



# **S**URVEY ON THE STORAGE METHODS OF GARCINIA KOLA USED IN OGUN, ONDO AND EDO STATES, NIGERIA

**HADIZA BELLO KATAGUM**

*Department of Soil Science Technology, Bauchi State  
College of Agriculture*

## **ABSTRACT**

The Survey was carried on the Storage methods of *Garcinia kola* in Ogun, Ondo and Edo State, Nigeria. The objectives were to examine the different storage methods of *G. kola* used in study area; analyse the causes and level of damage of *G. kola* during storage in the study area and to determine the influence of education on quantity of *G. kola* storage in the study area. The data for the study was obtained

## **INTRODUCTION**

**G***arcinia kola* is a medicinal plant which is exclusively tropical in distribution, and many people in Africa used it for medicinal purposes (Ajayi and Echi 2016). Similarly, Chinyere et al. (2013) reported that the plants bark, seeds and stem are usually used in the treatment of throat infections, acute fever and inflammation of the respiratory tract. The seed for example is used in the treatment of headache, prevent and relieve colic, gastric disorder, chest cold and cough (Anegbeh et al., 2006). Apart from being used for folklore remedies, it is chewed by many people because of its bitterness and astringent. Bioactive components of the seed according to vast evidence, serve as alternative medicine for the treatment of some immune-destructive diseases as well as ailments such as malaria, hepatitis (Mañourová et al. 2018). *Garcinia kola* as stated by Osunemena (2012) every part of the plant has been found to have medicinal value and thus, referred to as a “wonder plant”. The species, often called bitter kola, refers to as “false kola” or “male kola”.

A large part of forest economy in Nigeria has always been constituted by forest product other than timber and



using structured questionnaire administered to 133 respondent selected using multistage sampling technique. Descriptive statistics such as charts, frequency and percentages were used to evaluate the data. Storage is a very common activity among the respondents and its result showed that 91.7 % considered polyethylene bags as the preferred storage material. The result on the damage indicates that only 9 % recorded less than 10 % damage during storage and the contamination is mostly associated to biotic factors. It was determined that, if *G. kola* is stored properly using conventional method, the level of damage is less very minimal. Influence of education on quantity of *G. kola* stored suggests that education has significant influence on the quantity of storage of *G. kola*. It is recommended that the Federal Government should explore the potentials of NTFPs such as *Garcinia kola* by employing technology to develop and optimize the value chain and to make it more attractive for the younger generation to come in as this would help in discouraging deforestation.

**Keywords:** *Garcinia kola*, Southern Nigeria, Education, damage, storage, polyethylene

wood. These forest products are often called non-timber forest products (NTFPs) which contributes as much if not more, to national product in many countries (Sunderland and Ndoye, 2004). In addition to this, Renuka (2000), revealed that *G. kola* is an important NTFP tree crop second only to timber, it serves as a source of rural and urban livelihood in West and Central Africa. They are not only the chief raw material for traders in various parts of the world, but they also have great social benefits as a source of livelihood for the people residing near the forest areas.

*Garcinia kola* tree is an economically high valued tropical tree that produces *Garcinia kola* seeds which are readily available in West and Central Africa in large quantity. It is a multipurpose tree crop in Southern Nigeria, cultivated in home gardens and widely consumed due to its edible and medicinal seeds. *Garcinia kola* to generate income, it has to be qualitative and utilizable. The quality, value and utilization of the seed are determined by the methods of processing and storage used.



With the level of harvest of *G. kola* among populace and its economic importance, as well as its medicinal use, the empirical information on its processing and storage is not well unveiled. This research, therefore, seeks to explore methods of processing and storage of *Garcinia kola* among farmers.

### **OBJECTIVES**

The broad objective of this research is to assess the various methods used by farmers in processing and storage of *G. kola* in Ogun, Ondo and Edo State, Nigeria. While the specific objectives were to:

- I. examine the different storage methods *G. kola* in study area;
- II. analyse the causes and level of damage of *G. kola* during storage in the study area and
- III. determine influence of education on quantity of *G. kola* storage.

### **METHODOLOGY**

The study was carried out in southwest zone of Nigeria involving two states of Ogun and Ondo; and south-south zone of Nigeria in which one state of Edo is considered due to the production of that crop in that area. Ogun state is located between Lat.  $7^{\circ}00'7.000''\text{N}$ , Long.  $3^{\circ}35'3.583''\text{E}$ . The population of Ogun is 3,751,140 with a total land mass of 16,980.55 km<sup>2</sup> (NPC 2010). The state is within the humid tropical climatic zone, mainly characterized with high rainfall and high relative humidity (rainfall 105-128 mm). The mean annual temperature is 26 °C which varies a little over time. The state has tropical rainforest found in the coastal areas near the Ogun Waterside, part of Egbado South such as Shagamu, Ijebu Ode, Ijebu Igbo and Odogbolu (Akanni 2000). Ondo state is located Lat.  $7^{\circ}00'10''\text{N}$  Long.  $5^{\circ}05'00''\text{E}$  with a population of 3,446,877 and a total land mass of about 15,195.18 km<sup>2</sup> (NPC 2010). It geographically lies entirely in the tropical belt, it is covered with luxuriant vegetation with rain forest in the south and sub-savannah forest in the northern fringe. The annual rainfall differs from 2,000 mm in the southern areas to 1,150 mm in the northern areas, the temperature ranges from 21° C to 29 °C (Adisa, 2011). Edo state is located lat.  $6^{\circ}30'00''\text{N}$  long.  $6^{\circ}00'00''\text{E}$ . According to World Encyclopaedia (2018) it geographically lies on a rolling coastal plain crossed by rivers in an area of tropical rain forest. About 40 % of the region is forest reserve. The population of the state is approximately 3,233,366 with a total land mass of



19,819.28 km<sup>2</sup> (NPC 2010). The annual rainfall ranges between 1750 to 2000mm and the average daily temperature is about 27 °C.

### **Sampling and Data Collection**

Multistage sampling technique was used for the selection of respondents during data collection for the research. In the first stage: Purposive sampling was used for the selection of study site. The location is situated within three states of southern Nigeria that is Ogun, Ondo and Edo states respectively, because the site is the location of *G. kola* abundance in the country. In the second stage: For the selection of target respondents and their communities, snowball sampling technique was adopted. Although most of the inhabitants are Yoruba by tribe but some Hausa tribe migrated from the northern part of the country and settled there. Therefore, the tribe leader of the Hausa people was contacted to link the researcher with *G. kola* farmers from each of the selected community for the research. One hundred and twenty-six (126) respondents from fourteen different communities in the study area were contacted, seventy-eight (78) respondents from Ondo State, twentyseven (27) from Edo state and twenty-one (21) from Ogun state. However, seven (7) respondents were contacted from Wuse market, Abuja which is out of the initial study area which gives a total of 133 respondents. This is because most of the *G. kola* traders are found there. This helped to add some information on market and storage, making the total of 133 respondents for the research.

### **Analytical Techniques**

Descriptive statistics was used in grouping socio-economic characteristics of the respondents and also used to achieve objectives i and ii, while Analysis of variance (ANOVA) was used to achieved objective iii.

## **RESULTS AND DISCUSSIONS**

### **Different Methods of Storage and Processing of *G. kola* Used in the Storage Method Used for Seed**

The storage method used in the area of study is presented in Figure 1. The result reveals that 2 (1.5 %) of the respondents do not store *G. kola* at all. However, majority of them store *G. kola* using storage methods such as cocoa yam leaves 1 (0.8 %), polyethylene bags 122 (91.7 %), sawdust 3 (2.3 %), dry plantain 4 (3 %) and



other methods 1 (0.8 %). The result indicates that the use of polyethylene was the most popular and the largely adopted means of storage among the respondents.

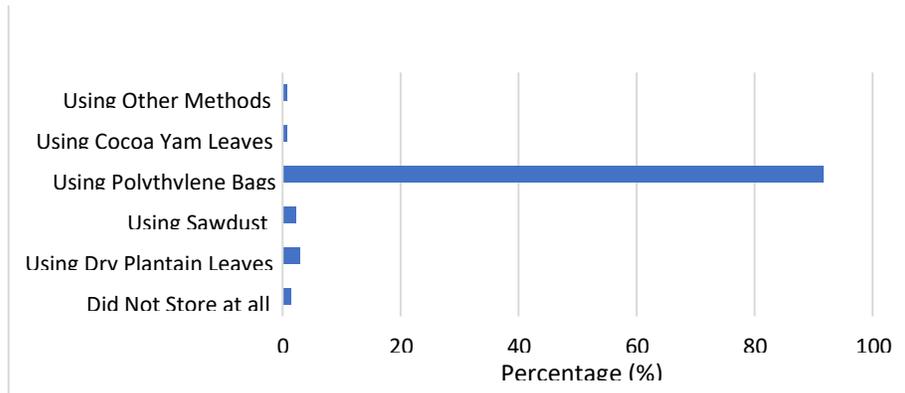


Figure 1: Storage Method Used.  
Source: Field Survey 2018.

### Duration of Storage

Figure 2 reveals the duration of storage of *G. kola* in the study area. The result indicates that majority of the respondent 101 (75.5 %) stored *G. kola* for over 10 weeks. Only 2 (1.5 %) respondents stored *G. kola* for period of less than 2 weeks. Other respondents stored *G. kola* respectively for durations of 8-10 weeks 11 (8.3 %), 5-7 weeks 2 (1.5 %) and 2-4 weeks 17 (12.8 %)

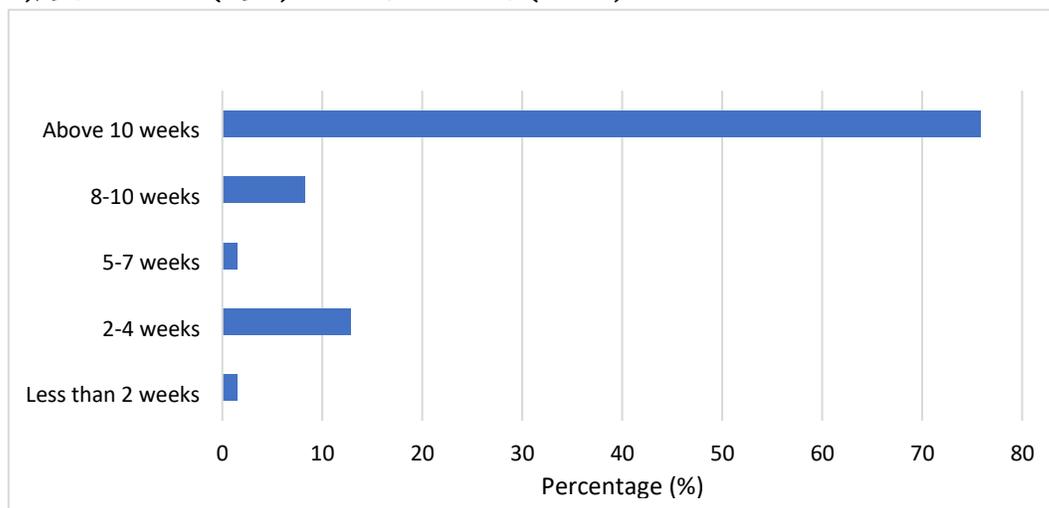


Figure 2. Duration of Storage.  
Source: Field Survey 2018.



### Causes and Level of Damage of *G. kola*.

For the purpose of determining causes and level of damage *G. kola*, variables such as causes of contamination and level of damage during storage was presented.

### Causes of Contamination of *G. Kola* during Storage

Figure 3 shows causes of contamination of *G. kola* during storage. The result reveals that that even though the majority of the respondents 118 (88.7 %) have not witness any contamination of *G. kola*, 14 (10.5 %) of the respondents believed that contamination of *G. kola* during storage was due to biotic factors while only 1 (0.8 %) respondent considered contamination of *G. kola* during storage was due to abiotic factors. This suggests that in the study area, biotic factors were the common factors that cause contamination of *G. kola* during storage.

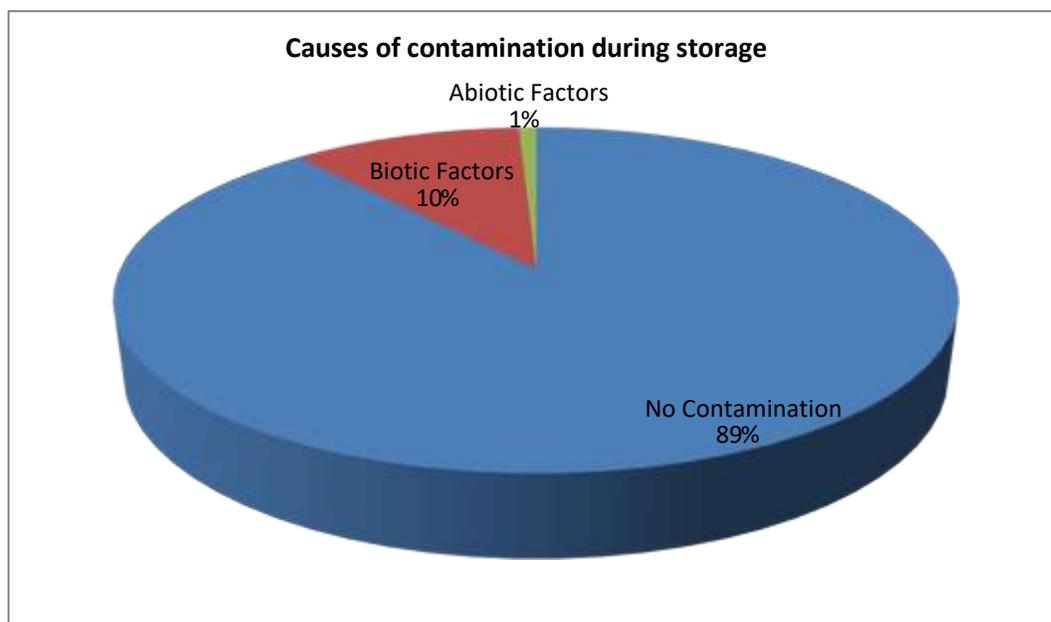


Figure 3 Causes of Contamination during Storage.

Source: Field Survey 2018.

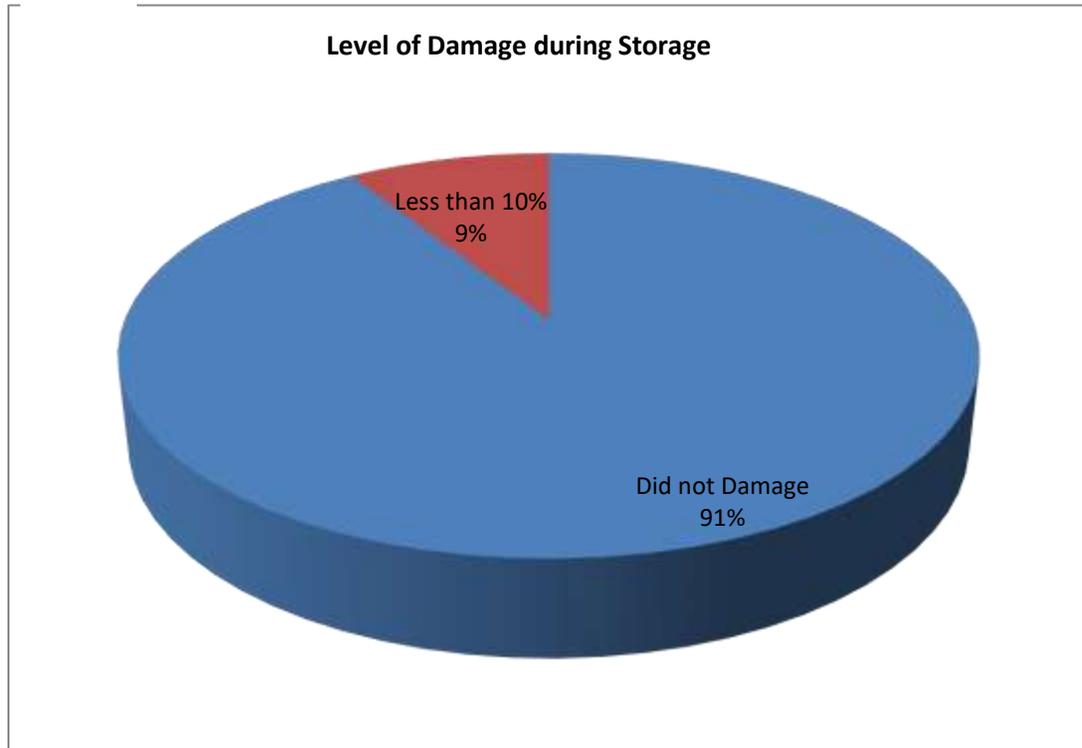
### Level of Damage of During Storage

Figure 4 shows the level of damage of *G. kola* during storage. The result reveals that only 12 (9.0 %) respondents reported less 10 % damage. Majority of the respondents 121 (91 %) indicated that they did not witness any damage during storage. This implies that



the level of damage of *G. kola* when stored properly is minimal.

N = 133



**Figure 4.** Level of Damage during Storage.

Source: Field Survey 2018.

#### Influence of Education on Quantity of Storage

The analysis of variance (ANOVA) was used to test the hypothesis: education has no statistical significant influence on stored quantity of *G. kola*. The results of the analyses are presented in Table 1 below.

**Table 1: Influence of Education on Quantity of Storage**

Source	Sum square	of Degree of freedom	Mean square	F	Sig.
Between groups	329.417	3	109.806	4.885	.003
Within groups	2854.892	127	22.479		



<b>Total</b>	3184.309	130			
--------------	----------	-----	--	--	--

Table 1 depicts the result of ANOVA on influence of education on quantity of *G. kola* stored. From the table, there was a statistical significant influence of education on quantity of storage between groups at the  $p < 0.05$  level as determined by one-way ANOVA ( $F(3, 127) = 4.885, P = 0.003$ ). The result therefore, suggests that education has significant influence on the quantity of storage of *G. kola*.

## CONCLUSION

It can be concluded based on this study that *G. kola* farmers use polyethylene bags for storage and the more educated the farmers are the more quantity of *G. kola* is stored before offering for sales. While in storage damage sometimes occur as a result of biotic factors.

## REFERENCE

- Adisa A. 2011. Ondo State – “The Sunshine State”. Available from <https://www.cometo-nigeria.com/region/south-west/ondo-state/> (accessed October 2018). Agiyili J, Sacande M, Kouame C. 2006. *Garcinia kola* Heckel. Seed Leaflet, (113).
- Ajayi S, Echi, AA. 2016. Effect of Pregermination treatments on the dormancy breaking and early growth Performance of bitter kola (*G. kola* (Hechel) in South Southern Nigeria. *Journal of Research in Forestry, Wildlife and Environment*. 8(2): 29 – 39.
- Akanni CO. 2000. Physical Environment Ogun state Local and Regional Perspectives, Centre for Sandwich Programmes (cesap) Ogun State University, Ago-Iwoye. Ashgate Publishing Ltd, Avebury. 14-25.
- Anegbeh PO, Iruka C, Nikirika C. 2006. Enhancing germination of bitter cola (*Garcinia kola*) Heckel: Prospects for agroforestry farmers in the Niger Delta. *Sci. Afr.* 5: 38–44.
- Chinyere CE, Ebakota OD. 2013. Antibacterial Activity of *Garcinia kola* Seed and Leaf Extract on Some Selected Clinical Isolates. *Science Journal of Microbiology*. 9:1-8.
- Maňourová A, Leuner O, Tchoundjeu Z, Van Damme P, Verner V, Pr̃ibyl O, Lojka B. 2018. Medicinal Potential, Utilization and Domestication Status of Bitter Kola (*Garcinia kola* Heckel) in West and Central Africa. *MDPI forest review*.
- National Population Commission (2010). Population Distribution By Sex, State, LGA & Senatorial District. Abuja, Nigeria. 65 p.
- Osunomena, O. 2012. A review of some African medicinal plants. *International Journal of Pharma and Bio sciences*. 3 (4): 1-11.
- Renuka C. 2000. Status of Rattan Resources and Uses in South Asia. In Non – Wood Forest Product FAO 14, Rattan Publ. J. D Rantified, Teroso, F. O, and Manokaran, N. (Eds). 101 – 114.
- Sunderland T, Ndoye O. 2004. *Forest Products, Livelihood and Conservation*. A Case Study of Non-Timber Forest Product Systems. 2.
- World Encyclopedia. (2018) "Edo" Encyclopedia of World Cultures. Available at <http://www.encyclopedia.com/humanities/encyclopedias-almanacs-transcripts-andmaps/edo>: Accessed 2018-10-17.