

## Postharvest Processing and its Effects on Kolanut Quality in Southwestern Nigeria

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### ABSTRACT

The study investigates the effect of post-harvest processing of kolanut on its quality. The study was carried out in the Southwestern Nigeria, specifically, Ogun, Osun and Ondo States. Purposive sampling technique was used to select three kola producing Local Government Areas (LGAs) from each State and one community was randomly selected from each of the selected LGA. A total of fifty-four kolanut processors were randomly selected from the nine communities. Information was collected from the selected processors with the aid of questionnaire and the data retrieved from the questionnaire were analysed using descriptive analysis. The result of the analysis shows that 64.2% of the respondents were aged 50 years and above while 94.4% of the respondents were female. Most (48.1%) of the respondents believed that the bitter taste of kolanut can be reduced by storing the nuts for a long time. Majority (79.6%) of the respondents claimed that they use leaf to preserve kolanut and 27.8% of this agreed that the use of leaf enhances the appearance of the nuts. Majority (96.3%) of the respondents use chemicals to preserve their nuts against pest infestation. With this, the study therefore recommended that the processors should look for a more body friendly way of preserving the nuts rather than using chemicals.

**Keywords:** Post-harvest, kolanut, quality, preserving, processors.

### INTRODUCTION

Kola is a member of the tropical family sterculiaceae and it grows as a tree form. It is believed that kola trees are native to Ghana and Ivory Coast and their spread has brought about by humans (American Horticultural Society, 2002). There are over fifty species of kola. Of these, seven have edible nuts, but only two have been widely exploited, these are *cola nitida* and *cola acuminata*. These species have been important objects of trade for a long time. The most important is *cola nitida* because of its wide economic value (Oluyole *et al.*, 2009). Kola is mostly produced in Africa and is cultivated to a large degree in Nigeria but also in Ghana, Ivory Coast, Brazil and the West Indian Islands (Oludemokun, 1983; Opeke, 1982). Annual production from these countries alone is in excess of 250,000 tons while the world production is about 300,000 tons (American Horticultural Society, 2002). According to Quarcoo (1969), Nigeria produces 88% of the world's kola production and 90% of this is consumed locally while the remaining 10% is exported. This finding was buttressed by

Oluokun and Oladokun (1999) who claimed that Nigeria produces two million metric tons of kolanut annually which represented 70% of the world's kolanut production.

Kolanut post-harvest processing starts by careful examination and sorting out pods infested with weevils, diseases and other deformities, from the healthy pods. The seed coat or testa of the nuts from these healthy pods are removed by soaking the nuts in clean water for 24 h to enhance rotting, after which the nuts are skinned and rinsed in fresh water. The rinsed nuts are collected in wide flat baskets through which excess water drains off before they are kept inside the room where they are maintained under ambient room temperature for a period of three days to cure. Defective/infested nuts are picked out during this curing process that usually involves considerable sweating to reduce the moisture content of the nuts. The nuts are then graded into sizes for proper preservation in big sized baskets (Asogua *et al.*, 2011)

Kola is an important economic cash crop to a significant proportion of Nigerian population who are involved in kola farming, trading and industrial utilization. However, Nigeria accounts for about 70% of the total world production of kolanuts (Oluokun and Oladokun, 1999; Oluyole, *et al*, 2009). The kolanut is used as a masticatory and stimulant in the tropics. It also has industrial usage in pharmaceuticals, production of soft drinks, wines and in confectionaries (Oguntuga, 1975). The kolanut pod husk, which is a byproduct from processing the nut, is widely used for animal feeding because of its high nutritive quality. According to Babatunde and Hamzat (2005), broilers fed with kolanut pod husk meal diets had an outstanding growth performance. Apart from this, kolanut is a very important farm produce which is used in extensive culturally and consumption. Culturally, kolanut is used to observe naming ceremony, wedding ceremony and for entertaining visitors. However, extensively, kolanut is consumed in Nigeria, especially in the Northern part of Nigeria. It is on record that the substantial proportion of the kolanut being produced in Nigeria is consumed domestically (Oluyole *et al*, 2009). However, the consumption of this valuable farm produce is limited by the bitter taste of the commodity. Hence, efforts must be put in place to reduce the bitter taste of the nut into a minimum level through post-harvest processing so as to increase its consumption level domestically. Therefore, the main aim of this project is to enhance the quality of kolanut through postharvest processing of the nut.

**METHODOLOGY**

The study was carried out in three Southwestern States namely Ogun, Osun and Ondo States. In each State, three kola producing Local Government Areas (LGAs) were purposively selected from each of the selected States thus making a total of nine LGAs used for the study. The randomly chosen LGAs are Sagamu, Ikenne and Ogunmakin from Ogun State; Ife-South, Ori-Ade and Atakunmosa from Osun State while Ifelodun, Ero, Ile-Oluji/Oke-Igbo from Ondo State. From each of the randomly selected LGAs, one community was randomly selected, these are Sagamu from Sagamu LGA, Illisan Remo from Ikenne LGA, Ogunmakin from Ogunmakin LGA, Omifunfun from Ife-South LGA, Apoti-Ayetero from Ori-Ade LGA, Olode from Atakunmosa LGA, Ikirun from Ifelodun LGA, Ero from Ero LGA and Bankemo from Ile-Oluji/Oke-Igbo LGA. Structured questionnaire was used to collect information from fifty four

respondents (kola processors). The data retrieved from the information collected was analysed using descriptive analysis.

**RESULT AND DISCUSSION**

Table 1 shows the socio-economic characteristics of the respondents. The table shows that most (64.2%) of the respondents were aged 50 years and above while only one respondent was aged thirty years and below. This shows that most of the kolanut processors are aged and this would automatically reduce their performance as young and vibrant individuals are more efficient. Table 1 also shows that majority (94.4%) of the respondents were female showing that there are more female kolanut processors than men in the study area. This is quite obvious because women are more engaged in farm produce processing than men and the result is in consonance with Adamu *et al* (2006), who stated that majority of rural women engaged in off-farm activities such as packing, processing, storage, buying and selling of farm produce while their male counterparts are involved in the real farm cultivation. It could also be observed in Table 1 that 42.6% had no formal education while 40.7% had just primary school education. Only 16.7% of the respondents had post-primary school education showing that the educational status of the respondents in the study area is low. This may have negative impact on the productivity of the respondents as they would not be able to read and interpret the result of the research findings.

**Table 1.** Socio-economic variables of kolanut processors

Variables	Frequency	Percentage
<b>Age</b>		
≤ 30	1	1.9
31-40	12	22.6
41-50	6	11.3
51-60	12	22.6
>60	23	41.6
Total	54	100.0
<b>Gender</b>		
Male	3	5.6
Female	51	94.4
Total	54	100.0
<b>Educational Status</b>		
No formal education	23	42.6
Primary education	22	40.7
Secondary education	9	6.7
Total	54	100.0

**Source:** Field survey, 2014.

Table 2 shows the post-harvest processing of kolanut. The table shows that majority (96.3%)

of the respondents processed *Cola nitida* (gbanja/goro) while 3.7% of the respondents process *Cola acuminata* (local kolanut). All (100%) of the respondents submitted that they process kolanut to avoid the nuts from being spoilt. The result of the analysis also showed that 48.1% of the respondents believed that the bitter taste of kolanut can be reduced by storing the nuts for a long time while 37.0% of the respondents believed that nothing could be done to remove the bitter taste of kolanut, hence, the bitter taste will have to remain there. Meanwhile, a small proportion of the respondents believed that bitter taste of kolanut can be reduced by the use of leaves to preserve the nuts and changing of the leaves periodically. Others believe that the bitter taste of kolanut depends on the processing technique used as well as the colour of the nut; red kola is bitter while white one is not bitter. However, some believe that Okuku as well as Ile-Oluji kolanuts do not taste bitter. Meanwhile, 79.6% of the respondents claimed that they use leaf to preserve kolanut and 27.8% of this agreed that they use leaf to preserve kolanut in order to enhance the appearance of the nuts while 33.3% claimed that they use leaf in order to prevent the nuts from being spoilt. Others use leaf for preservation because it dries up the nuts quickly, it makes the storage to be airtight and it improves the taste of the nuts. However, 77.8% of the respondents used nylon to preserve their nuts and the reason for this as claimed by the 50% of the respondents is that nylon is airtight and this prevents the nut from being spoilt while 7.4% of the respondents submitted that nylon enhances the storage of kolanuts for a long time. Other reasons given by the respondents for using nylon are: leaf dries up quickly, nylon saves labour and does not need to be changed regularly as leaf, leaf is no more available in the bush, leaf makes kolanut to burn and nylon moistens nuts. Almost all the respondents (96.3%) agreed that they use chemicals to preserve their nuts while 81.4% of the processors uses the combination of gamallin 20 and phostocin. However, 9.3% each uses gamallin 20 and phostocin separately. The essence of using these chemicals is to protect the nuts against pest infestation. Meanwhile, preservation of kolanuts with chemicals is highly discouraged because of its negative effects on human's body. Table 2 also revealed that 83.3% of the processors ferment their kolanuts before peeling. The reason for this as claimed by 33.3% and 31.5% was that it enhances long term storage and that it eases

peeling respectively. Other reasons as given by the respondents for fermenting kolanuts before peeling are: it enhances the appearance of the nut, it enhances colour to conspicuously show the black line of the nut and it stops certain type of insects from attacking the nuts.

**Table2.** Post-harvest Processing of kolanut

Variables	Frequency	Percentage
<b>Type of kola processed</b>		
Local kolanut	2	3.7
Gbanja/Goro	52	96.3
Total	54	100.0
<b>Why do you process your kolanut?</b>		
To avoid spoilage of the nut	54	100.0
To reduce bitter taste	0	0
To improve the physical outlook	0	0
To improve the quality of the nut	0	0
Total	54	100.0
<b>How do you reduce the bitter taste of kolanut?</b>		
Store the nut for a long time/well dried	26	48.0
Change the leaves periodically	1	1.9
Bitter tasting depends on colour; red kola is bitter while white one is not bitter	1	1.9
Bitter tasting depends on the processing technique used	1	1.9
Use leaf to preserve the nuts	1	1.9
Nothing could be done to remove the bitterness	20	36.8
Kolanut does not taste bitter	1	1.9
Okuku variety does not taste bitter	1	1.9
Ile-Oluji variety does not taste bitter	1	1.9
No response	1	1.9
Total	54	100.0

Source: Field survey, 2014.

**Table2.** (Contd.)

Variables	Frequency	Percentage
<b>Do you use leaf to preserve kolanut?</b>		
Yes	43	79.6
No	11	20.4
Total	54	100.0
<b>If yes, why do you use leaf?</b>		
To enhance the appearance of the kolanut	15	27.8
To dry up the nut quickly	4	7.4
To be used as airtight	4	7.4
To preserve the nut to avoid spoilage	18	33.3
To improve taste (to reduce bitterness)	2	3.7
To avoid being heated	1	1.9
No response	10	18.5
Total	54	100.0
<b>Do you use nylon to preserve your nut?</b>		
Yes	42	77.8
No	12	22.2
Total	54	100.0
<b>Why do you use nylon to preserve kola?</b>		
Leaf dries up quickly	1	1.9
Nylon is airtight and avoid spoilage of nut	27	50.0
Nylon saves labour and does not need to be		

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changed regularly as leaf	3	5.6
Leaf is no more available in the bush	1	1.9
Leaf makes kolanut to burn	2	3.7
Nylon moistens nuts	3	5.6
Nylon enhances storage for a long time	4	7.4
No response	13	24.1
Total	54	100.0

Source: Field survey, 2014.

Table 2. (Contd.)

Variables	Frequency	Percentage
<b>Do you use chemical to preserve your nut?</b>		
Yes	52	96.3
No	2	3.7
Total	54	100.0
<b>If yes, what type of chemical?</b>		
Gamalin 20 and Phostocin	44	81.4
Gamalin 20 alone	5	9.3
Phostocin alone	5	9.3
Total	54	100.0
<b>Do you ferment your kolanut before peeling?</b>		
Yes	45	83.3
No	9	16.7
Total	54	100.0
<b>Why do you ferment before peeling?</b>		
To enhance the appearance of the nut	3	5.6
To ease peeling	17	31.5
To enhance colour	4	7.4
To enhance long term storage	18	33.3
To conspicuously show the black line of the nut	1	1.9
It stops certain type of insect from attacking the nut	2	3.7
No response	9	16.7
Total	54	100.0

Source: Field survey, 2014.

## CONCLUSION

Kolanut is preserved primarily to prevent the nut from being spoilt and the bitter taste of kolanut can be reduced by storing the nut for a long time. Kolanut can be preserved with the use of leaf and nylon. These will keep the nut airtight thus preventing it from being spoilt. However, nylon has the advantage that it does not dry up quickly and hence it does not need to be changed regularly as it is does for leaf.

Fermenting of skinned kolanuts before peeling is encouraged as it enhances long term storage and eases peeling. Kolanut processors protect their kolanut against pest infestation with the use of Gamallin 20 and phostocin. This is highly discouraged because of its negative effects on human's body. With this, it is therefore recommended that the processors should look for a more body friendly way of preserving the nuts rather than using chemicals.

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