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Ethnobotanical survey of medicinal plants used in treatment of tuberculosis in Bauchi state Nigeria

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Abstract
The research is aimed at conducting an ethnobotanical survey of medicinal plants used in the management of tuberculosis and other respiratory diseases in Bauchi State. Research designed ethnobotanical Survey Questionnaires were administered to registered and non-registered members of traditional medicine practitioners association in some LGAs and the questionnaires were collected on the spot. The ethno-botanical survey of medicinal plants used by traditional herbalists in the treatment of tuberculosis and other respiratory diseases in Bauchi State showed that there are many plants (both Local and Botanical names were presented in table 1) and parts of the plants are used by the herbalists in the treatment of the ailments. It also showed that some plants were cited many times than other plants for a specific ailment probably due to its curative effects. A total of 48 plants were reported in the study. These plants were used by the herbalists to manage tuberculosis and other respiratory diseases (Table 2). The ailments considered in the survey are; Asthma, cough, cold, catarrh, chest pain, sore throat and tuberculosis (TB) in the three senatorial zones in the state. Plants that recorded number of citations ≥ 9 were considered for further investigation. Fourteen (14) plants have recorded high citation among all plants reported and the parts of these plants which are used by the herbalists were recommended for extraction and further studies.

Keywords: ethnobotanical survey, respiratory diseases, medicinal plants

Introduction
Plants are natural reservoirs of chemical compounds that are useful to man not only as food ingredients but also as source of medicines or remedies for the numerous human ailments. The different parts of plants have proven therapeutic potential for the treatment of many diseases hence using plants for medicinal purposes is an important aspect of many cultures and traditions in most part of the World (Sofowora, 1993) [12].
Despite the influence of orthodox medicines the use of medicinal plants has remained a very important aspect of health care delivery system especially in rural areas. It was reported that 80% of world's population relies on traditional medicines as primary source of their medication (Newman, 2006) [2]. About 25% of prescription drugs sold in USA contain active ingredients derived from plants(WHO, 2008) [15].
Medicinal plants are plants with medicinal activity based on some ethnobotanical information. These plants have been used in the treatment of many diseases (Akinniyi and Tella, 1991) [1] and clinical success of drugs obtained from plants has rekindled interest in research into medicinal plants as potential sources of new drugs. In some countries like China, India and Vietnam the research in to medicinal plants has been fully developed and plant-based remedies have been incorporated as alternative or complementary medicines to supplement the modern drugs (Tanaka, *et al*., 2010) [13]. However, in Nigeria like in most African countries the research into medicinal plants has not been given a desire attention as such the therapeutic potentials of these natural endowments were under-utilized (Ogundaini, 2005) [11]. In fact, research suggests that there are phytochemical agents in these plants which work together with nutrients found in vegetables, fruits and nuts that may even slow the aging process, prevent the risk of or cure many diseases such as heart diseases, diabetics, high blood pressure, cancer, tuberculosis, cataracts and urinary tract infections(Iwu,1993) [4]. There were several plant extractives that demonstrated significant inhibitory activity against microscopic pathogens like bacteria, fungi and viruses (Kubmarawa *et al.*, 2007; Tanaka *et al*., 2010) [6, 13].
Bauchi State is one of the thirty-six states of Nigeria. The state occupies a total land area of 49,119km^2 representing approximately 5.3% of Nigeria's total land mass. It is located between latitudes 9° 3′ and 12° 3′ north and longitudes 8° 50′ and 11° east. The state has 20 local government areas (LGA) and is bordered by seven states, Kano and Jigawa to the North, Taraba and Plateau to the South, Gombe and Yobe to the East and Kaduna to the West. Kare-Kare, Ningawa, Gyarawa, Jarawa and Hausa-Fulani are predominant communities in Bauchi State. In fact, these communities are well-known in Nigeria for combining orthodox and traditional medicines especially in the treatment of witches, asthma, leprosy, tuberculosis, jaundice and other respiratory diseases. Plants which are effective or frequently prescribed may contain phytochemicals that are potential drug or lead-drugs and could be recommended for further studies (Koua, *et al*., 2011) [5].

Materials and Method
Materials Required: Digital camera, GPRS for coordinates

location, papers, Laptop computer, Printer, Polythene bags (small and big sizes), Questionnaires, Oven and Fridge.

Methodology

Research methodology is an aspect of research work aimed at guiding the research on how to collect, interprets and analyzes data for decision making. In this work, this chapter discusses the kinds of procedures followed for collection of data, analysis of samples and interpretation of results.

Ethno botanical survey

The method described by Mann, *et al* (2007) [8] was adopted for the study. Ethnobotanical survey of medicinal plants used in the treatment of tuberculosis and related diseases was conducted using a designed questionnaire and oral interviews to seek information on the traditional uses of the plants from indigenous herbalists and elderly people with the knowledge of the herbs and curative properties. See appendix 1 for the sample questionnaire used in the study. The research team visited the three senatorial zones of the state that is Bauchi south, Bauchi central and Bauchi north. The distribution of the questionnaires and oral interviews were carried out in both rural and urban areas. Some village markets and herbal trading centre in the town of Azare, Bauchi, Ningi and Dass were also visited. The team interviewed both registered members and non-members of traditional medicine practitioners association (TMPA). The local names of plants obtained were recorded in Hausa language because Hausa is the most widely spoken language in the study areas visited.

Results and Discussion

Table 1 shows the result of the ethnobotanical survey of medicinal plants used by traditional herbalists in the treatment of tuberculosis and other respiratory diseases. It shows the names of the plants (Local and Botanical) and the parts of the plants used by the herbalists in the treatment of the ailments.

Table 1: Ethnobotanical survey of medicinal plants with the plant parts commonly used.

S/NO.	Local name(hausa)	Botanical name	Parts of plant used
1.	Gonda	Carica papaya	Root, Stem
2.	Sanya	Securidica longepedunculata	Root
3.	Ararrabi	Boswelia dalzielii	Stembark
4.	Kargo	Pilostigma reticulatum	Leaves
5.	Mangoro	Mangifrera indica	Stembark, Leaves
6.	Zuwo	Celtis integrifolia	Stembark
7.	Tumfafiya	Calotropis procera	Root
8.	Chediya	Ficus thonningii	Stembark, Leaves
9.	Kadanya	Vitellaria paradoxa	Stembark, leaves, Root
10.	Dauda-dauda	Stylosanthes erecta	Leaves
11.	Madaci	Khaya senegalensis	Stembark
12.	Marke	Anogeissus leocarpus	Stembark
13.	Dondoya	Ocimum basilicum	Root
14.	Hankufa	Waltheria indica	Leaves, Root
15.	Aduwa	Balanites aegyptica	Leaves, Fruits,
16.	Gawo	Acacia albida	Stembark
17.	Duman Rafi	Ipomoea aesarifolia	Leaves
18.	Kirya	Prosopis Africana	Stembark
19.	Kukkuki	Sterculia setigera	Stembark, Leaves
20.	Maje	Daniellia oliveri	Root
21.	Tsamiya	Tamarindus indica	Stembark, Root
22.	Dorawa	Parkia biglobosa	Stembark
23.	Dinya	Vitex doniana	Stembark, Leaves
24.	Kargo	Pilostigma reticulatum	Leaves
25.	Gabaruwa	Acacia nilotica	Stembark, Fruit
26.	Sabara	guiera senegalensis	Root
27.	Kuka	Adansonia digitata	Stembark
28.	Matsagi	Dalbergia melanoxylon	Stembark
29.	Gwaiba	Psidium guajava	Leaves
30.	Taura	Detarium microcarpum	Stembark
31.	Gurjiya	Bombax costatum	Stembark, Root
32.	Kanya	Diosphyros mespiliformis	Stembark
33.	Majamfari	Cassia occidentalis	Root, Leaves
34.	Garahunu	Mormodica charantia	Leaves, Root
35.	Lemo	Citrus sinesis	Leaves
36.	Gamji	Ficus platyphylla	Stembark
37.	Minjirya	Erythrina senegalensis	Stembark
38.	Gwandar daji	Annona senegalensis	Stembark, Root
39.	Makasa	Striga hermonthica	Wholeplant
40.	Alilliba	Cordia Africana	Stembark, Fruits
41.	Bita da Zugu	Jatropha curcas	Root

42.	Gauta	Solanum incanum	Root, fruits
43.	Giginya	Phoenix dactylifera	Root
44.	Tawatsa	Entada Africana	Stembark, Root
45.	Nonon Kurciya	Euphorbia hirta	Whole plant
46.	Tsada	Ximenia Americana	Stembark, Root
47.	Giyayya	Mitragyna inermis	Stembark, leaves
48.	Kimba	Xylopia aethiopica	Root

Table 2 shows the number of citation of each plant for a specific ailment during the survey of the medicinal plants used for the treatment of tuberculosis and other respiratory diseases. The ailments considered in survey are; Asthma, cough, cold, cartarrh, chest pain, sore throat and tuberculosis (TB) in the three senatorial zones in the state.

Table 2: Medicinal plants and number of citation of each plant for the ailments targeted in the study

	Number of citations of each plant for a specific ailment(s)							**Total**
Name of plants	**Asthma**	**Cold**	**Cough**	**Cartarrh**	**Chest pain**	**Sore throat**	**TB**	
Carica papaya	1	1	2	0	3	1	1	9
Securidica longepedunculata	1	2	1	0	3	0	1	8
Boswelia dalzielii	1	0	2	0	2	0	4	9
Citrus sinesis	1	2	2	0	3	0	1	9
Mangifrera indica	0	0	2	1	0	1	0	4
Celtis integrifolia	0	1	3	0	2	2	0	8
Calotropis procera	0	0	1	0	1	1	0	6
Ficus thonningii	0	1	1	1	0	1	1	8
Vitellaria paradoxa	1	0	0	0	1	0	3	12
Stylosanthes erecta	0	1	2	0	1	2	0	6
Khaya senegalensis	1	0	1	0	2	1	2	7
Anogeissus leocarpus	1	0	2	1	1	1	2	8
Ocimum basilicum	0	0	0	1	1	0	1	6
Waltheria indica	1	0	1	0	2	0	3	10
Balanites aegyptica	0	2	1	0	1	3	1	8
Acacia albida	1	1	2	0	2	0	0	6
Ipomoea aesarifolia	0	1	1	1	0	2	0	5
Prosopis Africana	0	1	1	0	1	0	0	3
Sterculia setigera	0	2	2	0	2	1	0	7
Daniellia oliveri	0	2	0	1	0	1	0	4
Tamarindus indica	1	0	2	0	3	2	3	11
Parkia biglobosa	0	1	3	0	1	3	0	8
Vitex doniana	0	2	1	0	0	1	0	4
Pilostigma reticulatum	2	0	2	0	1	2	3	10
Acacia nilotica	0	2	3	1	1	1	0	8
Guiera senegalensis	0	0	0	0	2	1	0	3
Adansonia digitata	0	1	1	1	0	1	0	4
Dalbergia melanoxylon	1	2	1	1	0	1	1	7
Psidium guajava	0	2	1	0	1	1	0	5
Detarium microcarpum	1	0	1	1	0	2	1	6
Bombax costatum	0	1	1	1	1	2	0	6
Diosphyros mespiliformis	0	0	2	0	2	1	0	5
Cassia occidentalis	0	1	0	1	1	0	0	3
Mormodica charantia	0	3	2	0	1	2	1	9
Ficus platyphylla	1	0	2	1	0	3	2	9
Erythrina senegalensis	2	1	3	1	2	1	3	13
Annona senegalensis	0	1	1	0	0	1	1	6
Striga hermonthica	2	0	2	3	1	0	4	12
Cordia Africana	1	0	2	1	1	0	0	5
Jatropha curcas	1	1	2	0	2	2	1	9
Solanum incanum	0	0	1	0	1	1	0	3
Phoenix dactylifera	0	0	2	0	2	0	1	5
Entada Africana	0	1	2	1	1	2	3	10
Euphorbia hirta	2	0	1	2	2	0	4	11
Ximenia Americana	0	1	2	1	2	1	3	10
Mitragyna inermis	0	1	1	2	0	0	1	5
Xylopia aethiopica	0	0	3	0	2	2	1	8

Many plant species in Nigeria were reported to be used in traditional medicine for treating of respiratory diseases such as asthma, catarrh, chronic bronchitis, cough, hay-fever, hemoptysis, pneumonia, pulmonary disorders and tuberculosis (Gill, 1992, Ashidi, *et al*.,1997) [3, 2]. The study conducted on the medicinal plants used by local communities and traditional herbalists in Bauchi state has shown that the plants reported could have therapeutic effects on the ailments but no scientific evidence is available. This study indicated that several medicinal plants are known to be use in the management of diseases traditionally not only in rural communities but even in urban areas. The herbalists are in this business for quite long time this has actually helped them to acquire the experience and the technical no how on the administration of herbs on their patients. The local communities relied on the traditional herbs due to their easy accessibility, low price and promising curative activity. The curative properties of medicinal plants are perhaps due to the presence of various secondary metabolites (Sofowora, 1993) [12]. Therefore, apart from giving an insight into valuable medicinal plants, further screening of different parts of medicinal plants would be required for evaluation of the pharmacological activities of a plant.

In conclusion the findings of this research study suggest that these plants might contain important therapeutic properties which could be the reason for their folkloric uses in the local communities for the treatment of respiratory ailments and tuberculosis. The researchers recommended for further studies on the anti tuberculosis and antimicrobial activities of the crude extracts of the 14 plant samples reported in the study.

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