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ETHNOBOTANY UTILIZATION OF SHEA BUTTER (*Vitellaria paradoxa* C. F. Gaertn) IN TWO SELECTED LOCAL GOVERNMENT AREAS OF KADUNA, NIGERIA.

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ABSTRACT

The study investigated ethno-botany utilization of Vitellaria paradoxa in Kaduna State, Northern Guinea Savannah eco-region of Nigeria. One hundred and sixty (160) copies of questionnaire were randomly administered in two areas: Igabi (Mando, Afaka) and Chikun (Buruku, Udawa). The choice of the chosen study areas was greatly influenced by the concentration of the respondents (users and markets) and availability of the species. Data collected were analyzed using descriptive statistics. Results revealed that most respondents (34.3%) were between 21 – 30 years'age bracket and 49.52% were married with 38.1% having 11-15 household size. Majority of respondents (41.9%) of the had secondary education and 52.4% were herbs trader. V. paradoxa was a valuable ethno-medicinal plant species in the study area and it was being used in treatment and prevention of various ailment such as yellow fever (82.50%); bees and wasp stings (77.50%); treatment of wound (100%); waist pain (90.00%); skin problem (86.25%); rheumatism (86.25%); bone dislocation and fracture (96.25%); back ache (71.25%); arthritis (100%) and pain killer / reliever (86.25%) Methods of application employed by the respondents include; rubbing (100%); direct on the wound (86.70%); mix with cream / lotion (100%) and inhaling in hot water (93.30%). Aboriginal utilization investigated shown that majority of the respondents used V. paradoxa oil for cooking (57.5%); soap making (86.70%); wood preservation (15.00%); cake baking (17.50%); jam making (57.5%) and cosmetics (61.70%).-The percentage of male was 46.7% while that of their female counterpart was 53.3%. The aboriginal processing techniques commonly used by the respondents include: picking/harvesting of fruits(67%), washing of fruits (97%), de-pulping (100%), drying(100%), seed selection(63%), seed cracking (100%), roasting of kernels (76%), milling of kernels (100%), boiling of ground kernels (94%), kneading(80%), mixing (100%), filtration (100%), solidification (100%) and packaging (25%). It is recommended that for sustainability and conservation of the species, plantation establishment should be encouraged in all our forest reserves.

Keywords: Ethnobotany, Kaduna, Northern Guinea Savannah, Aboriginal Utilization, Processing

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INTRODUCTION

Aboriginal knowledge is part of the overall culture of aboriginal people (Warren,1991) and is vital to their survival (Dewes,1993). The search for sources of drugs in plants is on the increase with the industrialized nations taking the lead (Ugbogu *et. al.*, 2004). Nigerians including urban dwellers, who had once rejected the efficacy of the traditional medicine, are shifting base to medicinal plants (Adodo, 2004). In Africa, local people plant or preserve some trees on farms field and home because of benefits (food, wood, fodder, medicine, climatic amelioration and boundary

demarcation) that can be derived from such trees (Barrow, 1996; Boffa,1999). There is mounting pressure on tree species as source of wood, food, medicine, fuel wood among others as many people trade on their products (Akachukwu, 1997). It is common knowledge that a plant of known importance (such as food, medicine and shade to a region is often not easily destroyed when clearing for agricultural or building purposes (Bakare and Oguntola, 1993). There are large number of plants and animals whose parts are useful for different purposes. These include food, medicine, chewing sticks, household articles and feeds for animals (Adeyoju, 1981). Plant species contain some active ingredients such as alkaloids, phenols, tannins, cynogenic glucocides, terpenoids; because of their active ingredient, they have been used and found effective as sweeteners, anti-infections and anti-bacteria.

Vitellaria paradoxa Gaertn commonly called Shea butter grows in the wild and has a huge economic and ecological potential. Shea butter is an oil extract from the kernel of the shea nut produce of the shea tree. It is naturally rich in vitamins A, E and F (Okullo *et. al.,* 2010). *Vitellaria paradoxa* belongs to the family Sapotaceae. It is mainly found in parts of the derived Savannah, Guinea Savannah and parts of the Sudan Savannah zone. The leaves of *vitellaria paradoxa* are clustered at the ends of the stout twigs up to 24 cm long by 9 cm broad. The taproots of *V. paradoxa* usually penetrate to a depth of 0.7 - 1.0cm. Flowers of *V. paradoxa* are hermaphrodite; the fruit ripen between May and September. The fruit, which is green in colour, has fleshly edible pulp, which contains 0.7 - 1.3 g of protein and 41.2 g of carbohydrate (Bup *et. al.,* 2012). The fruit pulp is a particularly rich source of ascorbic acid. The iron and calcium content compare favourably having about 1.93 g/100 mg for iron and 36.4 mg/100 g for calcium (FAO, 1988b). The sugar content varies from 3-6% equally distributed between glucose, fructose and sucrose. The tree of *V. paradoxa* is up to 1 2m high. The wood is dull red, very heavy and hard, termite proof, difficult to work with, but taking a good polish. Shea butter is the main edible oil for the people of Northern Ghana, being the most important source of fatty acids and glycerol in their diet (Taiwah, 1999; Lovett, 2004; Hatskevich *et. al.*, 2011). It is used in the pharmaceuticals and cosmetics industries as an important raw material for the manufacture of soaps, candles and cosmetics. Shea butter is used as a sedative or anodyne for the treatment of sprains, dislocations and the relief of minor aches and pains. The brown solid that is left after the extraction of the oil and the hard-protective shell are used as a water proofing material on the walls of mud building, to protect them from the eroding forces the wind and rain. Shea tree has a great untapped capacity for producing copious amount of sap that can constitute an important source of raw materials for the gum and rubber industry (Booth, 1988). It is used as a rub to relieve rheumatic and joint pains. Shea butter is widely used to treat skin problems such as dryness, sun burns, burns, ulcer, and dermatitis (Merchand, 1988). Refuse water from the production of shea butter is used as a termite repellant. Leaves of *V. paradoxa* are used as medicine to treat stomach ache in children. The roots are used as chewing sticks in Nigeria. Roots and roots bark powder are used to make paste and taken orally to cure jaundice (Ampofo, 1983). Previously, shea butter is used in edible fats and margarine. Many countries across the sub-saharan Africa have in the recent past realized the important of aboriginal knowledge and the formidable task of documenting it before it is lost (Barrow,1996), there is still little research on the use of indigenous knowledge in aboriginal and ethno-botany utilization of economic indigenous species such as *V. paradoxa* in parts of Kaduna, Northern Guinea Savannah of Nigeria.

The aboriginal methods of processing shea butter are a critical safety value that has being created and developed out of necessity. According to Ibnouf (2008), aboriginal methods of food processing are used in agricultural operations as well as in solving food shortage, therefore aboriginal methods of processing of shea butter represent a valuable cultural capital and a concrete resource most rural peoples depend on. All around the world, rural populace has quite sophisticated aboriginal methods of food processing and preservations which are recognized to be more sustainable. Rural populace is known to possess aboriginal cultural practices which help to maintain household food security particularly in terms of drought and famine as well as to provide a reserve for extended period of economic hardship. Rural populace in Nigeria

particularly in Northern savannah utilize aboriginal methods of food processing and preservation because they are cheaper compared to modern techniques. Rural populace usually uses a diversity of simple and traditional food processing techniques to make a variety of traditional food products. These processing techniques help in preventing growth of the microorganisms that cause foods to decay. Rural populace particularly women have traditionally played a significant role in the extraction of shea butter, right from the stage of collection of shea nuts to final processing into shea butter. The aboriginal methods of food processing and preservation enable people in the rural areas to survive under stressful conditions. This collective insight is critical to the survival and future well-being of local communities and especially of aboriginal people as they try to maintain their livelihoods under difficult environmental conditions (Parrotta and Agnoletti, 2007). Aboriginal knowledge systems are at risk of becoming extinct because of rapidly changing natural environments and fast growing of technologies on a global scale. Adesiji *et al.* (2009) stated that many practices disappear only because of the intrusion of foreign technologies or development concepts that promise short-term gains or solutions to problems without being capable of sustaining them. Shea butter is mostly processed manually in Kaduna Northern Guinea Savanna eco-region and mostly by women in villages. (Ademola *et al.,* 2012). Because of values and affordability of shea butter as vegetable fat in shea producing areas and beyond, to adapt to the requirements of the local conditions and allow survival of the people in the rural areas. This paper therefore assessed some of the aboriginal uses and processing of *V. paradox* as valuable ethno medicinal plants species commonly used by the people of Kaduna State.

MATERIALS AND METHODS

Study area

The study was conducted in Igabi and Chikun Local government areas of Kaduna State. Igabi Local Government is located in the Guinea Savannah zone of Nigeria. It is located on latitude$10^0$47'55''and 10º46'41''N / longitude7º31'29'' and 7º30'26''E (Figure1). The indigenous people of Igabi are predominantly Muslims with exception of Gbagyi's who were non-Muslims or traditionalist and they later accepted Christianity. It has an area of 3,222km^2 and density of 180.5/km^2. The area has a projected population of 581,500 people with annual rainfall of 1000mm – 1500mm (KDBS, 2016).

Chikun Local Government is located on latitude 10º26'62''and 10º28'48''N /longitude7º12'24''and 7º10'20''E of the prime meridian. It is bordered by Igabi local government to the North, West and Southeast by Kaduna South, Kajuru and Birnin Gwari local government to the Northeast (Figure:1). It has an area of 4,466km^2 and density of 7,010/km^2.The vegetation in the local government area is guinea savanna. The people of this area are predominantly farmers and traders. The area has a projected population of 372,272 and annual rainfall of 1500 mm – 2000 mm (KDBS, 2016).

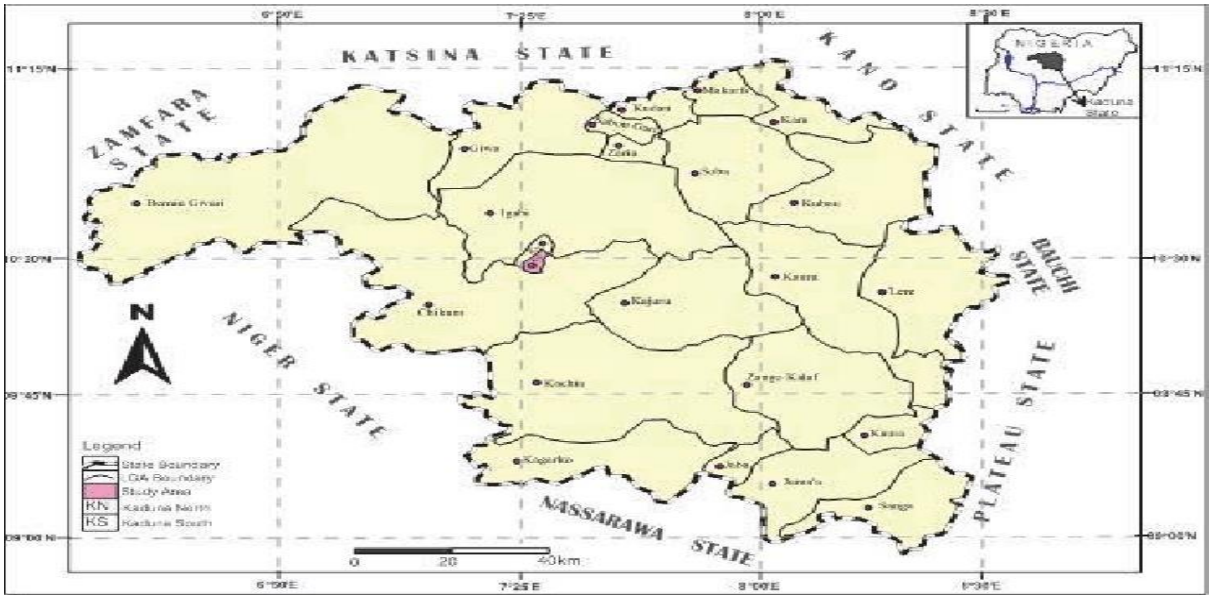

Figure1: Map of Kaduna State showing the two selected Local Government Areas.
Source: Sodimu *et.al*, 2021

Data collection

The primary data for this study were obtained using structured questionnaires. The two (2) Local Government Areas that fall into these eco-zones were chosen and two communities each were selected. Igabi (Mando and Afaka) and Chikun (Buruku and Udawa). A total of eighty (80) questionnaires were randomly administered in each of the Local Government Area (40 in each community) to make a total sum of one hundred and sixty (160) questionnaire in all. Random sampling technique was use in administering the questionnaire among the respondent. The choice of the study areas was greatly influenced by the availability of the species and concentration of the respondents who are traditional healers, herbs seller and civil servants who use shea butter day in out.

Statistical analysis

Descriptive statistics such as percentage, frequency distribution tables were used to analyze the data collected.

RESULTS

Results in Table 1 below, revealed that 34.3% of the sampled respondents were between the age brackets of 21-30 years. Most of the respondents were married (49.52%), 33.3% were single, 3.81% were divorced. It was observed that 9.52% were widow while 3.81% are widower. Gender distribution further revealed that women were the majority (53.3%) in the aboriginal and ethnobotanical survey of utilization of *V. paradoxa* against their men counter parts (46.7%). 41.9% of the sampled respondents had Secondary education and 4.8 % had tertiary education, 36.2% had primary education, 0.9% had Arabic education, 11.4% had adult education. Furthermore, 9.5 % of the respondents were between the household size of 1-5 while 38.1% of the respondents were in the household 11 – 15 individuals.

Shea butter sold in selected parts of Northern Guinea Savanna were being brought from seven (7) areas within the State (Kaduna metropolis; villages around Kaduna; Zaria and its environs) and outside the State (Nasarawa; Kwara and Oyo States). This product is being brought to this part of the area because of available markets. Table 2 below shows the sources.

Table 1: Demographic Characteristics of Respondents

Variable	Respondents	Percentage (%)
Age in Years		
10-20	05	4.80
21-30	36	34.3
31-40	35	33.3
41-50	19	18.1
Above 51	10	9.50
Average	**105**	**100**
Marital Status		
Married	52	49.5
Single	35	33.3
Divorce	04	3.81
Widower	04	3.81
Widow	10	9.52
Average	**105**	**100**
Gender		
Female	56	46.7
Male	49	53.3
Average	**105**	**100**
Educational Level		
Tertiary	05	4.80
Secondary School	44	41.9
Primary School	38	36.2
Arabic School	01	0.90
Adult School	12	11.4
Non-Formal Education	05	4.80
Average	**105**	**100**
Occupation		
Traditional Healer	29	27.6
Herbs Trader	55	52.4
Civil Servant	21	20.0
Average	**105**	**100**
House Hold Size		
1-5	10	9.50
6-10	39	37.1
11-15	40	38.1
Above 15	16	15.2
Average	**105**	**100**

Table 2: Sources of Shea Butter Being Sold in Kaduna

Source	Respondent*
From wholesaler in Kaduna Metropolis	54
Villages around Kaduna	84
Birnin Gwari and its environs	27
Zaria and its environs	21
Nasarawa and its environs	15
Ilorin and its environs	8
Ogbomosho and its environs	18

**Multiple responses*

Table 2 revealed that shea butter being sold in parts of Kaduna Northern Guinea Savannah eco-region was sourced from nearby villages in Kaduna State, with villages around Kaduna having the highest. The result also showed that some marketers sourced for the product outside Kaduna State. The results of ethno-botanical utilization of sheabutter in table 3 below show that it can be used for several therapeutic uses and prevention of certain ailments. which include; treatment of wound (100%), Arthritis (100%), treatment of boil (95.00%), skin problems (86.25%), bone dislocation and fracture (96.25%)

Table 3: Ethno-botanical Utilization of Shea Butter in Two Selected LGAs of Kaduna

Uses/Treatment	Respondent	Percentage
Back ache	114	71.25
bees and warps sting	124	77.50
yellow fever	132	82.50
wounds	160	100.00
waist pain	144	90.00
boil	152	95.00
skin problem	138	86.25
Used as ointment	160	100.00
Bone dislocation and fracture	154	96.25
Arthritis	160	100.00
Used for lighting	152	95.00
Treat rheumatism	138	86.25
Swollen Body	130	81.25
For industrial use	134	83.75
For herbal medicine	160	100.00
pain killer / reliever	138	86.25

The table 4 below shows various methods of ethno-botanical utilization of shea butter in the treatment and prevention of various diseases in the study area. Table 4 above shows that majority of the respondent's use rubbing method (100%) and mixing of the shea butter with cream / lotion (100%); 93.30% use inhaling method while 86.70% 0f the respondents apply the shea butter directly on the wound. The table 5 below shows the aboriginal utilization of shea butter in the study areas. Various respondents subjected shea butter to various aboriginal uses this includes soap making (86.70%), Industrial uses (78.30%), Cosmetics (61.70%), Jam making (57.50%), wood preservation (15.0%), cake baking (17.5%) and so on.

Table 4: Methods of application of Shea Butter products as treatment of ailments in Kaduna

S/No.	Methods	*Respondents	Percentage (%)
1	Rubbing	60	100
2	Apply directly on the wound	52	86.7
3	Mix with cream / lotion	60	100
4	Inhaling in hot water	56	93.3

* *Multiple Responses*

Table 5: Aboriginal Utilization of Shea Butter in Kaduna Northern Guinea Savannah eco-region.

Uses	*Respondents	Percentage (%)
Cooking oil	23	57.5
Cosmetics	37	61.7
Soap making	52	86.7
Wood preservation	9	15.0
Industrial use	47	78.3
Cake baking	7	17.5
Jam making	23	57.5

**Multiple Response*

The aboriginal processing techniques in Table 6 are the ones found in practice in the study areas. The majority (67%) of the respondent's harvest or pick the shea fruits themselves while fewer of them buy the fruits in the market. The hygiene practices in the processing of shea butter were high, as the processors have high rate of hygienic attitude, with 97.2% of them washing the fruits before eating or de-pulping and 63% of them selecting the good seeds from the bad or spoilt ones. Table 6 reveals that all the respondents de-pulp, dry and crack the shea seed before milling. The majority of the respondents (76%) roast their shea butter kernels. All the respondents milled their dried, cracked and roasted shea kernels. The majority of the respondents (94% and 80% respectively) claimed that they boiled their milled shea kernels and also kneaded them into dough. Furthermore, results in Table 6 above show that all the respondents mix, filtrate and solidify their shea butter. Lastly, minority of the respondents packaged their processed shea butter before marketing.

Table 6: *Vitellaria paradoxa* processing techniques in the study areas

S/No.	Processing techniques	Frequency	Percentage Favored	Frequency	Percentage Against
1.	Picking or harvesting of fruits	107	67	53	33
2.	Washing of fruits	155	97	5	3
3.	De-pulping	160	100	0	0
4.	Seed drying	160	100	0	0
5.	Seed drying	160	100	0	0
6.	Seed selection	100	63	60	37
7.	Seed cracking	160	100	0	0
8.	Roasting of kernels	121	76	39	24
9.	Milling of kernels	160	100	0	0
10.	Boiling of ground kernel	150	94	10	6
11.	Kneading into dough	128	80	32	20
12.	Cold water mixing	160	100	0	0
13.	Filtration	160	100	0	0
14.	Solidification	160	100	0	0
15.	Packaging	40	25	120	75

DISCUSSION

The results obtained for age distribution implies that the respondents were at the middle and economically active age which could have positive effect on their health status and standard of living. This is in conformity with report of Ekpong (1988) that active age in Nigeria communities fall between that age bracket. Majority were married, marriage is very important to rural populace and this is an indication that most of married people in the study area know the value and economic importance of the ethno-botany utilization of shea butter tree for curing and prevention of diseases using the aboriginal knowledge from their forefather. 95% of the respondents had formal education. Njoku, (1991) observed that formal education has positive influence on one's life especially in Nigeria of today. Sourcing and procurement of shea butter outside the Kaduna state is noticeable as the demand in the study area is more than production due to the usage and experience of the respondents. This is expected because *Vitellaria paradoxa* thrives very well in Derived and Northern Guinea savannah vegetation zones. However, the observation is in agreement with that of Soladoye *et al*., (1989), Okia *et. al., (*2005) who reported that climate of part of Northern Guinea Savannah supported the seeds and growth of *V. paradoxa.* Multipurpose and array of uses of shea butter among the respondents shows its significance in treatment and prevention of various chronic diseases among the general populace of the study communities. The results of ethno-botanical utilization of sheabutter is in line with the work of Soladoye *et. al.,* (1989); Sodimu *et al., (*2021). Various methods of application of Shea Butter products as treatment of ailments is in agreement with the work of Sodimu and Bako (2002) and the aboriginal uses of it are in consonant with the work of Poulsen (1981) and Taiwah (1994). Aboriginal processes of getting pure shea butter is laborious and tiresome. This shows the tedious nature of aboriginal shea butter processing (Carette *et al.*, 2009). Despite

with the little division of labour employed in the process

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CONCLUSION AND RECOMENDATION

Vitellaria paradoxa (sheabutter) as indicated in this study is multipurpose species with array of *Vitellaria paradoxa* uses which can be used in the treatment and prevention of arrays of chronic/acute ailments. Based on the above results it is recommended that for sustainability and conservation, plantation establishment of ***V. paradoxa*** species should be encouraged. *Vitellaria paradoxa* integration with conventional medicine should be promulgated. Also, Federal Government should encourage further research on the species through relevant parastatals.

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