



TECHNICAL SHEET FOR IMPROVING POST HARVEST STORAGE AND CONSERVATION OF KOLANUTS

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ABSTRACT

Kolanut is one of the most popular fruits in traditional ceremonies in Africa and it has great added value when it is well preserved for a long time. However, we found lot of losses during storage due to handling and poor storage conditions. The objective of this study was to evaluate effect of an improved process of storage and conservation on kolanuts. This resulted in the implementation of improved treatment process and storage condition. The study identified a CCP (Critical Control Point) by using HACCP method which reduces losses by 5 to 8 % after 10 months of storage compared to 15 % losses for the traditional method. This improved process reduces losses and adds value to kolanuts and allowed actors income rising.

Keywords: Kolanuts, HACCP, CCP, improved process, post-harvest storage

INTRODUCTION

Côte d'Ivoire is the world's largest producer and exporter of kolanuts, with around 100,000 tons of fresh nuts per year¹. According any authors, the fresh nuts (seeds) of kola are consumed for their physiological effects and kola is also used for many purposes². However, handling, poor storage conditions and post-harvest treatment of nuts result in many losses during storage¹. People use inadequate chemical treatment of the nuts and store them in poor condition. Moreover, the packages commonly used for storage are sources of numerous physical destruction of kolanuts³.

Indeed, some authors^{3,4} pointed out the handling, the packaging and the storage condition of kolanuts as sources poor sanitary quality of nuts and the enormous losses. The objective of this study is to implement an improved process dealing with HACCP method focus on washing of select wholesome nuts in soapy water containing a chlorinated disinfectant to reduce kola nuts losses.

MATERIALS AND METHODS

The biological material consists of kolanuts in pods (Figure 1A) collected in the area of Anyama (south of Côte d'Ivoire) harvested preferably from trees or plucked at maturity. Pods were breached, skinned and the kolanuts sorted to collect wholesome ones. The risk analysis for the identification of critical control points (CCP) was conducted according to the HACCP method described^{5,6}. The process steps ranged from sorting nuts from pods (Figure 1 A) to packaging (Figure 1 F).

The process units were focus on washing of select wholesome nuts in soapy water containing a chlorinated disinfectant (Figure 1 C) and then rinse with clear water (Figure 1 D) to be packaged in container PVC at ambient temperature (29 °C) (Figure 1 E) and at air-conditioned temperature. This improved packaging

using PVC Container (Figure 1 E) was compared to traditional container using basket lined with leaves of *Thaumatococcus daniellii* (Figure 1 F). The packages were stored for ten months with monthly analysis.

RESULTS AND DISCUSSION

The kolanuts are processed according to the process below (Figure 2). This process describes the step units focus on one Critical Control Point (CCP) identified at the watching step according to HACCP Hazard Analysis Critical Control Point, carrying out. The losses recorded in the various containers (PVC container and traditional container i.e. a basket lined with leaves of *Thaumatococcus daniellii*) are summarized in Table 1. The loss rates of red-colored kolanuts in container PVC were 5 % at ambient temperature (29 °C) and 7 % at air-conditioned temperature (26 °C). The loss rates of white-colored kolanut in container PVC were evaluated at 8 % at ambient temperature (29 °C) and 10 % at air-conditioned temperature (26 °C). With traditional container, the loss rates were 15 %. These losses ranged from 5 to 15 % with a better result for the preservation of red-colored kolanuts.

All processes significantly reduce the losses (5-15 %) of kolanuts with good conservation of the red-colored nuts packaged in PVC container at ambient temperature compared to enormous losses more than (50 %) reported by FIRCA⁴. Degradations in the quality of kolanuts causing losses are due by weevils (*Balanogastriis kolae*, *Paremydica insperata*), Diptera (*Pterandrus colae*) and fungi (*Aspergillus niger*) for 30 to 70 % of nuts destruction during storage⁷. Chlorinated disinfectant applied during the washing step of kolanuts, in improved process follow by a clean conditioning allowed reducing of pests. Action of chlorinated disinfectant is summed up by the effect of hypochlorite ion (ClO⁻) which destroys the cytoplasmic membrane of pests⁸.

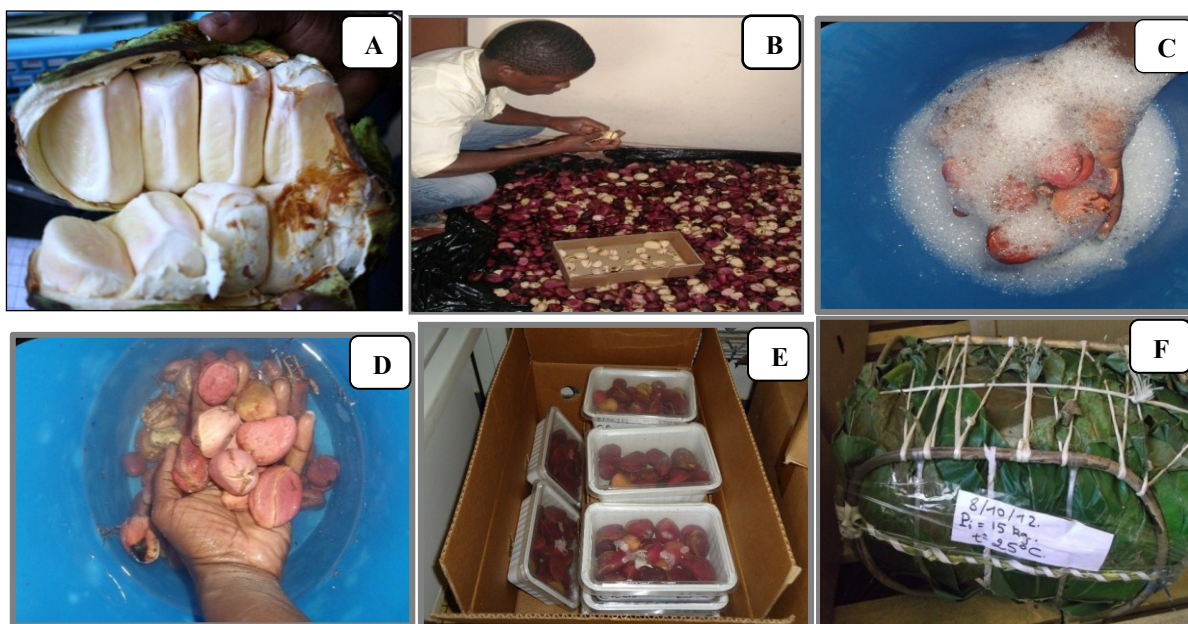


Figure 1: Kolanuts processing steps (A to F)

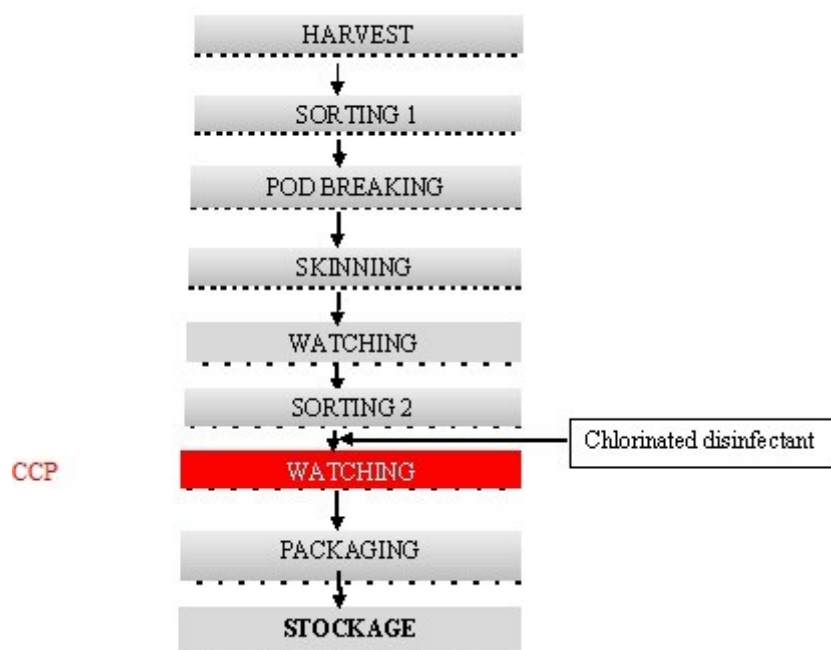


Figure 2: Improved process of kolanuts treatment

Table 1: Summary of losses recorded over a period of 10 months

Packaging	Storage temperature	Losses rate (%)
Container PVC (red kola) at room temperature	(29 °C ± 1 °C)	5
container PVC (red kola) at air-conditioned temperature	(26 °C ± 1 °C)	7
Container PVC white kola at ambient temperature	(29 °C ± 1 °C)	8
Banquet PVC white kola at air-conditioned temperature	(26 °C ± 1 °C)	10
Traditional container (traditionally method of conservation)	(29 °C ± 1 °C)	15

CONCLUSION

The improved process dealing with HACCP method focus on washing of select wholesome nuts in soapy water containing a chlorinated disinfectant enhanced the storage of the kolanuts and reduce the losses to less than 5 % compared to 15 % losses for the traditional method. This improved process allows well conservation of kolanuts and that allowed actors income rising.

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