

## **Conservation and Biodiversity Erosion in Ondo State, Nigeria: (2). Assessing Botanicals Used in the Storage of Farm Produce in Akure region**

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### **Abstract**

Semi-structured questionnaire matrix was used to identify plant species used for storage purposes in five communities situated within 5kilometre radius from Akure, the Ondo State capital, south-western Nigeria. A total of 32 botanical species were found to be commonly used in the preservation of farm produce in the study area. The leaves constituted the major part of the botanical that were widely utilised while the major farm produce common in the study area were kola nuts and bitter kola. The descriptions of the indigenous knowledge of the various methods of application of the botanicals were identified and documented. Only nine of the botanicals were cultivated abundantly in the study area. The household farm, forest and common area constituted the major primary sources of the storage botanicals. Strategies that could ensure the continuous supply of the storage botanicals were proposed.

**Key words:** Conservation, biodiversity erosion, botanicals, storage

### **Introduction**

In Nigeria, recent initiatives had called for comprehensive inventory of natural resources in the country particularly the floristic composition of the various vegetation types as basis for management planning (Ekete *et al.* 2008). This is particularly necessary in Ondo State where about 200hectares of forest areas are being destroyed annually (Fuwape 2001) through exploitation of timber, fuelwood, shifting cultivation and bush burning.

The effects of such massive deforestation, particularly on the rural dwellers cannot be over-emphasised. Previous studies, such as Akindele (1992), Peters (1996), Olagoke and Adekunle (2008) had

enumerated the dependence of rural dwellers on the use of non-timber forest products for their livelihood. One of such utilisations is the use of forest as source of storage materials. Unfortunately, apart from ethnomedicinal utility, gross dearths of documentations abound on other ethnobotanical utilities (Kayode 2003).

Thus, the study being reported here is part of on-going collaboratory studies on the ethnobotanical utilizations in Ondo State being conducted by the Department of Plant Science, University of Ado-Ekiti, Ado-Ekiti, Nigeria and the Department of Plant Science and Biotechnology, Adekunle Ajasin University, Akungba Akoko, Nigeria.

## **Materials and Methods**

Five communities viz: Ita-Ogbolu, Ayede-Ogbese, Oba-Ile, Ijare and Odudu, all situated within 5kilometre radius from Akure ( $7^{\circ} 17'N$ ,  $5^{\circ} 10'E$ ) the Ondo State capital, south-western Nigeria, were used in this study. In each community, twenty respondents were randomly selected and interviewed with the aid of a semi-structured questionnaire matrix. The interviews were focused, conversational and involved two-way communication (according to Martins 1995). The information obtained was further ascertained by PRA method (according to Balick and Cox 1996).

Plant species used for storage purpose were identified during the interviews. The part(s) of the plant used, method(s) of application, source(s) where the plants were derived were defined. Voucher specimens of the identified species were obtained and kept in the Herbarium of the Department of Plant Science, University of Ado-Ekiti, Ado-Ekiti, Nigeria. Vegetation samplings aimed at the definition of the abundance of the species in the study area were also carried out.

## **Results and Discussion**

A total of 32 botanical species were found to be commonly used in the preservation of farm produce in the study area (Table 1). The leaves constituted the major part of the botanical that are widely utilised while the major farm produce common in the study area are kola nuts and bitter kola (Table 2). Table 2 also give the descriptions of the indigenous knowledge of the various methods of application of the botanicals. The conservation features of the botanicals (Table 3) revealed that only nine botanicals were cultivated abundantly in the study area. These species were cultivated mainly for their economic values. They have edible fruits and/or seeds that serve as source of income in the study area. 11 botanicals were cultivated occasionally in the study area for purposes other than for the storage of farm produce. This tends to suggest that the storage potentials of these species could be regarded as secondary or bi products from these botanicals.

The leaves constituted the major part of the botanicals that were utilised. Though the harvesting of the leaves might not be regarded as being inhibitory yet the utilisation of the leaves of non cultivated species whose wildlings were usually unpreserved in the study area might be quite unsustainable. The use of stem bark from *E. suaveolens* and *R. vomitoria* were inhibitory in harvesting. Previous study by Fasola

and Egunyomi (2002) had revealed that such harvesting method might be detrimental to the health of plants or might even lead to their death. The inhibitory nature of harvesting these plants is further complemented by the fact that they were uncultivated species in the study area. These might lead to the scarcity of these species in the study area. The harvesting methods utilized in *E. guineensis* and *Z. mays* might not necessarily be inhibitory as the two species were important economic crops that were widely cultivated in the study area.

The household farm, forest and common area constituted the major primary sources of the storage botanicals as 41%, 32% and 16% respectively, of the botanicals were sourced from them. The common area and the household farm constituted the main secondary and tertiary sources of the botanicals. 50% and 25% respectively, of the botanicals were sourced from them. These tend to suggest that while the cultivation of most of the botanicals in household farms is practicable, the forest and common area still play considerable role as the repositories of the storage botanicals in the study area. Thus the continued and wantonly destruction of the environment is quite undesirable to the indigenous communities of the study area. Thus while deforestation is being discouraged in the study area, efforts should also be made to encourage reforestation and afforestation activities in the study area.

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**Table 1.** Botanicals used in the storage of farm produce in Ondo State, Nigeria.

S/N	BOTANICAL VERNACULAR		FAMILY	PART(S) USED*	MAJOR SOURCES+		
	NAME				1	2	3
1.	<i>Alchornia cordifolia</i>	Esin	Euphorbiaceae	L	CA	FR	HF
2.	<i>Alchornea laxiflora</i>	Pepe	Euphorbiaceae	L	FR	CA	-
3.	<i>Alium cepa</i>	Alubosa	Alliaceae	BU	PS	-	-
4.	<i>Artocarpus integrifolia</i>	Ade	Moraceae	L	FR	CA	HF
5.	<i>Azadirachta indica</i>	Dongoyaro	Malvaceae	L	HA	CA	-
6.	<i>Calotropis procera</i>	Bomubomu	Asclepiaceae	LA	HF	HA	CA
7.	<i>Carica papaya</i>	Ibepe	Caricaceae	F	HF	CA	-
8.	<i>Capsicum frutescens</i>	Ata wewe	Solanaceae	F	HF	PS	-
9.	<i>Celtis zenkeri</i>	Uta	Ulmaceae	CH	FR	CA	-
10.	<i>Chrysophyllum albidium</i>	Agbalumo	Sapotaceae	L	HF	PS	CA
11.	<i>Citrus aurantifolia</i>	Osan wewe	Rutaceae	F	HA	HF	PS
12.	<i>Colocasia esculenta</i>	Koko	Araceae	L	HF	PS	-
13.	<i>Costus afer</i>	Ireke orisa	Costaceae	L	FR	CA	HF
14.	<i>Costus lucanusianus</i>	Obibo	Costaceae	L	FR	CA	HF
15.	<i>Cymbopogon citratus</i>	Tee	Poaceae	L	HA	HF	CA
16.	<i>Elaeis guineensis</i>	Ope	Areceae	IF	HF	CA	-
17.	<i>Erythrophleum suaveolens</i>	Obo	Caesalpiniaceae	SB	FR	CA	-
18.	<i>Ficus exasperate</i>	Pinpin	Moraceae	L	FR	CA	HF
19.	<i>Leea procera</i>	Aigbokuta	Leeaceae	L	FR	CA	HF
20.	<i>Jatropha curcas</i>	Lapalapa	Euphorbiaceae	L	CA	HA	HF
21.	<i>Mitragyna stipulosa</i>	Gbago	Rubiaceae	L	HF	CA	FR
22.	<i>Musa paradisiaca</i>	Ogede agbagba	Musaceae	L	HF	HA	-
23.	<i>Musanga cacropioides</i>	Agbao	Moraceae	L	CA	FR	-
24.	<i>Nicotiana tobacum</i>	Taaba	Solanaceae	L	HF	PS	-
25.	<i>Rahia hookerii</i>	Iyo	Areceae	T	HF	CA	-
26.	<i>Rauvolfia vomitoria</i>	Asofeyeje	Apocynaceae	L, SB	FR	CA	HA
27.	<i>Sarcophrynium brachystachyum</i>	Gbodogi	Marantaceae	L	FR	CA	HF
28.	<i>Senna siamea</i>	Kasiaa	Caesalpiniaceae	L	CA	HA	-
29.	<i>Spondia mombin</i>	Iyeye	Anacardiaceae	L	CA	HF	HA
30.	<i>Thamautococcus danielli</i>	Uran	Marantaceae	L	HF	CA	FR
31.	<i>Theobroma cacao</i>	Koko	Sterculiaceae	L	HF	-	-
32.	<i>Zea mays</i>	Agbado	Poacea	S	HF	PS	-

\* BU= Bulb, CH= Charcoal, F= Fruits, IF= Inflorescence, L= Leaves, LA= Latex, S= Seeds, SB= Stem bark.  
 + CA= Common area, FR= Forest, HA= Household area, HF= Household farm, PS= Purchased

**Table 2.** The indigenous knowledge of respondents' on storage botanicals in Ondo State, Nigeria.

S/N	BOTANICAL	APPLICATION
1.	<i>Alchornia cordifolia</i>	Used for the preservation of fresh kola nuts. It is used to cover the fresh kola nuts in a container
2.	<i>Alchornea laxiflora</i>	Used for the preservation of fresh kola nuts. It makes the nuts firm. Its leaves are laid on the container, the kola nuts are placed in it and the container is covered with the leaves. It is also used for the preservation of bitter kola. The leaves are placed inside a nylon which is sandwiched within the bitter kola in a container.
3.	<i>Alium cepa</i>	Used to prevent tomato seedlings from pest by planting the species near the seedlings, the odour irritate pests.
4.	<i>Artocarpus integrifolia</i>	Used for the preservation of kola nuts where it helps in the maintenance of the colour of the kola nuts.
5.	<i>Azadirachta indica</i>	Used for the preservation of cocoa trees from insects and pests. The aqueous extracts from the leaves are sprayed on the trees.
6.	<i>Calotropis procera</i>	Used for the preservation of local cheese by adding the latex to the cheese.
7.	<i>Carica papaya</i>	Used together with <i>R. Vomitoria</i> as describe below.
8.	<i>Capsicum fruitecens</i>	Used for the preservation of beans and other legumes. Dried fruits of this botanical are scattered on the beans in container
9.	<i>Celtis zenkeri</i>	Used for the storage of kola nuts where it prevents the nuts from having black spots. Little quantity of the charcoal is sprinkled on the nuts in the container.
10.	<i>Chrysophylum albidium</i>	Used for the preservation of kola nuts where it prevents the nuts from breaking. The nuts are wrapped with the leaves of the species in a container.
11.	<i>Citrus aurantifolia</i>	Used for the preservation of kola nuts from weevil. The whole fruit is inserted into the container containing kola nuts. It is also used for the preservation of cake. The juice is squeezed into the

prepared flour to be baked. The species is also used for the preservation of 'Fufu', a carbohydrate food, during fermentation. The juice is squeezed into the fermented cassava during the preparation.

12. *Colocasia esculenta* Used for the preservation of okra. The okra is placed in a container and covered with fresh leaves of *C. esculenta*.

13. *Costus afer* Used for the storage of bitter kola. The leaves are inserted inside the container that contain bitter kola.

14. *Costus lucanusianus* Used for the preservation of bitter kola. The bitter kola is wrapped with the leaves of this species.

15. *Cymbopogon citratus* Used for the preservation of local concoction. The leaves are added to the ingredients and steamed together. It is also used in the preservation of kola nuts where the fresh leaves are inserted inside the container that contain the kola nuts.

16. *Elaeis guineensis* Used for the storage of palm oil, soup and foodstuff from ants. When the inflorescence is burned near ants' habitat or the place of storage, the ants are irritated. They are subsequently driven away.

17. *Erythrophleum suaveolens* Used for the preservation of kola nuts from weevils and spiritual attack. The dried bark is grinded and little quantity is tied inside small paper that is later inserted in the container containing the kola nuts.

18. *Ficus exasperate* Used for the storage and prevention of beans from weevils. The leaves are sandwiched within the beans in the container.

19. *Leea procera* Used for the preservation of kola nuts where its leaves are used to wrap the kola nuts in a container.

20. *Jatropha curcas* Used for the preservation of kola nuts still within the seed coat against black spots. The extracts of the leaves squeezed on little quantity of the local black soap is placed in the container that contain the kola nuts.

21. *Mitragyna stipulosa* Used for the preservation of dry kola nuts. The leaves of this species are laid in a basket then dried kola nuts are placed on it after which the leaves of the species are used to cover the kola nuts.

22. *Musa paradisiaca* Used for the preservation of fermented locust bean seeds, locally known as *Iru*. The *iru* is wrapped inside the leaves of this species which protect the shelf life of the *Iru*.

23. *Musanga cacropioides* Used for storage of fresh and dried kola nuts. Its leaves are used to wrap the kola nuts in a container.
24. *Nicotiana tobacum* Used for the preservation of eggs that is yet to be hatch or being hatched from insects and snakes. The leaves are burnt near the storage area. The resulting odour irritates the insects and snakes.
25. *Rahia hookerii* The thread-like substance obtained from this species is used to tie kola nuts and keep it in shape.
26. *Rauvolfia vomitoria* Used for the preservation of beans flour and other powdered foodstuffs from weevil. The leaves are inserted within the powdered foodstuff in a container. It is also used for the preservation of dried kola nuts from weevils. Extracts from its bark is mixed pawpaw juice and the mixture is poured into a nylon bag that is inserted into a basketful of kola nuts.
27. *Sarcophrynium brachystachyum* Used for the preservation of kola nuts. Dried leaves of this species are placed within the kola nuts in the container.
28. *Senna siamea* Used for the preservation of immature fresh kola nut. The leaves of this species are laid in a basket the immature kola nuts are placed on it after which the leaves of the species are used to cover the kola nuts.
29. *Spondia mombin* Used for the preservation of bitter kola. The leaves are used to wrap the bitter kola in a container.
30. *Thamautococcus danielli* Used for wrapping pounded yam, *eba* and *fufu*- both are local food prepared from cassava, *eko* and *Moinmoin*-local foods prepared from maize and beans respectively. It maintained their tastes and prolonged their shelve lives.
31. *Theobroma cacao* Used for the preservation of dried kola nuts. The leaves are wrapped around the kola nuts. Also used for the storage of already processed locust bean against termites. The leaf of this species is used to wrap the processed locust bean.
32. *Zea mays* Used for the preservation of fresh and dried kola nuts. Dried maize seeds are scattered inside the kola nuts in a container.

**Table 3.** The conservation features of the botanicals in Ondo State, Nigeria.

## **Cultivated Species**

(a) Species cultivated abundantly in the study area

*A. indica*, *C. frutescens*, *C. aurantifolia*, *C. esculenta*, *C. papaya*, *E. guineensis*, *M. paradisiaca*,  
*T. cacao*, *Z. mays*

(b) Species cultivated occasionally in the study area

*C. albidum*, *C. procera*, *C. citratus*, *F. exasperata*, *J. curcas*, *M. stipulosa*, *N. tabacum*, *R. hookerii*,  
*S. siamea*, *S. mombin*, *T. daniell*,

(c) Species cultivated elsewhere but made available in the study area

*A. cepa*,

## **Non-cultivated Species**

(a) Species whose wildlings are preserved in the study area

*A. integrifolia*, *C. zenkeri*, *C. afer*, *C. lucanusianus*, *E. suaveolens*, *L. procera*, *M. cacropioides*  
*R. vomitoria*, *S. brachystachyum*

(b) Species that grow as weeds in the study area

*A. cordifolia*, *A. laxiflora*