *Canadian Journal of microbiology* 12: 266-272.
- Hedberg, I., Hedberg, O., Madati, P. J., Mshigeni, K. E., Mshiu, E .N. and Samuelsson, G. 1982. Inventory of plants used in traditional medicine in Tanzania. I. Plants of the families Acanthaceae-Cucurbitaceae. *Journal of Ethnopharmacology* 6(1): 29–60.
- Holmstrup, P. and Axéll, T. 1990. Classification and clinical manifestations of oral yeast infections. *Acta Odontologica Scandinavica* 48(1):57-59.
- Huang, G. 2012. Regulation of phenotypic transitions in the fungal pathogen *Candida albicans*. *Australian dental Journal of Virulence* 3(3):251-61.
- Joy, P. P., Thomas, S., Mathew, G. and Skaria, B. P. 2001. “Medicinal plants ” in Tropical Horticulture, *Editions volume 2*, Pg. 449–632, Naya Prokash, Calcutta, India.

- Kamat, S., Rajeev, K. and Saraf, P. 2011. Role of herbs in endodontics: *An update Endodontology* 23:98-102.
- Lalla, R. V., Patton, L. L. and Dongari-Bagtzoglou, Y. 2013. An Oral *candidiasis* pathogenesis, clinical presentation, diagnosis and treatment strategies. *Journal of the California Dental Association* 41(4):263-268.
- Laudenbach, J. M. and Epstein, J. B. 2009. Treatment strategies for oropharyngeal candidiasis. *Expert opinion on pharmacotherapy* 10(9):1413-1421.
- longipedunculata* root extract on ionic currents and contraction of cultured ear
- Marsh, P.D. 1991. Sugar, fluoride, pH and microbial homeostasis in dental plaque. *Proceedings of the Finnish Dental SocietySuomen Hammaslaakariseuran toimituksia* 87(4):515-525
- Matulunga (Citrus medica)". 2013. *frlht.org*. Archived from the original Pg12-24
- McCullough, M. J. and Savage, N. W. 2005. Oral candidosis and the therapeutic use of antifungal agents in dentistry. *Australian dental Journal* 50(4):36-39.
- McGaw, L.J., Lall, N., Meyer, J. J. and Eloff, J. N. 2008. The potential of South African plants against Mycobacterium infections. *Journal of Ethnopharmacology* 119: 482–500.
- Meena, T., Ajay Kumar Kandale, A., Ajit Rao, M. M., Panda, P., Reddy, R. and Govind O. 2011. A review on citron-pharmacognosy, phytochemistry and medicinal uses" *The Journal of Pharmacy* 2 (1): 14–20.
- Mehtal, D. k., Martin, J., Jordan, B., Macfaralance, C. R. and Hashimi, 2002. Biritish national forumlarly London pharmaceutical press Pg 294-298.
- Mouzou, A.P., Boulteau, L. and Raymond, G. 1999. The effects of S.
- Nayak, B. S. and Patel, K. N. 2010. Pharmacognosis studies of *Jatropha curcas* leaves. *International Journal of Pharmtech Research* 2(1):140-14
- Ndenecho, E. N . 2009. “Herbalism and resources for the development of ethnopharmacology in Mount Cameroon region. *African Journal of Pharmacy and Pharmacology* 2 (1): 14–20
- Ngilisho, H. J., Mosha, T, and Poulsen, S. 1994. The role of traditional healers in the treatment of toothache in Tanga Region, Tanzania. *Community Dental Health* volume 11: 240–242.