

USE OF INDIGENOUS TECHNOLOGY IN PROCESSING AND UTILIZATION OF NON-TIMBER FOREST PRODUCT IN SOUTH-EASTERN NIGERIA

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**ABSTRACT**

*Nigeria is richly endowed with numerous non-wood resources such as Treculia africana, Brachyestegia eurycoma, Pencladethra macrophylla and Detarium microcarpum. Investigation on the use of indigenous technology in processing and utilization of B. eurycoma, T. africana P. macrophylla and D. microcarpum was carried out in five (5) eastern states of Nigeria. Purposive sampling of the population to ensure that only those targeted was adopted in Akwa, Abalikili, Umuahia, Owerri, and Enugu states. Information used for this paper came from both primary and secondary sources. Ten (10) respondents were interviewed from each secondary source of information. The use of indigenous technology to process these forest products to forest foods is currently limited by use of crude methods, inability to expand production and lack of encouragement by government. The government of Nigeria can develop a political will to make it more attractive to men for greater productivity, through research into modern methods of processing of forest foods.*

**Keywords:** indigenous technology, processing, utilization, non-timber forest products

**INTRODUCTION**

Indigenous technology involves all systems of production which are basically done on small-scale using local equipment or materials with homes as major centers of production. It is also known as traditional, domestic or endogenous technology and has played significant role in processing and utilization of forest resources in Nigeria since the pre-colonial era. The cultural adaptability of this local technology in southeastern Nigeria is evident in improving the standard of living of the people through the processing and utilization of biodiversity in many towns and villages. Several authors have reported on forest food processing and utilization in Nigeria (Akachukwu 1997; Ejiofor, 1988; Enujiugh and Agbade, 2004; Okafor, 1987; Singh, 1985 FORMECU, 1999. Like in many other parts of Nigeria, the Southeastern states are rich in Non-Timber Forest Products (NTFPS,). The NTFPS are wild plant and animal products excluding wood, harvested from the forest. They are also referred to as Non- Wood Forest Products (NWFPs), they include all goods and items from the forest such as vegetables, nuts, edible roots, wind fruits, snails, *et cetera* ( FAO, 1995, 2000;FORMECU 1999),

The concept of indigenous technology and food processing in sustainable development of millions of people in the southeastern Nigeria cannot be complete without examining its application by the local people in meeting their food needed from the forest. This creates the need for this paper. The numerous non- wood forest products are processed and utilized as edible food using different technologies dependent on each of the species. Our interest here, is to examine the collection, processing and utilization of some forest products involving: *Brachyestegia eurycoma, Treculia Africana, Pentaclethra macroplla* and *Detarium microcarpum* in southeastern states of Nigeria.

## **METHODOLOGY**

Investigation of the use of indigenous technology in processing and utilization of *B. eurycoma*, *T. africana*, *P. macrophylla* and *D. microcarpum* was carried out in five (5) eastern states of Nigeria. Purposive sampling of the population to ensure that only those targeted was adopted in Akwa, Abalikili, Umuahia, Owerri, and Enugu states. Information used for this paper came from both primary and secondary sources. Ten (10) respondents were interviewed from each secondary source of information. The respondents are knowledgeable in the collection, processing and utilization of the four forest resources. We also observed and participated in the use of indigenous technology for processing and utilization of the four products as primary sources of our information.

### **Brachystegia eurycoma**

*B. eurycoma* belongs to the family *Fabaceae* ( sub family: *Caesalpiniodae*). The tree can attain a height of about 36m and 8m in girth. The tree is common along river banks and may be readily recognized by its large size, irregular bole and huge, frosted spreading branches, and by the rough fibrous bark which peels off in untidy patches and often exudes a brownish bitterly gum ( Keay, 1989). It's common names in Nigeria are: achi ( Ibo); okwen (bini); eku ( esan); akpakpa ( ijaw) and ukung (Efik).

#### **Seed Collection**

The species is usually not cultivated but exist mainly in the wild although a few stands are found in compound farms or homestead and traditional agroforestry farms. The method of fruit collection for seed extraction is usually by natural seed fall. This method occurs naturally without human influence. Fallen fruits are collected from the forest floor with manual labour mainly by women and children. The people collect the fruits and seeds of the species and process them immediately to avoid deterioration that may be due to fungal infections. Sorting of fruits after collection is done to remove unwanted materials such as twigs, leaves and other materials that normally accompany fruit collection

#### **Processing**

Threshing is done to extract seeds from dry fruits of *B. eurycoma*. The procedure involves spreading the pods on a straw mat and beating them with a flail or slender pole.

#### **Separation**

Separation involves sorting of seeds to clean every impurity from the seedlot. Sound seeds are separated from empty ones or any other inert matter manually.

#### **Drying**

Drying of *B. eurycoma* seeds is done under the sun. The effectiveness of sun drying the seeds is dependent on the prevailing weather conditions at a particular time. Well dried seeds could have moisture content of (MC) of 18-20%

#### **Frying**

Seeds are fried under low heat in a frying pan with sharp river sand for about 15-20 minutes using a frying pan. The fried seeds are allowed to cool and then soaked in water for about 8 hours to soften the testa and consequently its removal. This is dehulling. It makes the milling process easier and soaked seeds are washed under running water and sieved to remove the seed coat.

#### **Milling**

Milling of seeds is done locally by using pestle and mortar for subsistence consumption. Commercial quantities are milled mechanically using hand-operated machines. The end-product

is a powder whose moisture content is between 12- 15%. Electrically operated machines are also available for large scale milling of the seeds.

**Colourization**

The end-product is usually milky in colour. It is usually colourized with palm oil to give it an attractive yellow appearance.

**Utilization**

The flour of *B. eurycoma* is used as soup condiment. The use of the flour as soup condiment dates back to ancient civilization in southeastern states of Nigeria. The condiment has a sharp taste and usually added to soup when cooking is almost done. It makes the soup thick and gives a characteristic strong aroma with a pleasant taste.

A table spoonful of the condiment is enough to mix a 5-litre pot of soup. The thickness usually follows the addition of palm oil into the pot of soup. The soup is stirred very well after addition of the flour to avoid the formation of balls in the soup.

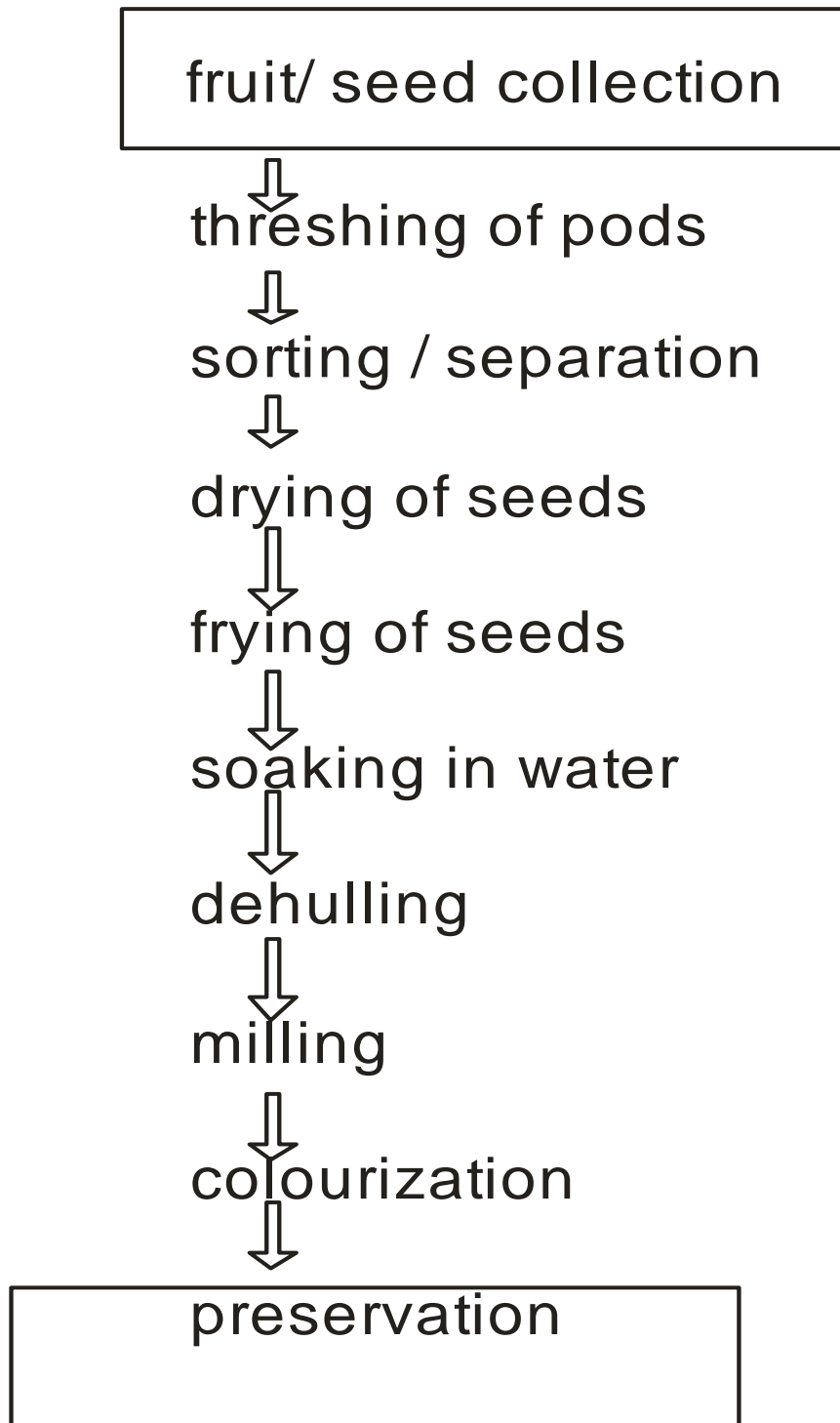


Figure 1: Flow chart of seed collection to preservation stages of *B. eurycoma*.

***Treculia africana***

*Treculia africana* commonly known as African breadfruit belongs to the family *Moraceae*. It species is locally known as ‘a fon’ in Yoruba, ‘ize’ in Edo, ukwa in Igbo and edeang in Efik. *T. africana* can attain a height of 24cm and 3m in girth. The bole is usually fluted at the base but

without buttresses. Leaves could be 10-23cm long by 7-10cm broad. It flowers in October-February of every year and fruits are usually available in February- March (Keay, 1989).

### **Seed Collection**

The species is found in the wild in places where it is endemic *T. africana* is often found in compound farms or homestead. Fruits are not usually harvested but fall naturally from their mother trees when fully matured. Mature fruits are very heavy with an average weight of about 12kg in some trees. Fruit collection and transportation from the base of trees is a usually a big problem because of their sizes, hence fallen fruits are usually gathered at the base of their respective mother trees. About 30-35 fruits have been recorded per fruiting season at the swamp forest station of the Forestry Research Institute of Nigeria, Onne, Rivers state. Collected fruits are allowed to ferment for 3-6 weeks prior to processing dependent on their maturity.

Depulping of fruits of *T. africana* is done soon after fermentation. The practice involves marceration of small lots of the fruit bit by bit using hands. The pulp is usually separated from the seeds using locally fabricated basket which vary in sizes. Differential flotation method of separation is used to separate the pulp and seeds. This is done in a deep bowl in which a slow stream of water is flown. The seeds sink while the pulp remains afloat. Sorting of the seeds is done manually to remove empty seeds or unwanted materials.

### **Processing**

Processing of *Treculia africana* seed begins with parboiling. Parboiling of the seeds is usually done with fuelwood as a source of heat at the temperature of about 100<sup>0</sup> C in a pot of water for 30 minutes. This is to cook the cotyledons prior to dehulling. Dehulling of the seeds is carried out by spreading them on a flat platform or any clean surface, and with the aid of a rolling fruit press, the seeds are pressed against the hard surface to remove the testa. Small seeds lots are slightly pounded by using pestle and mortar. The mixture of dehulled seeds and testa is sun-dried for 24 hours dependent on local weather conditions.

Winnowing is carried out after sun-drying it involves the use of a stream of air to separate the desired seeds from poor quality ones. This is done manually by using trays. The seeds in trays are technically thrown up above the trays to blow out the husk without losing them. Average workers can winnow 1kg of seeds in 5 minutes.

### **Utilization**

The consumption of *T. africana* as a major food is very popular among the Ibos in Nigeria. The seeds are boiled with several ingredients and eaten. Fried seeds are dehulled and eaten with coconut as snacks in both urban and rural areas of southeastern.

### ***Pentaclethra macrophylla***

*Pentaclethra macrophylla* also known as oil bean belongs to the family *Fabaceae* (sub family; *mimosoidae*). They species is known locally in Nigeria as: apara (Yoruba). Okpangha (Edo) ‘ugba’ (ibo) ‘ukana’ ( efik) ;ukpaghan’ (itsekiri), ‘ukpakara’ (ijaw). The species is not usually cultivated but found growing along road sides. The tree can attain a height of 25m and a girth of 6m. The bole is crooked with low branching habit and wide spreading crown. Leaves have a stout angular common stalk of 20-45m long, covered with rusty stellate hairs. Flowers are creamy yellow a pinkish white sweet smelling and crowded in narrow spikes (Keay, 1989). Fruits and seeds are usually available throughout the year in communities where the species are endemic

### **Seed Collection**

Oil bean seeds are not normally harvested from the stands. Seed collection is usually by natural seed fall method, involving the picking of seeds from the forest floor by children and women. The pods containing the seeds split open by explosive mechanism to discharge the seeds. Collection is done early in the morning based on the principle of first come first serve. Seed collection is competitive, especially trees in the wild which belongs to no body in particular unlike the trees in compound farms. Sometimes market demand can prompt the harvest of pods to augment natural seed fall.

### **Processing**

Threshing is necessary and carried out where the pods are not allowed to release their seeds naturally under normal situation. Collected seeds are boiled in a pot for about 12 hours to cook the cotyledon and soften the testa, after boiling the seeds, dehulling is carried out to separate the cotyledon from the testa with the aid of a sharp knife. Slicing of dehulled seeds is done on wooden plank to slender pieces of about 3-5cm long and 0.3-0.5cm in diameter using a sharp knife. The sliced product is wrapped in leaves. The use of polythene product as wrapper is fast becoming populare. Fermentation increases the products palatability, improve it s nutritional value and reduces its bitterness. Fermentation of the product is usually done for 3 days in haze baskets before wrapping in smaller quantities using leaves of *Costus afer*.

### **Utilization**

Processed 'ugba' is of high cultural value in Igboland. It constitute one of the first products to be served during marriage ceremonies. The use of 'ugba' are as follows:

- 1) processed and well fermented 'ugba' .Is eaten as snacks
- 2) The product is added to soup as thickener and condiment.
- 3) it is eaten with yam porridge to improve palatability
- 4) the popular 'african salad' in southeastern Nigeria is made mainly of 'ugba' and garden egg.
- 5) Unfermented cotyledons of 'ugba' are used as medicine for human abortion.

### ***Detarium microcarpum***

*Detarium microcarpum* belongs to the family *Fabaceae* (subfamily *Caesapiniodeae*). The species is locally known in Nigeria as: 'ofò' (Igbo), 'taura' (Hausa), 'gatapo' (kanuri), 'gkungorochi (Nupe) and 'ai kperlarimi (Etsako). The tree can attain a height of 9m with a twisted bole and widely spreading crooked branches. Leaves with a common stalk 5-13cm long with 5-12 leaflets. Flower available in November to January and lay of every year (keay, 1989).

### **Seed Collection**

*Detarium microcarpum* occurs in the wild and not usually cultivated. The method of seed collection is natural seed fall. Seeds are generally collected from the forest floor. Dry pods are harvested from the trees occasionally when market demand is high.

### **Seed Processing**

The dry pods are threshed and seeds are scooped out for processing. Sorting of empty or unhealthy seeds from good ones is done to ensure a high quality of product after processing. The seeds are parboiled in a pot of water for about 1 hour to cook them and soaked in cold water for about 30 minutes to ease testa removal from the cotyledons. Dehullins to remove the testa from the cooked cotyledons is done manually with the aid of a local knife. All impurities are sorted out to obtain a clean seed lot.

Milling of the seeds could be done locally with the aid of pestle and mortar. Milling methods involving the use of hand –operated milling machines are available. After milling and product, ' ofor' could be colourized with palm oil to give it and attractive flavour.

### Utilization

*Detarium microcarpum* is used mainly as a soup thickener in southeastern Nigeria and other geographical regions that consume the product in the country. It improves the palatability and flavour of soup when added.

### PROBLEMS OF INDEGENONS TECHNOLOGY IN FOREST FOOD PROCESSING

- i) Raw material involving the seeds or fruits of these forest plants is not easy to collect from the forest because of competition from wild animals. For instance *Treulia africana* is a major food for parrots, rodents and many birds in the wild. *Pentaclethra macrophylla* is fed upon in the forest by giant rats and porcupines.
- ii) The problem of deforestation has caused the destruction of many of the mother trees of the forest food plants. The tropical rain forest in Nigeria which is home to many of these forest food plants has been destroyed in many communities. This lives the collectors of the forest food products to threack several kilometers to distant farms in search of the raw materials.
- iii) Lack of political will on the part of the government to fund research aimed at development of modern method of processing of these forest food plants is a major problem
- iv) The impression of elites that the indigenous technology used in processing these forest food plants is not safe for consumption constitute a problem. Many of the elites are skeptical in consuming these forest foods because of heath reasons.
- v) The inferiority complex associated with indegenons technology in compassion to western- exogenous technology is as major problem. The domestic technology has been referred to as primitive. This makes it unattractive to the youths who would have taken to processing of these forest food plants.

### CONCLUSION

Nigeria is rich in food-based traditional technologies that can be hybridized with modern scientific technology for the attainment of sustainable development of her citizens. These local technologies are simple and economical. They are being used in the production of soup thickener, seasoning substances and garnishing of products for food not only in rural areas but also in urban centres. The technology is in the hands of women. These suggestion are recommended

- (i) The government of Nigeria can develop a political will to make it more attractive to men for greater productivity, through research into modern methods of processing of forest foods. (ii) Both in-situ and ex-situ methods of conservation should be adopted for useful indigenous food species in Nigeria.

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