IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 11, Issue 3 Ver. III (May - Jun.2016), PP 76-82
www.iosrjournals.org

Preliminary Survey of the Indigenous Knowledge of *Canarium schweinfurthii* Engl. (Atile) In Some Parts of Plateau State, Nigeria

Dawang, S.N.*, Danahap,T. S., Makvereng,S.S. and Nyam, M. A.
Department of Plant Science and Technology, University of Jos, P.M.B. 2084, Jos, Nigeria.

Abstract: *A survey was undertaken in selected locations in Jos North and South Areas of Plateau State Nigeria to document the Indigenous/Traditional Knowledge of Canarium schweinfurthii Engl. Semi-structured questionnaires were administered to 38 Respondents who are sellers/hawkers of Canarium schweinfurthii ('Atile') fruit. Information on the plant's common name, varieties, location where it grows in the State, uses and parts used were elicited through the questionnaires. With respect to utilization 38(100%) of the Respondents agreed that the plant can be used as food and as fuel wood. The parts revealed as edible are the fruit, seed kernel and oil. Regarding the part of the plant used, all the Respondents 38 (100%) agreed that the wood can be used. The wood is used as fuel wood and in construction. Furthermore, the survey revealed specific edible uses and medicinal applications and six local names of the plant. The survey has therefore provided baseline indigenous knowledge on vital aspects such as names, uses and parts used of a native, underutilized economic plant for which there was paucity. This document can serve as a reference material for future researchers.*
Keywords*: Canarium schweinfurthii, Indigenous/Traditional Knowledge, Atile, Survey, Plateau State*

I. Introduction

Indigenous / Traditional knowledge is the knowledge that people in a given community have developed over time and continue to develop. It has been described to be based on experience, often tested overtime centuries of use, adapted to local culture and local environment and is dynamic and changing. It is not confined to tribal groups or the original inhabitants of an area of any country or rural people but possessed by any community, Rural or Urban (NAARAP, 2016). Traditional knowledge is currently attracting growing appreciation. Its role/value is essential not only to those who depend on it for their lives but has relevant applications in modern industry (plant based medicines and cosmetics), agriculture and non-wood forest products, handicraft and sustainable development (CBD, 2016).

To the best of our knowledge, there is a paucity of documented literature on the current indigenous/traditional knowledge of *Canarium schweinfurthii* in Plateau State where the plant is locally abundant and known.

Canarium schweinfurthii Engl. belongs to the family Burseraceae (which is also known as Torchwood, frankincense or incense tree family) (Wikipedia, 2016 a). In English it is commonly known as African Elemi, Incense tree and Bush candle tree, Purple canary tree, or Gum resin tree. In the African region it is also known as ''elemier d'Afrique'' or ''elemi de Moahum'' in French, ''muwafu'' in Luganda and ''mpafu'' /''mbani'' in Swahili (Burkill, 1985 and Orwa *et al*. 2009).

In Nigeria, it is also known by quite a number of local names which include; Berom (Pwat), Hausa (Atile or Atilis), Igbo (Ube agba) and Yoruba (Origbo , Elemi or Agbabubu) (Keay *et al.* 1964, Gbile, 1984 and Burkill, 1985).

Canarium schweinfurthii has widespread geographical distribution throughout Africa. The native species are found in Angola, Cameroon, Ethiopia, Tanzania, Ghana, Guinea – Bissau, Liberia, Mali, Senegal, Siera Leone, Sudan, Togo, Uganda, Zambia and Nigeria (Orwa *et al.*, 2009).In Nigeria, Nyam *et al*., 2014 have reported that it thrives well in the rocky and flatlands of the State where the current study was undertaken. It is common in Bauchi, Southern Kaduna, Niger, Oyo and Plateau States of Nigeria (Nyam, 2011).

It has been described as a large tree commonly growing to 40m high, but attaining 50m or more in Sierra Leone and Ghana (Burkill, 1985). The fruit contains a hard fluted stone in which is a seed. Inside the seed are edible and oily nuts (Nyam and Wonang, 2004). The fruits are similar in structure and color to the well-known fruits of Olive plant (*Olea europaeae*) of Israel, though from different families (Nyam et al., 2014).

It is a plant which can be described as multipurpose economic plant whose broad utilization in the West Africa Region has been documented (Burkill, 1985 and Orwa *et al*., 2009).The tree is a major source of Elemi, an oleoresin that is used in food, medicinally and has a range of industrial applications, although not usually cultivated the tree is usually protected by local people. The slightly greenish outer pulp of the fruit is oily and edible. It can be eaten raw or often in warm water to improve palatability. The pulp oil contains about

71% palmatic acid and 18% oleic acid and is edible. The seed kernel is also oily and edible. It is cooked and in Nigeria sometimes prepared into a vegetable butter and used as a substitute for shea butter (Orwa *et al*., 2009).

Nyam and Wonang (2004), have reported the oil to have medicinal values such as in the treatment of hot water and fire burns, wounds, applications to circumcision cuts and umbilical cord and orally administered to victims of snake bite. It is reported also to be used as a worm expeller and also in teething (in children) and ulcer treatment. Furthermore it is locally applied as a lubricant for hairdo and as pomade.

Various reports abound with respect to researches on aspects of its fruits (Maduelosi and Angaye, 2015). Katunku *et al*, (2014) have studied various tissues (leaves, fruit mesocarp and seed cotyledon) of the plant for insecticidal activities in stored bambara groundnut.

The nutritional potential and chemical composition of the fruit pulp have also been reported in Agbo *et al*,(1992) and Nyam *et al* (2014) and the screening for active compounds in its leaves have also been documented (Ngbede et al, 2008). Proximate analysis of *Canarium schweinfurthii* endosperm oil revealed the oil to be a good source of most essential minerals such as Sodium, Potassium and Magnesium (Nyam and Wonang, 2004).Obame et al. 2007 have investigated and reported the antioxidant and antimicrobial activities of the essential oil of the plant.

Orwa *et al*., 2009 enumerates other useful products derived from *Canarium schweinfurthii* plant to include its timber, resin (an oleoresin),its seeds (for making necklaces/traditional instruments)and the services it provides in reforestation and as an ornamental or shade plant.

Canarium schweinfurthii has been categorized as one of the plant species which is yet to be maximally identified and utilized (Nyam *et al*, 2014).It has also been described as one of the lesser known seeds with respect to underutilized wild fruits and oil seeds (Maduelosi and Angaye, 2015).

We are hopeful that this survey would provide relevant information which would serve as baseline data to further enhance local research and documentation on the ethnobotany, ecology, taxonomy and distribution of this native economically important plant.

II. Materials And Methods

Study Site

The study was undertaken in selected areas within Jos North and Jos South Local Government Areas of Plateau State in Nigeria. Plateau State is one of the States in Nigeria, popularly known as the Home of Peace and Tourism. The State is described as the twelfth largest in the Country and located approximately in the centre of Nigeria(Middle Belt Region).The State is located between latitude 80^0 24'N and longitude 80^0 32' and 100^0 38' east. The State's average temperature ranges are between 18 and 22^0C, with mean annual rainfall from '131.75cm (in the Southern part) to 146cm on the Plateau. It is further divided into seventeen (17) Local government Areas (LGAs) with over forty ethno-linguistic groups (Wikipedia, 2016 b).

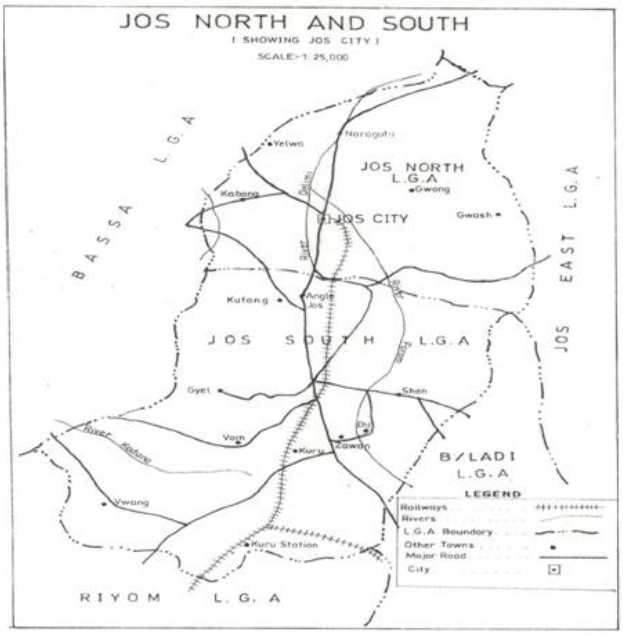


Figure 1: Map of Jos North and South LGA Area of Plateau State

Source: Ministry of Lands and Survey, Plateau State.

III. Methodology

For the purpose of this study, data was collected through the administration of semi-structured questionnaires. A total of 38 questionnaires were administered to 38 respondents, who are sellers/hawkers of *Canarium schweinfurthii* ('Atile') fruit.

The locations where the respondents were encountered include the Terminus Market, Jos Jarawa Market, Angwan Rukuba , Gada Biu Market,Gyel Market, Kugiya Market,Maraban Jama'a,Rantya State – Lowcost, Bauchi Road and Farin Gada(all located within the Jos North and South Areas of the State). Information elicited from the Respondents include their biodata, knowledge on common name, varieties , location where plant grows, utilization/parts used and edible and medicinal uses of *Canarium schweinfurthii* plant.

IV. General Results

With regards to the age group of the respondents 16 of them belong to the 29 – 39 age groups. Gender, wise, 37 of the respondents (97%) were females. Regarding their level of education, majority of the respondents 21 (55.3%) have not attained any formal education while 9 (23.7%) and 6 (15.8%) Respondents had attained Primary and Secondary level of education respectively, (Table 1).

Tribe wise, the respondents were distributed across eight (8) tribes with the Berom tribe recording the highest number of 17 respondents (44.7%) (Table 1).

Table 1: Personal Bio-Data Of Respondents

S/No	Variables	Frequency	Percentage (%)
1	**AGE GROUP**		
A	18-28	1	2.6
B	29-36	16	42.1
c	40-50	12	31.6
d	51 and above	9	33.7
2	**GENDER**		
a	Male	1	2.6
b	female	37	97.4
3	**EDUCATIONAL QUALIFICATION**		
a	Primary School	9	23.7
b	Secondary School	6	15.8
c	Literacy	2	5.3
d	None	21	55.3
4	**OCCUPATION**		
a	Sellers of only Atile	11	28.9
b	Sellers of Atile with other fruits	8	21.1
c	Business/Traders	17	44.7
d	Farmer/Seller of Atile	1	2.6
e	None	1	2.6
5	**TRIBE**		
a	Afizere/Jarawa	3	7.9
b	Anaguta/Naraguta	8	21.1
c	Berom	17	44.7
d	Bokkos	1	2.6
e	Hausa	2	5.1
f	Irigwe/Miango	5	13.2
g	Mwaghavul	1	2.6
h	Ngas	1	2.6

Table 2 reveals Six (6) local names of *Canarium schweinfurthii* obtained from the survey. Result gathered also indicated that most of the Respondents 34(89.5%) knowledge was obtained through oral means.

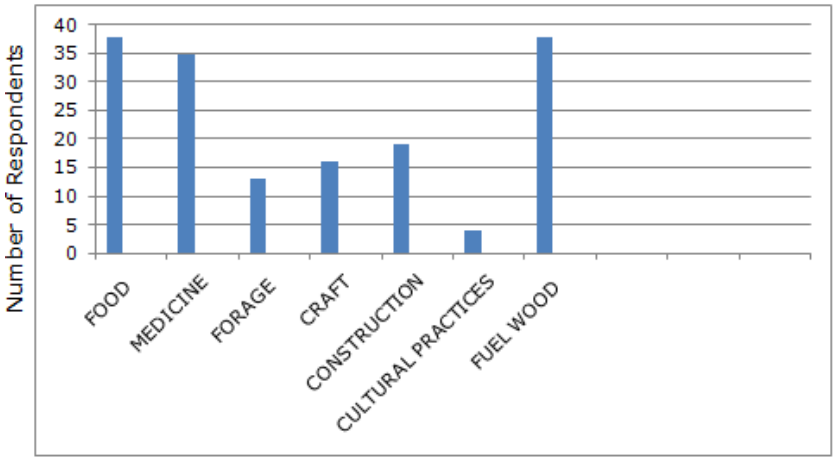
With regards to the utilization, 38 respondents (100%) stated that the plant can be used as a source of food and fuel wood, 35 (92%) stated that plant can be used for medicinal purposes, 19 respondents (50%), agreed that the plant can be used for construction purposes and sixteen (16) Respondents (42%) agreed that the plant can be used for craft purposes. With respect to the use of the plant as forage only 13 Respondents (34%) agreed that the plant can be used as a source of forage for animals and for its use in cultural practices, only 4 Respondents (11%) indicated knowledge of the plant to use. (Fig 2 and Table 3)

With respect to the plant being used, 38 respondents (100%) stated that the wood can be used while 37 respondents (97%) agreed that the fruit and seed could be used. Regarding the use of the Gum/resin 18 Respondents (47%), Leaf 15 Respondents (39%), Root 10 Respondents (26%) and Bark 11 Respondents (29%), gave consent of their knowledge of the part mentioned. This is further illustrated in Fig 3 and Table 4.

Table 2: Common Names and Medium Through Which Knowledge Was Obtained

S/No	Variable	Frequency	Percentage (%)
1	**Common Names**		
A	Apar	8	21.1
B	Atile	4	10.5
C	Fwat	17	44.7
D	Paat	2	5.3
E	Refat	3	7.9
F	Rihwie	4	10.5
2	**Medium Through Which Knowledge On The Plant Was Obtained**		
A	Orally from Parents	26	68.4
B	Orally from grandparents	3	7.9
c	Orally from Parents (Mother and grandparents	1	2.6
d	Orally from Parents and Personal use	1	2.6
e	Orally from Parents and self knowledge	1	2.6
f	Orally from parents and knowledge from reading	1	2.6
g	Orally from Market Women and neighbours	1	2.6
h	Through Self knowledge	1	2.6
i	None	3	7.9

Figure 2: Traditional knowledge on the utilization of the plant *Canarium schweinfurthii* "Atile" amongst respondents



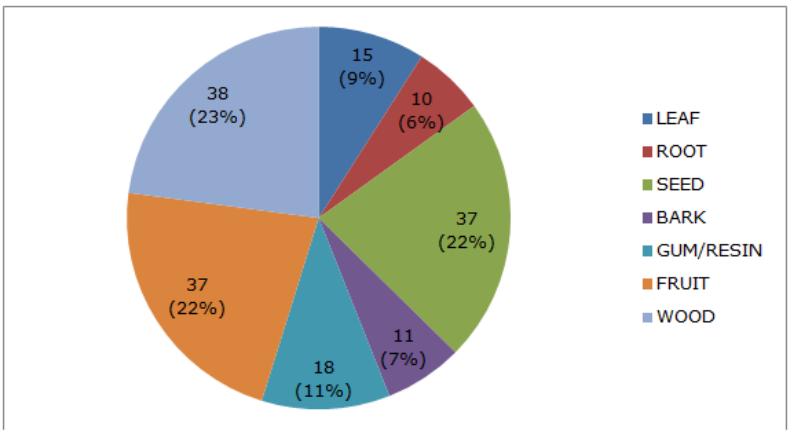


Figure 3: Traditional knowledge on the utilization of various parts of *Canarium schweinfurthii (*"Atile") plant amongst respondents

Table 3: Specific knowledge On Utilization of Canarium schweinfurthii Used Amongst Respondents

S/No	**Utilization**	**Part Used**
1	Food	• Fruit • Oil • Seed kernel

2	Medicine	• Oil • Fruit • Resin/Gum
3	Forage	• Fresh leaves fed to goats
4	Craft	• Seed for making curtains • Seed for musical instruments • Wood for making seats/benches • Wood for making mortar and pistle
5	Construction	• Matured wood for roofing • Matured wood for construction of local bridges • Construction of houses • Wood for building
6	Cultural practices	
7	Fuel Wood	• Dried ones used as firewood • Roots
8	Other Uses	• Plant is used as shade plant

Table 4: Specific knowledge on part of plant used amongst Respondents

S/No	Part	Uses
1	Leaf	• Medicine • Forage for animals (e.g. goats)
2	Root	• Medicine • Firewood
3	Seed	• Game • African tambourine • Musical instruments • Kernel edible
4	Bank	• Firewood • Application in medicine • Medicine for pile (haemorrhoids) in children
5	Gum/Resin	• Medicine • Dried form used as perfume, incense to drive away witches /insects • Used as glue
6	Fruit	• Fruit edible (builds the body) • Food • Oil
7	Wood	• Firewood (Fuel/Wood) • Construction purposes

Table 5 reveals the Edible while Table 6 shows the Medicinal Uses of *Canarium schweinfurthii* elicited from the respondents. The leaf, seed, fruit and oil are the edible parts of the plant while the leaves are used as forage for animals. The various parts used in medicinal applications are the leaf, bark, gum/resin, fruit and oil of the plant.

Information obtained from the Respondents on the types/varieties of Atile fruit available indicates that with respect to size, there exist short, long, small, big or large varieties which could differ in colour.Tastewise; the varieties available could be sweet, sour, bitter or thick and oily. Regarding their usage, they could be used for food to obtain oil and as a snack. Both the small and large types can be used for oil with indications that the smaller ones possessing more oil.

Data drawn out on the areas within the State where the plant grows revealed the key mentioned localities as Vom, Mangu, Pankshin, Ganawuri, Maza, Bokkos, Fobur and Daffo.

Table 5: Edible Uses of "Atile" Plant elicited from Respondents

S/No	**Plant part**	**Utilization**	**Nutritional Value**
1	Leaf	Fresh leaves are used as forage for animals (for example goats)	
2	Root		
3	Seed	Shell is broken to remove the inner part of seed (kernel) which eaten. It can also be roasted before it is broken. Described as "Groundnut/Cashew nut like"	Seed kernel builds the body
4	Bark		
5	Gum/Resin		
6	Fruit	Fruit is pre-warmed/cooked in hot or warm water and fleshy part is eaten.	• Fruit builds the body
7	Oil	Drink or lick oil orally, mix with food or meat. Used as a dressing or in sweetening cooked beans.	• Builds the body • Oil helps fight diseases

			• Oil repairs the passage of blood veins • It is believed to give strength, strong bones.

Table 6: Medicinal uses of "Atile" plant elicited from Respondents

S/No	Plant Part	Medicinal application	Preparation
1	Leaf	• Treatment of Stomach ache/pain	Boil leaf and drink
2	Root		
3	Seed		
4	Bark	• Fever • Treatment of pile (haemorrhoids)	Bark is boiled and mixed with the bark of *Parkia biglobosa* and taken orally i) Bark is boiled and child is placed in it to sit. ii) Grounded bark is mixed with oil and applied in child's anus and some is given to the child to eat.
5	Gum/Resin	• Toothache • Pile (haemorrhoids) • Skin rashes	Gum is applied on tooth Gum/Resin boiled together with the root for children Rub gum/resin on the affected area
6	Fruit	• Ulcer • Pile (haemorrhoids) • Typhoid	Fruit is eaten
7	Oil	• Ulcer • Typhoid • Pile (haemorrhoids) • Bone fracture • Burns (from hot water and fire)	Put in food or taken orally Put in food Put in food or taken orally For fractures apply oil on the bone after bone is locally joined to heal. Oil is applied on the burns
		• Rheumatism	
		• Hepatitis • Cough • Diabetes	Taken orally or mixed with food
		• Skin rashes	Oil is rubbed on the affected area and taken orally
		• Measles	Rub oil on the affected body and also taken orally.
		• Teething in children • Too much crying (incessant) in children	Oil is given orally

V. Discussion

With respect to the Traditional knowledge of the Respondents (sellers of Atile fruit) on the utilization of *Canarium schweinfurthii*, the study revealed that all the respondents agreed that the plant can be used as Food and fuel wood. This further highlights the economic importance of this plant. The parts revealed in the study to be edible include its fruit, seed kernel and oil. These have also been reported by Orwa *et al*.2009 and Nyam *et al*., 2014.

With respect to the utilization of the plant, a higher number of respondents agreed that the plant is used as food, followed by fuel wood and medicine. Fewer respondents agreed to its use for cultural practices which may be unpopular to them.

With regards to the parts of *Canarium schweinfurthii* used, all the respondents (38) agreed that the wood is the most utilized part probably due to its utilization as fuel wood/ firewood and its use in construction. Orwa *et al*, 2009 have reported that the plant makes good fuelwood and that the timber obtained from it is used as a substitute for true mahogany.

Thirty seven (37) of the respondents agree that the fruit is the most utilized part (probably due to the utilization of its fleshy pulp, and edible seed kernel).Thirty seven (37) of the respondents agreed that the seed is the most utilized part probably due to its edible kernel or nut and its utilization in making musical instruments and game. The use of its seeds in making traditional instruments has also been mentioned by Orwa *et al*., 2009.

With respect to the medicinal applications of the plant elicited and revealed in Table 6 the leaf, bark, gum/resin, fruit and oil of the plant are used to treat quite a number of ailments. The oil from the plant is

recorded to have a wide variety of medicinal applications. Similar applications of the oil such as its use in treating hotwater and fire burns, ulcer treatment and treating in children have been reported (Nyam *et al*. 2009.)Its gum/resin is used in the treatment of skin rashes. This is similar to reports of Burkill (1985) that the resin is able to have action on skin infections. The Traditional/indigenous knowledge of the Atile sellers shows that there could be higher demand for the fruits, and wood of this plant, which could pose some danger on the existence of the plant if conservation strategies are not put in place to grow more of it and use the available ones sustainably. Respondents knowledge on other uses of the plant shows that it can be used as a shade plant which is listed in Orwa *et al*. (2009), as one of the services provided by the plant. With respect to the local names of the plant. The study revealed that the respondents were from Eight (8) different tribes. Six (6) local/indigenous names were obtained from the Respondents,namely;Anaguta ("Apar"),Hausa ("Atile"),Berom("Fwat) ,Mwaghavul ("Paat") ,"Refat" (Afizere,Jarawa) and "Rihwie" (Irigwe, Miango).Three of these local names have also been previously reported as local names of the plant *Canarium schweinfurthii* in Nigeria(Burkill, 1985 and Nyam *et al*. 2009.). Information gathered on the locations in the State where the plant grows locally revealed the plant to grow in Pankshin one of the Local Government Areas of the State. This is supported by entries on the plant in Keay et al., 1964 and Maduelosi and Angaye (2015) who reported that the fruit is found in large quantities in this area. With respect to the knowledge on the varieties/types available, their responses indicate that different types/varieties exist based on shape, taste and usage of the fruits. Maduelosi and Angaye (2015) have also reported that the fruits are of two varieties (long spiral and short round).

Most of the Respondents obtained their knowledge on the plant through oral means as the knowledge was transferred to them from their grandparents, parents and others and is now made available for future research on the plant and its products.

VI. Conclusion

The study has revealed valuable information on the various parts of *Canarium schweinfurthii* that can be used for edible, medicinal and other purposes in the study area. It has also provided vital information on locations in the State where the plants grows and some of its local names.

This document can serve as a working document for further studies on the ethnobotany (its utilization), ecology(its distribution) and taxonomy(of varieties available) of this economically important indigenous plant firstly at a local scale in Plateau State, and then at a national scale in Nigeria. These would in the long run yield global benefits on the Traditional/Indigenous Knowledge of *Canarium schweinfurthii*.

References

[1]. Convention on Biological Diversity(CBD,2016).www.cbd.int/traditional/intro.shtml
[2]. Burkill; H.M. (1985). The Useful plants of West Tropical Africa. Royal Botanic Garden Kew, Pp 301 – 303.
[3]. Gbile,Z.O.(1984).Vernacular names of Nigerian Plants (Yoruba).Forestry Research Institute of Nigeria.Ibadan.pp73
[4]. Katunku,D.,Ogunwolu,E.O.,andUkwela,M.U.(2014).Contact toxicity of *Canarium schweinfurthii* Engl.tissues against *Callosobruchus maculatus* in stored bambara groundnut .International Journal of Agronomy and Agricultural Research (IJAAR) Vol.5 No.5 p 20-28.
[5]. Keay, R.W.J., Onochie, C.F.A. and Stanfield, D.P (1964).Nigerian Trees. Published by the Department of Forest Research, Ibadan. Pp 252 – 254.
[6]. Maduelosi, N.J. and Angaye; S.S (2015). Characterization of African Elemi (Canarium schweinfurthii). International Journal of Advanced Research in Chemical Science. (IJ ARCS), Volume 2, Issue 11. PP 34 – 36.
[7]. NAARAP.blogspot.com.ng/2009/10/importance-of-indigenous traditional.html
[8]. Rohini, R. (2009) NGO Association for Agriculture Research in Asia – pacific. Excerpted from Traditional practices in Agriculture Sourcebook, Rohini Reddy SARRA; India pp.l – 3 [9].Ngbede,J .,Yakubu ,R.A .and Nyam,D.A.(2008).Phytochemical Screening for Active Compounds in *Canarium schweinfurthii*(Atile) Leaves from Jos North, Plateau State, Nigeria. Medwell Journals, Research Journal of Biological Sciences 3(9) : 1076-1078.
[9]. Nyam, M.A. and Wonang, D.L.(2004).Proximate Chemical Analysis of ('Atili') Canarium schweinfurthii Linn Endosperm and Elemental Analysis of the Oil. Nutrition Society of Nigeria, 35:78-81.Proceeedings of 35th Annual Conference.
[10]. Nyam ,M.A, Wonang ,D.L.and Akueshi, C.O.(2009) .Phytochemical screening and Antimicrobial Studies on Canarium *schweinfurthii* ('Atili') fruits and Oil.Nigerian Journal of Botany 22 (2),247-253.
[11]. Nyam, M.A., (2011). The Effects of microbial Colonization of *Canarium schweinfurthii* Linn ("Atili") fruit oil on its domestic and industrial uses. PhD Thesis, University of Jos, Nigeria.
[12]. Nyam, M.A, Makut, M.D., Itelima, J.U, and Daniel, A.M. (2014). Nutritional Potential of the fruits of Black Olive (Canarium *schweinfurthii* Linn) from Plateau State, Nigeria. Pakistan Journal of Nutrition 13 (6): 335 – 339.
[13].].Obame,L.C.,Koudou,J.,Kumulungui,B.S.,Bassole,I.H.N.,Edou,P.,Ouattara,A.S.,Traore,A.S.(2007).Antioxidant and antimicrobial activities of *Canarium schweinfurthii* Engl. Essential oil from Centrafrican Republic. African Journal of Biotechnology Vol 6 (20),pp 2319-2323.
[14]. Orwa .C.A, Mutua, Kindt. R, Jamnadass; R.S. Anthony. (2009) Agro forestry Database: a tree reference and selection guide version .4.0 (http://worldagroforestry.org/sites trees/tree dabases.asp)
[15]. Wikipedia(2016 a).en.m .wikipedia .orgwiki /Burseraceae (Retrieved 14/05/2016)
[16]. Wikipedia (2016b).http://en.wikipedia.org/wiki/Plateau_State. (Retrieved 30/05/2016).