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Ethnomedicinal and phytochemical evaluation of tree species among some local folks of northern Nigeria

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ABSTRACT

In many parts of northern Nigeria, indigenous knowledge about the significance of different tree species has been passed down from one generation to another without proper research and documentation. Therefore, this research work involves the preliminary ethnomedicinal and phytochemical evaluation of selected tree species among some local folks of northern Nigeria. Data were collected using structured questionnaires and oral interviews. Descriptive analysis was used to carry out the data analysis for all the tree species, while laboratory analysis was used to carry out the phytochemical screening of selected tree species in the study area. The result from the study shows that about twenty three (23) tree species belonging to diverse families were discovered. The phytochemical screening shows that only *Piliostigma thonningii* obtained a positive result for all the parameters checked. This work also revealed the ethnomedicinal study of tree species in the study area.

Keywords: ethnomedicinal, local folks, phytochemical evaluation, preliminary, indigenous, *Piliostigma thonningii*

1. INTRODUCTION

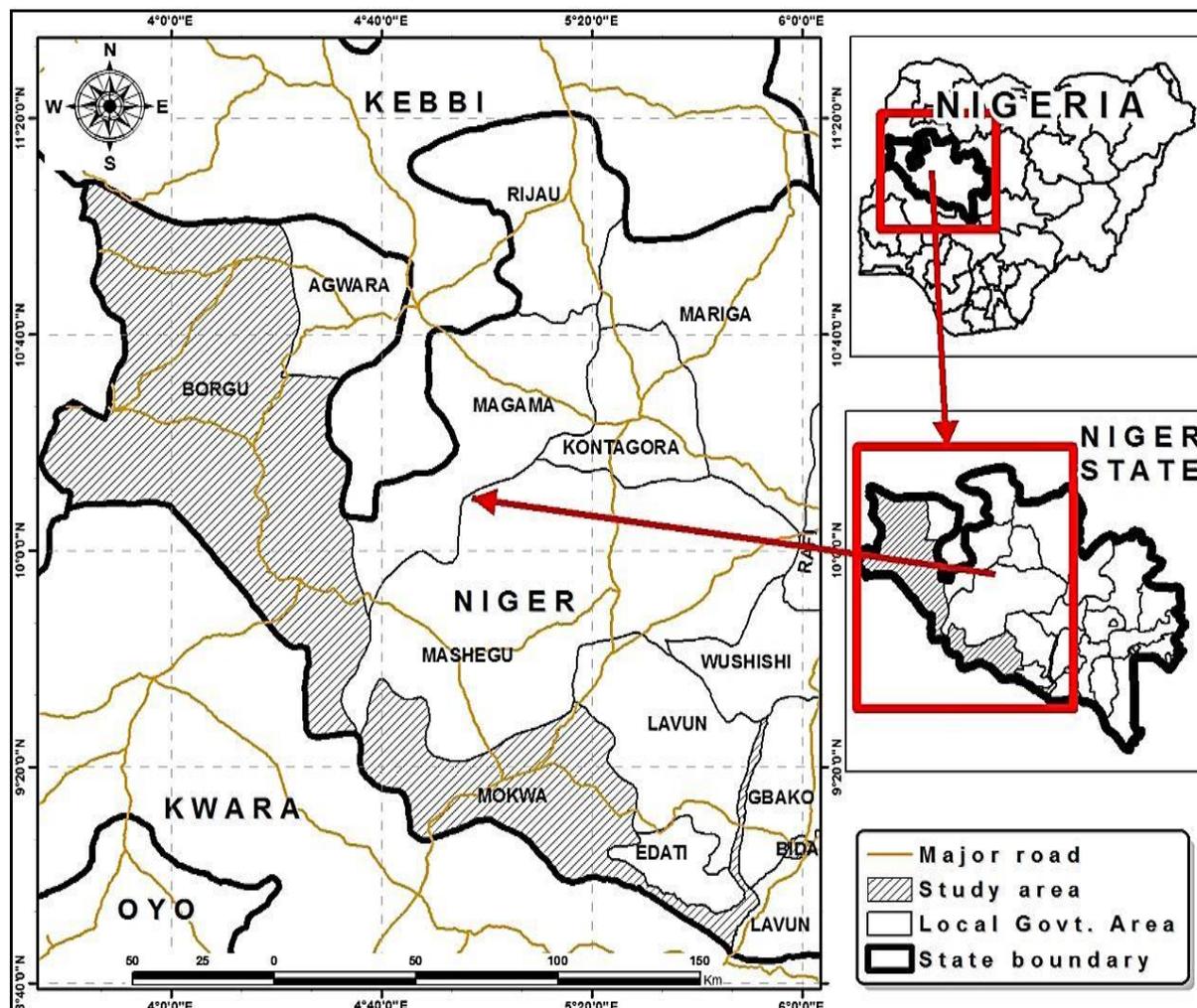


Figure 1. Map of Niger State showing the study area

Ethnomedicine is concerned with the study of medical systems from the native's point of view [1]. Many African societies have processed and utilized different tree species to cure various ailments for ages. For instance, 80% of Africans [2] and about 27 million South Africans (54%) have been identified as herbal remedy users [3, 4]. Determined that the use of herbs and other forms of Complementary and Alternative Medicine (CAM) was common among cancer patients in Nigeria. Other studies have revealed its use in children [5], asthma patients [6], hypertensive patients [7], pregnant women [8, 9], as well as medical inpatients [10] and outpatients [10, 11]. There are several reasons given as to why people contemplate herbal medicine use. While some consider them to be natural and therefore safe [12, 13], others put economic reasons into consideration: high cost of healthcare and poor access to conventional medications. Protracted health issues [14], religion and traditional or cultural beliefs [15] have been known to play a role as well as dissatisfaction with efficacy of

conventional medications [16] and the perception that herbal remedies are much more efficacious than the former [17].

Medicinal plants besides therapeutic agents are also a big source of information for a wide variety of chemical constituents which could be developed as drugs with precise selectivity [18]. These are the reservoirs of potentially useful chemical compounds which could serve as newer leads and clues for modern drug design [19]. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds [20]. Correlation between the phytoconstituents and the bioactivity of plant is desirable to know for the synthesis of compounds with specific activities to treat various health ailments and chronic diseases as well [21]. Consequently, this present study aims to showcase the ethnomedicinal study and phytochemical screening of selected tree species in the study area.

2. MATERIALS AND METHOD

2. 1. Study Area

This research was carried out among some local folks in Magama Local Government Area of Niger State, Nigeria. It is situated at latitude 10° 28' N and longitude 5° 03' E. (Figure 1).

2. 2. Data Collection and analysis

Field surveys were carried through the use of questionnaires and oral interviews. Descriptive statistics was used in the data analysis. The Phytochemical screening of the tree's leaves were carried out to determine the level of alkaloids, flavonoids, tannins, phlobatannins, Saponins and anthraquinones

2. 2. 1. Phytochemical Screening

Phytochemical screenings of the crude tree samples were carried out to identify the chemical constituents, using standard phytochemical methods as described [22].

Alkaloids: About 0.5g of the tree extract was added with a few drops of picric acid reagent. A white or yellow precipitate indicates a positive test for Alkaloids.

Tannins: About 0.5g of the dried powdered tree samples was boiled in 20ml of water in a test tube and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or a blue black colouration.

Flavonoids: A portion of powdered tree sample was in each case heated with 10ml ethyl acetate over a steam bath for 3min. The mixture was filtered and 4ml of the extract was shaken with 1ml of dilute Ammonia solution. A yellow colouration was observed indicating a positive test for flavonoid.

Phlobatannins: About 0.5g of the tree extract was added with 3 drops of 40% formaldehyde, 6 drop of diluted hydrochloric acid [HCl] is also added to boiling and cool. A precipitate was

formed, if positive and washed with hot water; this leaves a colourless residue after washing indicating the presence of phlobatannins.

Saponins: About 0.5g of the filtered tree extract was put in a test tube and 2ml of distilled water added and shaken vigorously. Formation of frothing or foam which persisted on warming was taken as preliminary evidence for the presence of Saponins.

Anthraquinones: About 0.5g of the plant extract was boiled with 5ml of 10% sulphuric acid [H₂SO₄] and filtered. The filtrate was cooled in ice and shaken with 2.5ml benzene, the benzene layer separates and half its own volume of 10% ammonia hydroxide [NH₄OH] was added. The development of pink, red or violet colouration in Ammonia (lower) phase indicates a positive test. Records were made on life specimens.

3. RESULTS AND DISCUSSION

Table 1 reveals the ethnomedicinal study of tree species in the study area. It shows that a total of twenty three (23) species belonging to diverse families were recorded.

Table 1. Ethnomedicinal study of tree species in the study area.

S/N	Botanical Names	Common name	Family	Part Used	Mode of Preparation	Ethnomedicinal Uses
1	<i>Azalia africana</i>	Azalia	Fabaceae	Bark, leave	Decoction	Miscarriage
2	<i>Pterocarpus erinaceus</i>	Barwood	Fabaceae	Bark, Leave	Decoction	Menstrual Flow, Asthma
3	<i>Daniella oliveri</i>	African Copaiba Balsam	Fabaceae	Bark	Pounding	Blood Pressure, Hernia, Malaria
4	<i>Khaya senegalensis</i>	Senegal Mahogany	Meliaceae	Bark	Decoction	Pile, Stomach Ache, Anaemia
5	<i>Boswellia dalzielii</i>	Frankincense	Burseraceae	Bark, Root	Decoction	Measles, Vaginal Diseases
6	<i>Detarium macrocarpum</i>	Tallow Tree	Fabaceae	Bark	Decoction	Dysentery
7	<i>Citrus sinensis</i>	Orange	Rutaceae	Leave	Decoction	Fever, Cough
8	<i>Annona senegalensis</i>	Wild Soursop	Annonaceae	Leave	Decoction	Fever
9	<i>Tamarindus indica</i>	Tamarind	Leguminosae	Leave	Pounding	Fever

10	<i>Parkia biglobosa</i>	African Locust Bean	Fabaceae	Leave, Bark	Decoction	Malaria, Dysentery
11	<i>Mangifera indica</i>	Mango	Anacardiaceae	Leave	Decoction	Malaria, Diarrhea, Diabetes
12	<i>Azadirachta indica</i>	Neem	Meliaceae	Leave	Decoction	Fever, Stomach Upset And Malaria
13	<i>Grewia mollis</i>		Malvaceae	Leave	Soaking	Body Pain
14	<i>Lannea acida</i>	False Marula	Anacardiaceae	Bark	Decoction	Fever
15	<i>Psidium guava</i>	Guava	Myrtaceae	Leave	Decoction	Fever
16	<i>Piliostigma thonningii</i>	Camelfoot	Fabaceae	Leave	Decoction, Pounding	Eye Problem
17	<i>Vitellaria paradoxa</i>	Shea Tree	Sapotaceae	Bark	Decoction, Pounding	Swollen Pain, Toothache, Dysentery
18	<i>Adansonia digitata</i>	Baobab	Malvaceae	Leave	Pounding	Cancer, Cardiovascular Diseases
19	<i>Ficus sycomorus</i>	Sycamore Fig	Moraceae	Leave	Pounding	Wound, Ringworm
20	<i>Anacardium occidentale</i>	Cashew Tree	Anacardiaceae	Leave	Decoction	Malaria
21	<i>Ficus thonningii</i>	Common Wild Fig	Moraceae	Leave	Squeezing	Stomach Offset, Malaria
22	<i>Moringa oleifera</i>	Moringa	Moringaceae	Leave	Decoction	Asthma, Arthritis, Rheumatism, Ulcer
23	<i>Piper guineense</i>	West African Pepper	Piperaceae	Fruits, leaves	Decoction	Impotence, Hypertension,

Figure 2 shows the mode of preparation of the tree species in the study area. It reveals that decoction (65.2%) is the most frequently mode of preparation of the tree species in the study area, followed by pounding (17.4%).

Figure 3 shows the part of the tree species used in the study area. It reveals that the leaves of the trees were the commonly used plant part in the study area, followed by the bark of the tree.

Table 2 reveals the phytochemical result for some selected tree species in the study area. The phytochemical screening shows that only *Piliostigma thonningii* obtained a positive result for all the parameters checked.

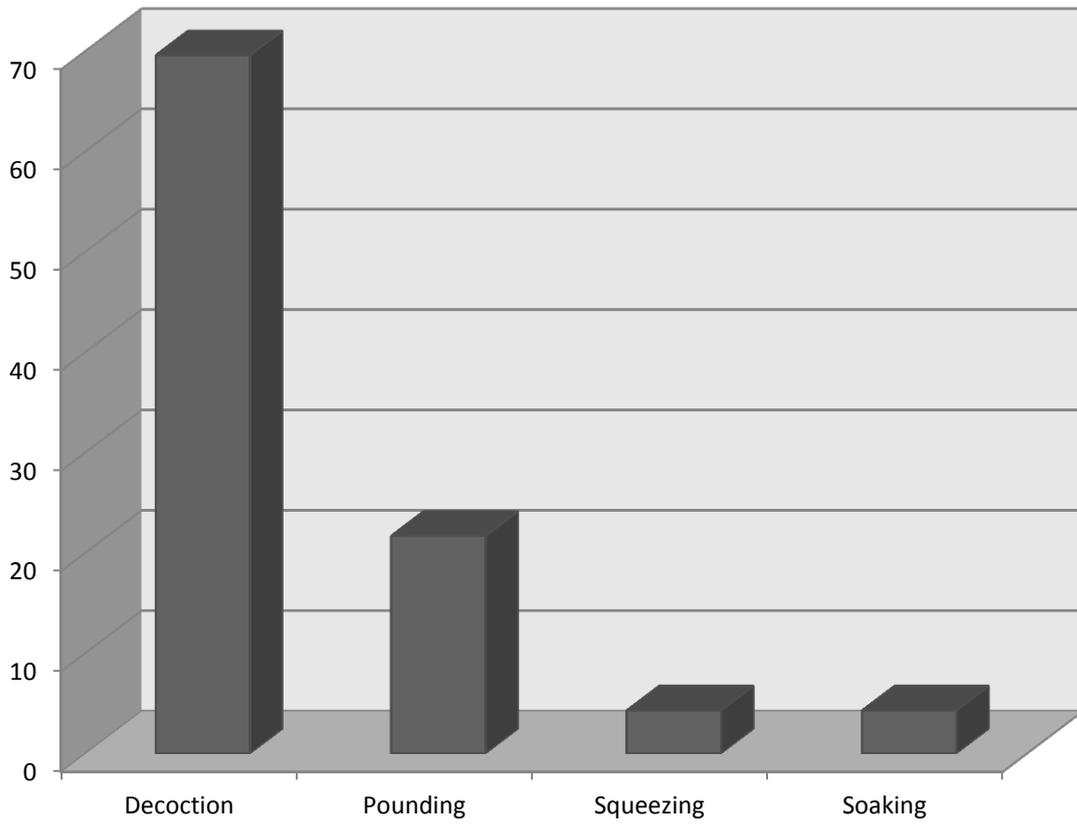


Figure 2. Mode of preparation

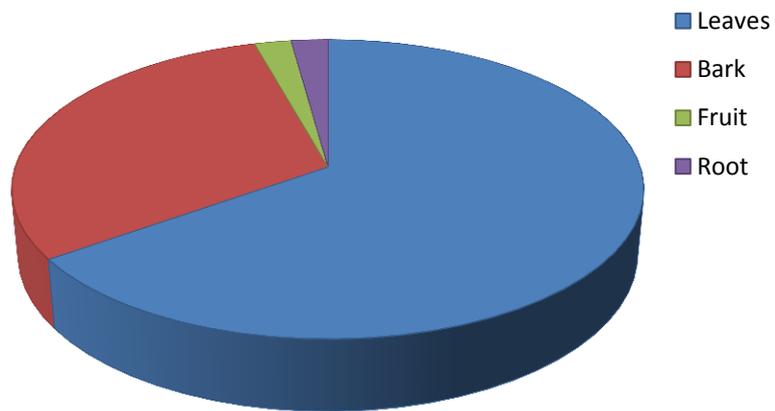


Figure 3. Plant parts used in the study area

Table 2. Phytochemical Result for some selected tree species in the study area

S/no	Name of species	Alkaloids	Flavonoids	Tannins	Phlabotannins	Saponin	Antraquinones
1	<i>Afzelia africana</i>	+	—	+	—	+	—
2	<i>Parkia biglobosa</i>	+	—	+	+	+	+
3	<i>Daniellia oliveri</i>	+	—	+	+	+	+
4	<i>Piliostigma thonnigii</i>	+	+	+	+	+	+

(+) = Present, (—) = Absent

4. DISCUSSION

Tree species contain medicinal properties which have been used by local folks for ages without proper research and documentation. [23] Reported that research and extension work are the major pathways to integrate folk knowledge about ethnobotanical and ethnomedicinal plants for modern primary health care and human welfare.

The study has provided evidence that the tribal people of northern Nigeria use about twenty three (23) tree species for the treatment of various ailments. The tree species are generally used for stomach ache, malaria, fever, asthma, cancer among others. This conforms to previous findings. For instance, [24] stated that medicinal plants have important contributions in the healthcare system of local communities as the main source of medicine for the majority of the rural population. [25] Asserted that out of the total 422,000 flowering plants reported from the world, more than 50,000 are used for medicinal purposes. About 60% of the world population and 80% of the population of developing countries rely on traditional medicine. According to [26], more than 4.5 billion people in the developing world rely on medicinal plants as components of their healthcare.

The study shows different mode of preparation of the tree species. Decoction was found to be the most widely used mode of preparation. This is akin to the findings of [27] who obtained a similar result in the survey of ethnomedicinal plants in Surigao Del Sur Mountain Range, Philippines; they observed that decoction was found to be the most widely used

dosage preparation in the study. This agrees with the works of [28, 29] who also discovered decoction as the most widely used mode of preparation.

Different tree parts were used in the study. However, the most commonly used part was the leaves. [30] Stated that leaves were found to be the most used plant part in the ethnomedicinal practice of Garo Hills, of Durgapur, Bangladesh. Comparable to our present finding, leaves were found to be the most used plant part in many other ethnomedicinal studies [31-35]. Metabolically the most active part of the plant, leaves are known to synthesize a wide range of secondary metabolites [36, 37]. Leaves are also the first choice in ethnomedicine due to the easy collection and preparation procedure [38, 39].

The phytochemical screening shows that for all the tree species examined, alkaloids, tannis and saponin were presence. However, flavonoid was present in only *Piliostigma thonnigii*, while *Azalia africana* was lacking in Phlabotannins and Anthraquinone. A similar result was reported by [40] when they researched on the ethnobotanical and phytochemical studies of some selected species of leguminoseae of Northern Nigeria: a study of Borgu Local Government Area, Niger State. Nigeria.

5. CONCLUSION

This study has revealed the importance of tree species among some local people. A total of 23 tree species were utilized by some local folks of northern Nigeria. The use of trees for medicinal purposes has been an age long practice in many societies.

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