



ETHNOBOTANICAL AND PHYTOCHEMICAL STUDIES OF SOME SELECTED SPECIES OF LEGUMINOSEAE OF NORTHERN NIGERIA: A STUDY OF BORGU LOCAL GOVERNMENT AREA, NIGER STATE. NIGERIA

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ABSTRACT

The studies involve the phytochemical screening and ethnobotanical survey of ten medicinal plants belonging to the family of leguminosae in Borgu Local Government. Semi – structured interviews and questionnaires were used to collect ethnobotanical information on the selected plants. The selected plants species were *Acacia nilotica*, *Acacia polyacantha*, *Senna occidentalis*, *Danielia oliveri*, *Entanda africana*, *Piliostigma thonningii*, *Prosopis africana*, *Mimosa pudica*, *Parkia biglobosa*, and *Azalia africana*. In ethnobotanical survey the herbalist/traditional healers, the herb sellers were the respondents. The result of ethnobotanical studies revealed that the selected species of plants cured or used as remedies for about fifty three (53) different diseases and ailments in the study area. The phytochemical analysis revealed that all the selected plants species have the phytochemical ingredients that are useful in human therapeutic and health care delivery. It was discovered that all the ten plants possess Alkaloids, Flavonoids, Tannins, Saponins, phlobotannin and Anthranquinone in a varying degree. *Piliostigma thonningii* and *Prosopis africana* possess all the chemical parameters tested, while the *Acacia polyacantha*, *Senna occidentalis*, *Mimosa pudica* and *Azalia africana* possess three chemical parameters each, the phytochemical present in the samples correspond with their ethnomedical significance selected plants, the study also revealed that the tree plants debarked for the purpose of herbs are posed to the danger of pathogenic infestation, hence affecting the environment at large.

KEYWORD: *ethnobotanical, phytochemical, leguminosae.*

INTRODUCTION

Herbal medicine which is the use of medicinal plants for drugs, plants in the treatment and cure of sicknesses conditions has been with man since time immemorial. Early 20th century witnessed the arrival of hormones, chemotherapy, vitamins, antibiotics, and more recently, the biotechnological products, which marked a sharp decline in the contribution of herbal medicine to health care delivery. Fortunately however, there is a revival of herbal medicine at the close of the 20th century (Osai, 1998). This is especially so with the rising cost of imported medication to the extents that governments cannot meet the demand of people. The contribution of leguminosae to livelihood of man and animal are greatly immense, its relevance to socio economics of rural people cannot be over emphasised as it constitutes one of the humanity's most important groups of plants. Legumes are used as crops, forages, and green manure. They also synthesised a wide large of natural products such as flavours, drugs poison and dyes. (Polhill and Baven 1981). In most developing countries, low income people such as farmers, people of small isolated villages and native communities use folk medicine, extracts from the leaves, seeds, fruits, bark and roots of plants and in the preparation of syrups and infusions in the traditional medicine for treatment of common infections. These

preparations have been used to treat cases ranging from common cold to malaria, liver diseases, hypertension, and so on. The active constituents contributing to these protective effects are the phytochemical, vitamins and minerals which could be derived from roots, barks, seeds and fruit of various plants (Okwu and Ekeke 2003). In northern Nigeria, many indigenous plants are widely consumed as food or home remedies especially treatment of common diseases (Aliyu et al, 2008). The important of plant in medicine remains even of greater relevance with current global shift to obtain drugs from plants sources, as a result of which attention has been given to the medicinal value of herbal remedies for safety, efficacy and economy used in the preparation of syrups and infusion in traditional medicine Also, Aliyu et al, (2008), reported phytochemical analyses and minerals elements composition of some medicinal plants of northern Nigeria, showed that the plants hold tremendous promise in providing the variable secondary metabolite and mineral supply that could enhance the curative process of ill health. The medicinal plants are continually being utilized as therapeutic agents' information for treating diseases in traditional ethno medicinal system, the ethnobotanical and phytochemical studies of five (5) species of senna (family leguminosae: caesalpinodeae) in Ogbomoso area, Nigeria, establishes some concordance between local

medicinal application of plants investigated and their constituent phytochemical groups which are relevant to the pharmaceutical industries (Ogunkunle and Ladejobi 2011). The study presents the plants as potential sources of raw materials in the chemical and pharmaceutical industries and it also confirms ethno botany as a viable tool in search plants genetic resources for use in the industries. (Ogunkunle and Ladejobi, 2011).

However, When one thinks of the productivity of a forest, the first thing that comes to mind is timber. The production of timber is often organized and highly visible and the markets for woods are highly structured, organized and well established, (Oluwalana, et al 2008) relatively, reverse is the case in NTFPs in Nigeria, due to the trends of events that surround it, despite the enormous contribution of herbal medicine to human health, the collection practices of the plants' parts constituents still remain crude and unsustainable, hence pose a lot of dangers to the various economic standing trees both in the forest or within the communities, for instance, the indiscriminate collection of bark of trees and its danger is gaining more awareness daily, Tree barks have been defined biologically as a number of different tissues a dead tissue lying outside the active cork cambium of the plant (Dutter, 1981). They are classified into rings and scale bark, bark perform some biological functions to the plants, its basic function is protection because it is a hard dry covering for the plant, it protects inner portion from the attack of insects and fangs, against loss of water by evaporation and against the variation of external temperature. Some green trees' bark of plants is photosynthetic in nature.

This research work covered the assessment of ethnobotanical values of some selected species of leguminosae in Borgu Local Government Area and phytochemical screening of ten selected leguminosae plants species. The studies identified the medicinal values of leguminosae, the diseases they cure, the method of application and the studies covered five villages in Borgu local government area in Niger state.

METHODOLOGY

The study area is Borgu local government area with the total land mass of about 16,200km, it is located in Nigeria at the coordinate of Latitude 9° 40'N and 10° 30'N and Longitude 30° 30'E and 50° 5' E. The study area enjoys a transitory Northern savannah climate that characterized by two (2) distinct weather conditions that is the dry and wet season The wet season begins from April to October, while the dry season is from November to March.

Method of Data Collection and Procedures

Field survey were carried through the use of questionnaires, the respondents involved herbalists and herb sellers. Literatures on medicinal plants, vernacular and botanical names were considered to corroborate the claims by the healers

The information on the local names and ethno botanical uses of some selected leguminosae, scientific name of selected species, and the parts used the ailments they cure, method of preparation and applications. The plant samples collected for the study were taken for Phyto-chemical analyses at Chemistry Laboratory, National Institute of

Freshwater Fisheries Research, (NIFFR) New Bussa, Niger State, Nigeria. The Phytochemical screening of the plants' leaves were carried out to determine the level of alkaloids, flavonoids, tannins, phlobatannins, Saponins and anthraquinones

Sampling Procedures

The studies were also braced up by administering 80 questionnaires to the respondents. The five villages were purposely sampled; Babanna, Shagunu, Wawa, Luma and Dekara respectively, the sampling intensity of the population was 5%.

Data Analysis

The descriptive data collected from the study were analysed with descriptive statistics, which involves, the presentation of tables, percentages and charts.

Phytochemical Screening

Phytochemical screenings of the crude plant samples were carried out to identify the chemical constituents, using standard phytochemical methods as described by Sofowora (1993).

Alkaloids: Hager's [picric acid]. About 0.5g of the plant 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 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 plant 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 plant 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 plant extract was put in a test tube and 2ml of distilled water added and shaken vigorously. Formation of frothing or foam which persisted of 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.

RESULT & DISCUSSION

Demographic characteristic of respondents whose are majorly traditional healers/ herbalist and herbs sellers are represented in (Table: 1), with the 40 years and above represent (73.75%) of total respondents in the study area. While the age between 20 – 24 years has the lowest percentage of (1.25%). The study shows that almost (95%) of the respondent were married and the common religion

practice in the study area are Islam and Christianity with (92.5%) and (7.5%) respectively.

TABLE 1: Demographic characteristic of the respondents

Sex	Frequency	Percentage %
Male	69	86.25
Female	11	13.75
Age Distribution		
20 – 24	1	1.25
25 – 29	2	2.50
30 – 34	0	0.00
35 – 39	18	22.50
40 – Above	59	73.75
Marital Status		
Married	3	3.75
Single	1	1.25
Widow	0	-
Divorce		
Religion		
Islam	74	92.5
Christianity	6	7.5
Notice of any Extraction		
No	80	100
Yes	0	-
Any of Cultivation		
No	80	100
Yes	0	-
Any Imported		
No	80	100
Yes	0	-
Around Houses		
No	72	90
Yes	8	10

Source field survey, 2012

Saeed, *et al.*, (2004) reported that there is ample evidence that increasing numbers of people across various parts of the world depend on traditional herbal remedies for their health care. The local uses of plants and products in health care are even much higher in particularly those areas with little or no access to modern health service Table 2 shows the plant species commonly use to treat about fifty three (53) diseases or ailment in the study area. The table shows the diseases they cured, parts used, methods of preparation, applications, the dosage and the period of taking them to corroborate the assertion of Sofowora, (1982), that lack of standardization and precision on dosage and quality control is seen as one of the main disadvantages of traditional medicine as summarized from various sources. It was observed from the research that there were some disagreements among the informants on the dosage of certain remedies prescribed. The dosage depended on the informant that prescribed the herbs for medicinal purpose. The diseases and ailments cured by these species include; Malaria, Typhoid, Gonorrhoea, Syphilis, High blood pressure, Blindness, Sore throat, Wound, Worms, Rib pain, Fibroids, Male impotence and Sterility in woman, Dysentery, Cough and many others. The result revealed that *Piliostigma thonigii* have the highest curative of about seven (7) diseases while the *Mimosa pudica* and *Afzelia africana* have the lowest of four (4) diseases or ailment each of the curative. The study revealed that the selected plants were commonly used to treat about fifty three (53) different disease and ailments in human therapeutics, According to

(table 2) there is an indication that *Piliostigma thonigii* rank highest cure seven (7) diseases with (12.96%) followed by *Acacia nilotica*, *Senna occidentalis*, *Danielia oliveri*, *Parkia biglobosa* each with six (6) ailments with (11.11%) each. *Acacia polyacantha*, *Entanda africana* and *Prosopis africana* ranked third cured five (5) diseases each with (9.25%), while *mimosa pudica* and *Afzelia africana* have the lowest cured four (4) diseases each with (7.40%). The perception of respondents on the other socio-economic importance of the selected species revealed that, the forage for animals rank higher with (97.5%), plank (95%), for fencing of the houses or farm has (93.75%), fuel wood (88.75%) for soap making (78.75), pot making (70) vegetable (8.75) and for beverage (5). The result revealed that all the species possessed the phytochemical ingredients that are useful in human therapeutic. The phytochemical screening/analysis of the selected species revealed that *Piliostigma thonigii* and *Prosopis africana* possess all the parameter tested for followed by *Danielia oliveri*, *Entanda africana*, and *Parkia biglobosa* possess five (5) chemical parameters each. *Mimosa pudica*, *Afzelia africana*, *Acacia polyacantha* possess lowest parameter of three (3) each. Flavonoid present in four out of the ten selected species, flavonoid plays a significant roles in the herbal plants, according to Salah *et al.*, (1995); Del-Rio *et al.*, (1997); and (Okwu, 2004), Flavonoids and other phenolic compounds are potent water soluble antioxidants and free radical scavengers, which prevent oxidative cell damage, have strong anti cancer activity.

TABLE 2: the species identified,

S/n	Plant species.	Common name.	Local name.	Aliment/diseases.	Part used.	Method of preparation/application.	Doses to be taken.	Time. (Interval)
1.	<i>Acacia nilotica</i>		Bagaruwa (h), Bani (y)	(i)Gonorrhoea, (ii)Body pain, (iii)Blindness, (iv)Wound, (v)Sore throat, (vi)Control of children bed wetting	(i)Root & bark, (ii)Leaf & bark,(iii) Seed, (iv)Seed, (v)Leaves, (vi)Leaf, Bark	(i)Decoction & drink, (ii)Decoction, (iii)drink & bath , (iv)Calcinations & soak in water & wash the face, (v)Calcinations pond to powder & apply to affected place, (vi) Decoction & drink, Decoction & drink	(i)½ a cup, (ii)Bath once a day & ½ a cup,(iii)2 cups, Little, (iv)Once a day,(v), ½ cup, (vi)¼ cup	(i)2 time daily for 7 day, (ii)2 times a day for 3-5 days,(iii) 2 times a day for 7 days ,(iv) For 7 days,(v)2 times daily for 3 days ,(vi)2 times a day for 5-7 days
2.	<i>Acacia polyacanth ha</i>		Karo (h), Kununu (k)	(i)Fibroids,(ii)Body pain,(iii) Rib pain,(iv)Typhoid,(v) Wound	(i)Bark,(ii)Bark, (iii)Bark, (iv)Leaf	(i)Macerate & drink,, (ii)Cooked with red potash & drink, (iii)Decoction & drink, (iv)Decoction or maceration with red potash in water & drink, (v)Squeeze the juice & apply to the wound	(i)½ a cup, (ii)½ cup, (iii)½ a cup,(iv) ½ a cup	(i)2 times for a month, (ii)2 times daily for 3-5 days, (iii)Until it cure,(iv) 2 times a day for 3-5days, (v)2 times a day for 2, Days.
3.	<i>Senna occidentitis</i>	Luffes enna	Rere,(y) ,Radore(h), Sigisge(b)	(i)Jaundice, (ii)Abscess, (iii)Vomiting, (iv)Malaria/fever,(v) Typhoid	(i)Leaf, (ii)Leaf, (iii)Root, (iv)Leaf, (v)Root	(i)Macerate& drink path by adding salt & wash face with other portion., (ii)Used as plaster on the affected place,(iii) Decoction & drink,(iv) Decoction with some other leaves and drink, (v)Soaked with water of maize & drink	(i)½ a cup, (ii)½ cup, (iii)½1 cup	(i)2 times a day for 3 day ,(ii) Until the place healed ,(iii) Once or twice a day for 2 days, (iv) 2 times a day for 2-3 days,(v) 2 times a days for 5-7 days
4.	<i>Danielia oliveri</i>		(h)maje, (y)iya b.	(i)High blood pressure, (ii) Hernia, (iii) Malaria, (iv) Sore throat, (v) Wound, (vi) General pain.	(i)Bark, (ii) Root, (iii) Bark, (iv) Bark, (v) Bark (vi) Bark.	(i)Soaked & drink, (ii)Decoction (boiled)& drink, (iii)Pound to powder & add to pap & drink, (iv)Chew & swallow the juice, (v)Grind to powdered & apply to the wound, (vi)Powered are taken with pap.	(i)1 cup,(ii)1 cup, (iii)1spoonful, (iv)A length of stick., (v)Little on affected place, (vi)One spoonful	(i)2 times a day for 2Weeks,(ii)2 times a day for 1 week, (iii)2 times a days for 5-7 days,(iv) 2 times a day, (v)Once a day for 5-7 days,(vi) Once a day for 5 - 7 days.
5.	<i>Entanda africana</i>		Twatsa (h)	(i)Dysentery (ii)Impotence (male),(iii) Cough, (iv)Gonorrhoea, (v)Worms	(i)Bark, (ii)Bark, (iii)Root, (iv)Root, (v)Root	(i)Steam bath & drink, (ii)Decoction & drink, (iii)Decoction (boiled) & drink, (iv)Decoction & drink, (v)Decoction & with red potash	(i)½ a cup, (ii)½ a cup,(iii) ½ a cup,(iv) ½ a cup, (v) 2 cup	(i)3 times a day for 5-7 days, (ii)3 times a day for 5-7 days, (iii)2 times a day for 3-5 days,(iv) 3 times a day for 7 days,(v) 2 times a day for 5 days

6.	<i>Pilosostigm a thomigii</i>	Kal go (h) Abate (y)	(i)Evil attack, (ii)Stomach pain, (iii)Wound, (iv)Circumcision, (iv)Dysentery ,(v) In child walking, (vi)Male impotence	(i)Leaf & bark, (ii)Leaf, (iii)Leaf, (iv)Leaf, (iv)Root, (v)Leaves, (vi)Bark	(i)Decoction & bath & drink, (ii)Young leaf chew & swallow the juice., (iii)Chew & apply on wound,(iv) Decoction &submerge to bath the cut, Decoction (boiled) & drink, (v)Decoction & bath the child, (vi)Decoction (boiled) & drink	(i)A bucket , (ii)½ cup for drink, (iii)Few leaves, (iv)Little, One bucket,(v) ½ a cup, One bucket, (vi)½ a cup	(i)Bath once a day, (ii)drink 2 times a day for 7 days, (iii)Until it stop., (iv)Once day for 5 days, (v)Once daily for 7 days., 3 times a day for 5-7 days, Once a day for 7 days,(vi) 3 times a day for 7 days
7.	<i>Prosopis africana</i>	Ayan (y)	(i)Wound, (ii)Neck pain,(iii) Burnt, (iv)Fever, (v)Toothache	(i)Bark, (ii)Leaf, (iii)Bark, (iv)Root, (v)Stem	(i)Powered & apply on the wound, (ii)Pound & soaked & drink, (iii)Grind & apply on the affected place, (iv)Decoction with limes & drink., (v)Chew as brush.	(i)Little,(ii)1 cup,(iii)Little,(iv) ½ cup,(v) A chewing stick	(i)Once a day for 3 days, (ii)Once a day for 3 days, (iii)Once a day for 7 days, (iv)4 times a day for 5-7 days,(v) 2 times a day until it cured
8.	<i>Mimosa pudica</i>	Patanno (y)	(i)Pile, (ii)Dysentery, (iii)Weakness of body,(iv) Fever	(i)Whole plant, (ii)Whole plant, (iii)Whole plant, (iv)Whole plant	(i)Powder & take with pap, (ii)Powder & take with pap, (iii)Decoction & drink, (iv)Powered & take with pap	(i)1-2 teaspoonful,(ii) 1-2 teaspoonful,(iii) ½ cup,(iv) 1-2 teaspoonful	(i)2 times a day for 5-7 days., (ii)2 times a day for 5-7 days.,(iii) 2 times a day for 5-7 days.,(iv) 2 times a day for 5-7 days.
9.	<i>Parkia biglobosa</i>	Dorowa (h) Igba (y)	(i)Syphilis, (ii)Stomach ache, (iii)Jinn attack, (iv)Rashes (v)Measles, (vi)for poison for catch Fishes, (vii)For high blood pressure	(i)Leaf, (ii)Leaf, (iii)Leaf, (iv)Bar, (v)Young leaf, (vi)Yellow Powder, (vii)Seeds	(i)Decoction & drink, (ii)Decoction & drink, (iii)Decoction & bath with it , (iv)Pound with onion & drink, (v)Pound & apply on the body & drink,(vi) Apply on the pound, (vii)Fermented to “dawadawa” (viii)	(i)1 cup, (ii)½ a cup,(iii) One bucket,(iv) 2 teaspoon, (v)½ cup, (vi)Large quantity, (vii)Eaten in large quantity	(i)2 times a day 5-7 days, (ii)2 times a day for 5 days, (iii)Once a day for 7 days.,(iv) 2 times a day for 7 days, ,(v) Apply at regular interval for 3 days,(vi) drink once a day for 3 days,(vii) At regular interval until it cured
10.	<i>Azizelia africana</i>	Africa Kawo (h), Apa (y)	(i)Unstable pregnant (ii)witch attack, (iii)Miscarriage, (iv)Sore throat	(i)Leaves, Bark & (ii)leaves, (iii)Leaf, (iv)Seed	(i)Decoction & drink with it, (ii)Decoction & bath, (iii)Decoction with red potash & drink, (iv)Calculations & squeezed in water & drink	(i)½ cup, (ii)One bucket, (iii)½ cup, (iv)¼ cup	(i)2 times a day for 6 days, (ii)Once a day for 7 days,(iii) 2 times a day for 7 days,(iv) 2 times a day 2- 3 day.

H=(Hausa) Y=(Yoruba) K=(Kamberi) B=(Bussa) A cup =(500ml)

The indiscriminate collection of medicinal plants is an implication for environmental conservation for sustainable use of the resources. It should be borne in mind that forest begins with trees, therefore trees should be planted and abuse of the natural forest should be frowned. There is high level of illiteracy among herbal material traders in the

northern Nigeria which could be an advantage to propagate the campaign for environmental resources conservation for sustainability. Tree planting campaign should be stepped up in Northern Nigeria and the government should provide highly subsidized tree seedling to farmers to encourage them.

TABLE 3: Phytochemical Result

S/no	Identification	Alkaloids	Flavonoids	Tannins	Phlbotannins	Saponin	Anthraquinones
1.	<i>Acacia nilotica</i>	+	+	-	+	+	-
2.	<i>Acacia polyacantha</i>	+	-	+	-	+	-
3.	<i>Senna occidentalis</i>	+	-	+	-	+	-
4.	<i>Danielia oliveri</i>	+	-	+	+	+	+
5.	<i>Entanda Africana</i>	+	+	+	+	+	-
6.	<i>Piliostigma thonnigii</i>	+	+	+	+	+	+
7.	<i>Prosopis Africana</i>	+	+	+	+	+	+
8.	<i>Mimosa pudica</i>	+	-	-	-	+	+
9.	<i>Parkia biglobosa</i>	+	-	+	+	+	+
10.	<i>Azelia Africana</i>	+	-	+	-	+	-

Source: Field survey 2012

CONCLUSION

The results from this studies revealed that people living in the rural areas still dependant much on tree plants species for the remedies of ailments and diseases. However, the phytochemical analyses carried out shown that the plants specimen holds tremendous significant chemical ingredients that can be used in day- to- day health care delivery.

The study also revealed that there are high diversity of medicinal uses of sampled species and traditional knowledge in the study area. The indication which shows that, the decline in the knowledge of plant used by the younger age may gradually lead to fading away of the indigenous knowledge associate with the plants. Conclusively, it could be said that the leguminoseae are relatively rich herbal medicinal plants of northern Nigeria as the ethnobotanical analysis of the selected plants proved it

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