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ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED IN THE TREATMENT OF CANCER IN DUTSIN-MA LOCAL GOVERNMENT AREA OF KATSINA STATE, NIGERIA

***Okunola, O. J., Ali, T. and Bello, O. M.**

Department of Applied Chemistry, Federal University Dutsin-ma, Katsina State, Nigeria

*Corresponding author's email: ookunola@fudutsinma.edu.ng

ABSTRACT

Ethnopharmacological surveys showed that herbal remedies and their products are mostly preferred type of alternative and complementary medicine (ACM) globally. In Dutsin-Ma Local Government Area (LGA) like other places herbal remedies are popularly employed against many ailment including tumor and cancer. Therefore, this study aimed to report and document the ethnobotanical survey of the plants used in the management of tumor and cancer in Dutsin-Ma Local Government Area of Katsina State, Nigeria. Traditional medicine practitioners (TMPs) living within the area of study were cross-examined by employing questionnaires forms and key informant survey. Forty-two (42) different plant species were discovered to be employed against cancer and tumor management. The results obtained showed the parts of plant used for the herbs include; roots (4), bark (10), whole plant (13), seeds (5), fruits (3), stem (1) and leaves (6). The plant families Leguminosae caesalpinoideae and Leguminosae mimosoideae appeared more in the ethno-surveyed plant list though other families are involved. Many of these plants are mix together as storehouses for active compounds which may be good template for cancer and tumor management. The preparation of the remedies include; grinding to powder form then dispersing in either water or milk for drinking, or either mix with shear butter or water and administered on the affected part of the body. The reports showed that the herbal remedies indentified are effective for the treatment of cancer in Dutsin-Ma local government area. Hence, it is imperative for ethnobotanists and chemists to establish the toxicity and efficacy of these plants

Keywords: Ethnobotanical, Survey, Cancer, Dutsin-Ma, Leguminosae caesalpinoideae

INTRODUCTION

Cancer is one of the principal cause of death globally, world's second leading cause of death and is responsible for reported deaths of 9.6 million in 2018. About one in six deaths worldwide were due to cancer. Approximately 70% of cancer deaths happen in low- and middle-income countries. (WHO, 2018). In last few years, reports of deaths from cancer ailments have continued to send cold shrills down the spines of many Nigerians. There is a pervasive concern and apprehension over the high incident rate of the disease amongst people of various strata of the society. Cancer is no respect for age or social status, the young and the old as well as the poor and the rich are susceptible to infection (Independent News, 2017).World Health Organization (WHO) report indicates that Nigeria has an estimated 10,000 cancer deaths annually, with no few than 250,000 new cases being recorded yearly. Judging by the high number of cases recorded across the country on annual basis, cancer has gradually become an endemic plague requiring a national emergency (Independent News, 2017).

Good health is the most important thing and the basis for happiness in people. The employment of herbal medicine against diseases and illness is a constituent of body balance systems and has turnout to be an integral part of people's cultural life and traditional heritage (Amupitan, 2013). Since its development, many groups have therefore developed new traditional systems exploiting locally available plant and animals resources to address health issues (Adesina, 2008).

Herbal remedies have long been accepted by human as one of the oldest types of medicine (Eisenberg *et al*., 1998). Despite advances in modern medicine many people in third world countries often depend on traditional therapeutic methods and medicinal plants for their daily healthcare needs (Ojewole, 2004).

Moreover, there is little report on the vast indigenous unexplored medicinal plants of Dutsin-Ma, Local Government Area (LGA), Katsina State despite its rich ethnomedicinal heritage. This calls for survey of medicinal plants of the study area in order to generate a data base for anti-cancer plants. The need for cheap and affordable treatment approaches to fulfill the primary health care needs has increased demand for herbal drugs among people in rural areas.

Therefore, in order to obtain this knowledge, ethnobotanical survey needs to be enforced, the cultivation, uses and conservation of plants continues to be a significant part of people's live, so the need for this report. The research

subsequently gives more details to increasing awareness about the successful use of these local plants species.

MATERIALS AND METHODS

Dutsin-Ma is the headquarters for Dutsin-Ma LGA in Katsina State, Nigeria. The town lies within the 12°27′18″N 7°29′29″E and covers an area of 527 km^2 (203 sq metres). About nineteen (19) districts comprises of this LGA. A preliminary study was carried out to identify the traditional medicine practitioners (TMPs) in the local government using the traditional medicine Union leader. A total number of twenty (20) traditional medicine practitioners (TMPs) were identified in sixteen (16) districts out of the nineteen (19) district in the LGA as shown in Figure 1. Hence, a well designed structured and open-ended questionnaire was administered to the TMPs to derived information regarding plants used for treatment of cancer, mode of preparation and administration using guided dialogue techniques in Hausa language – local dialect of the TMPs. The designed questionnaire was validated by the discussant groups which include experts in the research area. Plants used by the TMPs are collected and botanically identified. The plants identification was done by Umar Shehu Gallah herbarium consultant and plant taxonomist at Deaprtment of Biological Science, Ahmadu Bello University, Zaria, Nigeria. Voucher specimens of the plants were deposited in the herbarium. Data obtained from the questionnaires were analyzed using descriptive statistics.

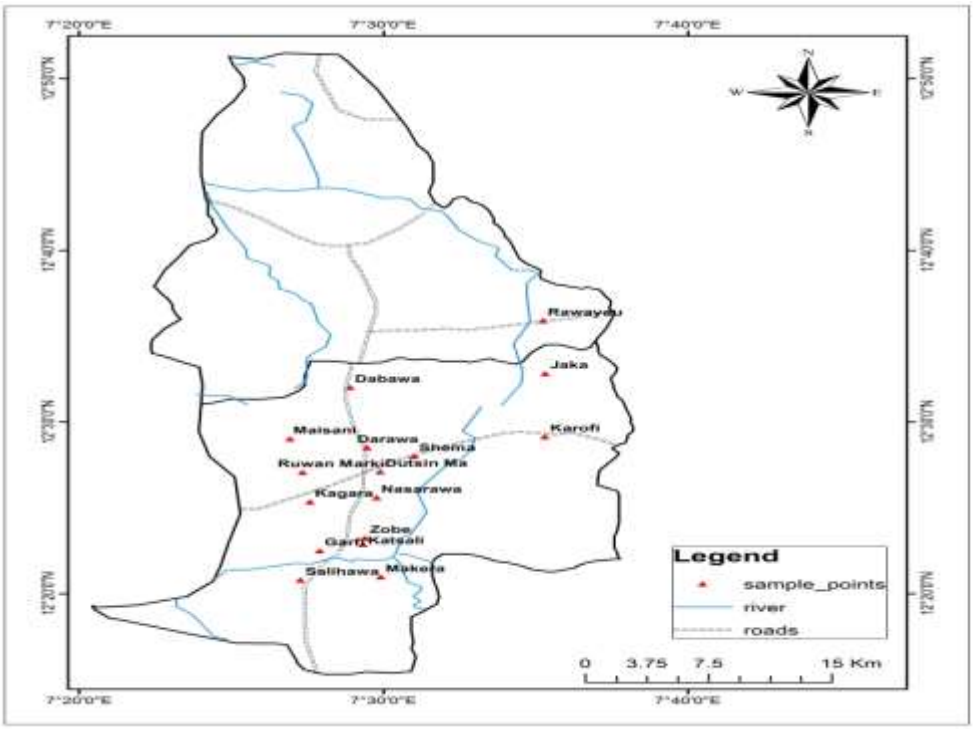

Figure 1: Map of Dutsin-Ma LGA showing the sampling points.

RESULTS AND DISCUSSION

A total of 42 plant species belonging to 32 families were used as medicinal plants in the study area as shown in Table 1. From Figure 2 *Leguminosae*, *caesalpinoideae* and *mimosoideae* occurred more but the incidence of other families also indicates the significance of all those families as sources of useful organic compounds that can be investigated for drugs in cancer management. However, *leguminosaecae salpinoideae* have been documented to be used for the treatment of cancer among others (Burkil, 1995; Deeni and Sadiq, 2002; Olapade, 2002; Soladoye *et al.*, 2010; Traore, 2000). Fabaceae or Leguminosae is with over 600 genera and 17 900 species, it is renown to be the third largest family of flowering plants (angiosperms), followed by Orchidaceae and Asteraceae or Compositae. Plants of this family are rich in phytoconstituents which make them effective therapeutic agents for various diseases.Secondary metabolites from the plants of this family have been reported for their cytotoxicity against various human cancer cells (Kumar *et al.*, 2011; Rayanil *et al.*, 2011). The family leguminosae is also divided into 3 subfamilies papilionodae, caesalpinioideae and mimosoideae. *Leguminosaecae salpinioideae* and mimosoideae are reputed to have diverse characteristics and activities i.e. anticancer (Salem *et al.*, 2011)

Also, Table 1 describes the parts of plant used for the herbs, these include; roots (4), bark (10), whole plant (13), seeds (5), fruits (3), stem (1) and leaves (6). This corroborate with similar study reported by Soladoye *et al.* (2010), that quite a number of

plant parts in particular the leaves, roots, barks and seeds were found to be efficient in cancer management.

The popular parts of plant species employment in the treatment of cancer is the whole plant (31%) followed by the bark (24%), leaves (14%), seed (12%), roots (10%), fruits (7%) and lastly the stem (2%) as shown in Figure 3. Fresh or air-dried parts of the plants were employed by majority of the TMPs. Sustainable methods of harvesting were employed by the TMPs to protect the medicinal plants from obliteration and overutilization (Ochwang'I *et al.*, 2013).

From this study, 42 plants belonging to 32 families employed in the treatment of cancer and tumour in Dutsin-Ma L.G.A. Some of these medicinal plants have been reported in the treatment of cancer notably amongst these are *Securidaca longipedunculata* Fresen, also called violet tree in English. Ngulde *et al.* (2019) reported the activity of ethanol extract of *S. longipedunculata* against Brain Tumor (U87) Cells. The ethanol extract of the root bark of *S. longipedunculata* inhibited proliferation of U87 cell line and induced apoptosis by cleavage of PARP (Ngulde *et al.*, 2019).

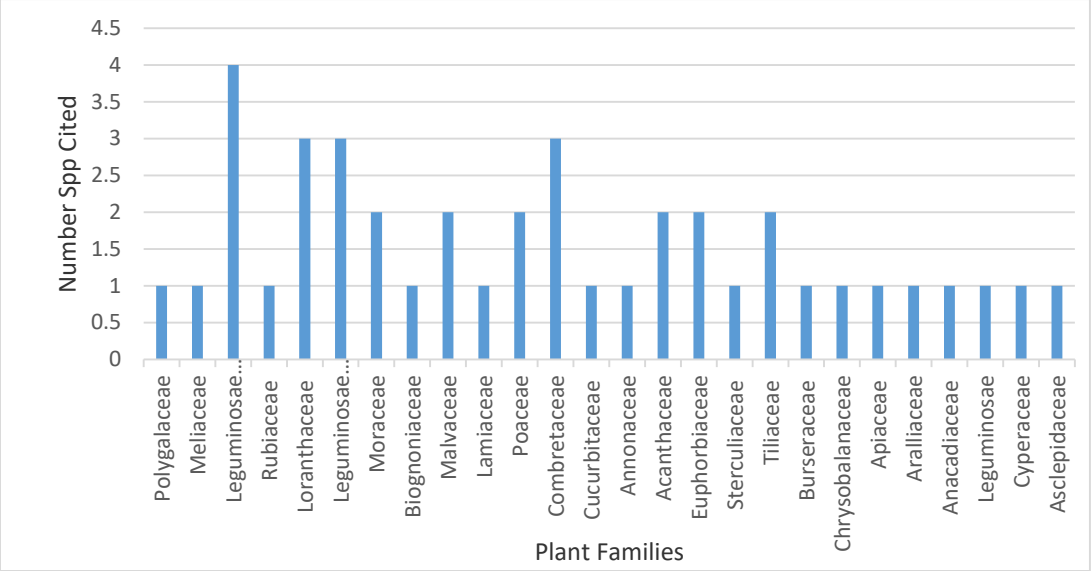

Figure 2: Frequency of plant families employed against Cancer in Dutsin-Ma L.G.A

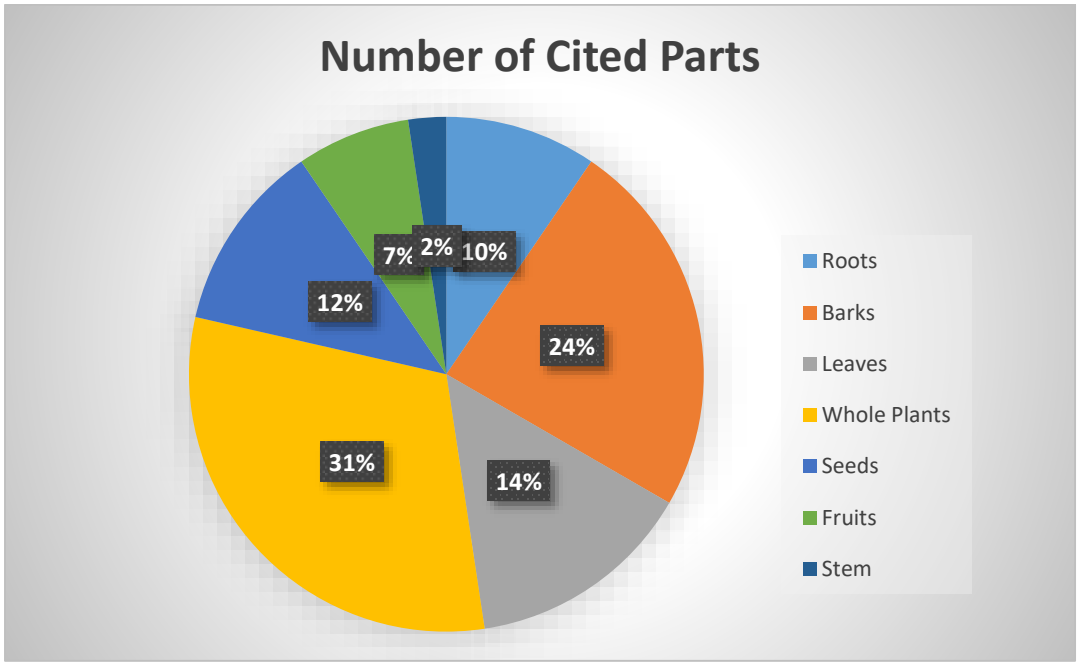

Figure 3: Frequency of parts from the medicinal plants surveyed

The crude extract and isolated constituents of the *Dichrostachys cinerea* bark was also reported against multifactorial drug-resistant Cancer Cells by Mbaveng *et al., (*2019). The betulinic acid and 6-hydroxy-2-(4-hydroxyphenyl)-4H-chromen-4-oneisolated from *D. cinera*showed cytotoxic effects towards the 9 tested cancer cell lines with IC_{50} below 50 µM (Mbaveng *et al.,*2019). Tatematsu *et al.* (1991) reported two cytotoxic secondary metabolites isolated from *Securinega virosa* i.e. virosecurinine and viroallosecurinine. These isolated alkaloids showed significant cytotoxicity with ED_{50} of2.9 and 0.9 pg/mL in *in vitro* P-388, respectively (Tatematsu *et al.,* 1991).

Furthermore, Table 2 presented the preparation and administration of the medicinal plants for the treatment of cancer. The most frequent method of preparation in the study area is by decoction as shown in Table 2. All the plants are grinded to powdered form before either dispersing in water or milk for drinking or either mix with shear butter or water and applied on the affected part of the body.

CONCLUSION

It was observed that Dutsin-Ma LGA has species of plants for the treatment of cancer. The plants were also corroborated by other literatures as having anti-cancer agent. The utilization of herbal products is associated with educational level, time, point of diagnosis, it looks as if most of the TMPs are satisfy with their prognosis i.e. the use of these plants. It is imperative for ethnobotanists and chemists to establish the toxicity and efficacy of these medicinal plants identified scientifically. The primary challenge in the utilization of herbal remedies is the lack of appropriate quantification and standardization, quality control, good safety measures as well as adulteration with orthodox medicine (WHO, 1998, 2003). Our medical health practitioners should also focus attention on more cancer and tumour research on medicinal plants which can save the lives of our people.

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Table 1: Identification of medicinal plants, used by traditional medicine practitioners (TMP's) as anticancer agent in the study area

S/N	Voucher No	Hausa Name	Botanical/Scientific Name	Family name	English name	Parts Used
1.	6782	Sanya	*Securidaca longipedunculata*	Polygalaceae	Violet Tree	Roots
2.	1342	Madachi	*Khaya ivorensis*	Meliaceae	Balsam tree	Bark
3.	1614	Maje	*Daniellia oliveri*	Leguminosae caesalpinoirea	Doka	Bark
4.	1532	Goga Masu	*Mitracarpus scaber*	Rubiaceae	Mitracarp	Whole plant
5.	5211	Bagaye	*Cadaba Farinosa*		Cadaba	Roots
6.	3221	Kaucin Bagaruwa	*Tapinanthus voltensis*	Loranthaceae	Mistletoe	Whole plant
7.	6319	Dundu	*Dichrostachys cinerea*	Leguminosae mimosoideae	Double flower	Roots
8.	5441	Kaucin Kalga	*Topinanthus dodoneifolius*	Loranthaceae	Mistletoe	Whole plant
9.	8494	Kaucin Kadanya	*Topinanthus dodoneifolius*	Loranthaceae	Mistletoe	Whole plant
10.	5404	Gamji	*Ficus platyphylla*	Moraceae	Fig tree	Bark
11.	1781	Tsamiya	*Tamarindus indica*	Leg: Caesalpinoideae	Tamarind	Bark
12.	1911	Runhu	*Senna singueana*	Leg: Caesalpinoideae	Sinq senna	Seeds
13.	9598	Gawo	*Acacia albida*	Leguminosae mimosoideae	Fodder tree	Bark
14.	8079	Sansami	*Stereospermum kunthianum*	biognoniaceae	Kunths stereosperm	Bark
15	2011	Dorawa	*Parkia biglobosa*	Leg: mimosoideae	Locust bean tree	Bark, seeds
16	6119	Shirinya	*Ficus iteophylla*	Moraceae	Tiny leaved fig	Bark
17	2025	Rai dore	*Senna occidentalis*	Leg: caesalpinoideae	Coffea senna	Whole plant
18	9010	Auduga (karmo)	*Gossypium persicum*	Malvaceae	Wild cotton	Fruits
19	6052	Busurun Fadama	*Hyptis pecutinata*	Lamiaceae	Pectinate hyptis	Whole plant
20	1491	Bokai	*Eragorastis Tenella*	Poaceae	Love grass tiny	Whole plant
21	2016	Sabara (Galls)	*Guiera senegalensis*	combretaceae	Senegal guiera	Fruits
22	5154	Fasarfafu	*Sida cardifolia*	Malvaceae	Broom weed	Leaves
23	8013	Tarauniya	*Combretum collinum*	Combretaceae	Collinum combretum	Leaves
24	2520	Sawun dawa	*Sorghum tricolour*	Poaceae	Guinea corn	Roots
25	3725	Kauchin sarkakiya	*Tapinanthus voltensis*	Loranthaceae	Mistletoe	Whole plant
26	7591	Daddawar guna	*Cucumeropsis*	Cucurbitaceae		Seeds
27	1216	Ginadan Daji	*Annona senegalensis*	Annonaceae	Custard apple	Leaves
28	4577	Zazar giwa	*Hygrophila auriculata*	Acanthaceae	Auricul hygrophila	Whole plant
29	6613	Tunya	*Euphorbia desmondii*	Euphorbiaceae	Desmond euphorbia	Leaves
30	2356	Kukuki	*Sterculia setgera*	Sterculiaceae	Setiger sterculia	Fruits
31	1617	Kaucin sarkakiya	*Tapinanthus globiferus*	Loranthaceae	Mistletoe	Whole plant
32	1113	Kakaya	*Triumphetta cordifolia*	Tiliaceae	Triumphetta	Leaves
33	8294	Dashi	*Commiphora pendunculat*	Burseraceae	Commiphora	Bark
34	4403	Taruri	*Parinari curatellifolia*	chrysobalanaceae	Parinary	Seeds
35	9099	Algaris	*Nigella sativa*	Apiaceae	Black seed	Seeds
36	2217	Hannu	*Steganotonia aralliaece*	Aralliaceae		Bark
37	4048	Kwaro Faru	*Lannea acida*	Anacadiaceae		Seeds
38	3031	Tsa gwiwar kare	*Securinega virosa*	Euphorbiacea		Roots
39	1610	Dakwara	*Acacia polyarcantha*	Leguminosae		Leaves
40	9062	Turen gulbi	*Cyperus articulatae*	Cyperaceae		Whole plant

41	9095	Fataka	*Perugularia tomentosa*	Asclepidaceae	Whole plant
42	6430	Marke	*Annogeissus leiocanpus*	Combretaceaae	Stem

Table 2: Preparation and Administration of medicinal plants used by traditional medicine practitioners (TMP's) as anticancer agent in the study area

S/N	Voucher No	Hausa Name	Botanical/Scientific Name	Family name	Preparation/Administration
1.	6782	Sanya	*Securidaca longepedunculata*	Polygalaceae	Powdered and make a paste with minimum amount of water and apply on affected part
2.	1342	Madachi	*Khaya ivorensis*	Meliaceae	Powdered and make a paste with minimum amount of water and apply on affected part
3.	1614	Maje	*Daniellia oliveri*	Leguminosae caesalpinoirea	Powdered and mix with shear butter as ointment and apply on affected part
4.	1532	Goga Masu	*Mitracarpus scaber*	Rubiaceae	Powdered and make a paste with minimum amount of water and apply on affected part
5.	5211	Bagaye	*Cadaba Farinosa*		Powdered and make a paste with minimum amount of water and apply on affected part
6.	3221	Kaucin Bagaruwa	*Tapinanthus voltensis*	Loranthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
7.	6319	Dundu	*Dichrostachys cinerea*	Leg: mimosoideae	Powdered and suspended in water and drink
8.	5441	Kaucin Kalga	*Topinanthus dodoneifolius*	Loranthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
9.	8494	Kaucin Kadanya	*Topinanthus dodoneifolius*	Loranthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
10.	5404	Gamji	*Ficus platyphylla*	Moraceae	Powdered and suspended in water and use for bath
11.	1781	Tsamiya	*Tomarindus indica*	Leguminosae Caesalpinoideae	Powdered and suspended in water and drink
12.	1911	Runhu	*Senna sinqueana*	Leguminosae Caesalpinoideae	Powdered and make a paste with minimum amount of water and apply on affected part
13.	9598	Gawo	*Acacia albida*	Leguminosae mimosoideae	Powdered and make a paste with minimum amount of water and apply on affected part
14.	8079	Sansami	*Stereospermum kunthianum*	biognoniaceae	Powdered and make a paste with minimum amount of water and apply on affected part
15	2011	Dorawa	*Parkia biglbosa*	Leguminosae mimosoideae	Powdered and make a paste with minimum amount of water and apply on affected part
16	6119	Shirinya	*Ficus iteophylla*	Moraceae	Powdered and suspended in water and drink
17	2025	Rai dore	*Senna occidentalis*	Leg: caesalpinoideae	Powdered and make a paste with minimum amount of water and apply on affected part
18	9010	Auduga (karmo)	*Gossypium persicum*	Malvaceae	Powdered and make a paste with minimum amount of water and apply on affected part
19	6052	Busurun Fadama	*Hyptis pecutinata*	lamiaceae	Powdered and burn as incense
20	1491	Bokai	*Eragorastis Tenella*	Poaceae	Powdered and make a paste with minimum amount of water and apply on affected part
21	2016	Sabara (Galls)	*Guiera senegalensis*	combretaceae	Powdered and make a paste with minimum amount of water and apply on affected part
22	5154	Fasarfafu	*Sida cardifolia*	malvaceae	Powdered and make a paste with minimum amount of water and apply on affected part
23	8013	Tarauniya	*Combretum collinum*	Combretaceae	Powdered and make a paste with minimum amount of water and apply on affected part
24	2520	Sawun dawa	*Sorghum tricolour*	Poaceae	Powdered and make a paste with minimum amount of water and apply on affected part
25	3725	Kauchin sarkakiya	*Tapinanthus voltensis*	Loranthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
26	7591	Daddawar guna	*Cucumeropsis*	Cucurbitaceae	Powdered and make a paste with minimum amount of water and apply on affected part
27	1216	Ginadan Daji	*Annona senegalensis*	annonaceae	Powdered and make a paste with minimum amount of water and apply on affected part
28	4577	Zazar giwa	*Hygrophila auriculata*	acanthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
29	6613	Tunya	*Euphorbia desmondii*	Euphorbiaceae	Powdered and make a paste with minimum amount of water and apply on affected part
30	2356	Kukuki	*Sterculia setgera*	Sterculiaceae	Powdered and make a paste with minimum amount of water and apply on affected part

31	1617	Kaucin sarkakiya	*Tapinanthus globiferus*	loranthaceae	Powdered and make a paste with minimum amount of water and apply on affected part
32	1113	Kakaya	*Triumphetta cordifolia*	Tiliaceae	Powdered and mix with potash, then a paste with minimum amount of water and apply on affected part
33	8294	Dashi	*Commiphora pendunculat*	Burseraceae	Powdered and make a paste with minimum amount of water and apply on affected part
34	4403	Taruri	*Parinari curatellifolia*	chrysobalanaceae	Powdered and make a paste with minimum amount of water and apply on affected part
35	9099	Algaris	*Nigella sativa*	Apiaceae	Powdered and make a paste with minimum amount of water and apply on affected part
36	2217	Hannu	*Steganotonia aralliaece*	aralliaceae	Powdered and suspended in water and drink
37	4048	Kwaro Faru	*Lannea acida*	Anacadiaceae	Powdered and burn as incense
38	3031	Tsa gwiwar kare	*Securinega virosa*	euphorbiacea	Powdered and suspended in milk and drink
39	1610	Dakwara	*Acacia polyarcantha*	leguminosae	Powdered and make a paste with minimum amount of water and apply on affected part
40	9062	Turen gulbi	*Cyperus articulatae*	cyperaceae	Powdered and burn as incense
41	9095	Fataka	*Perugularia tomentosa*	Asclepidaceae	Powdered and make a paste with minimum amount of water and apply on affected part
42	6430	Marke	*Annogeissus leiocanpus*	Combretaceaae	Powdered and make a paste with minimum amount of water and apply on affected part