

Research article

Technical Sheet on two conservation methods for three fresh varieties of cassava (*Manihot esculenta* Crantz)

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Abstract

Cassava (*Manihot esculenta* CRANTZ) is an important food source of carbohydrates in the tropics. Cassava roots have a short shelf life due to a process known as post-harvest physiological deterioration (PPD). This study showed that three varieties Bonoua 2, TMS4(2)1425 and Yacé storage in pit and in box after bleaching roots increase the conservation for six weeks.

Keywords: Cassava, conservation, pit, box, bleaching

Introduction

Cassava (*Manihot esculenta* CRANTZ) is a woody shrub of the Euphorbiaceae family grown mainly for its edible tuberous roots (Zidenya *et al.*, 2012). Worldwide, cassava is the sixth most important crop after wheat, rice, maize, potato and barley and is the fourth most important food source of carbohydrates in the tropics after rice, maize, and sugar cane. It is a staple food for more than 500 million people (Zidenya *et al.*, 2012; Katie *et al.*, 2015). In Sub-Saharan Africa, cassava is mainly grown by smallholder farmers, often on marginal land where it is productive even on poor soils and under drought conditions. Thus, cassava is a crop for both food security and income generation in least developed countries (Naziri *et al.*, 2014). In addition, cassava has low demand for modern inputs and is relatively resistant to diseases, which contribute to its rapid propagation (Zhao *et al.*, 2014). In Côte d'Ivoire, cassava is grown on about 4/5 of the national territory and is the major food crop after yam (N'Zué *et al.*, 2004). Starch of cassava is also used in the textile, paper, pharmacy, and plastic industries (Emmanuel *et al.*, 2012). According to the Food and Agriculture Organization of the United Nations (FAO, 2013), this food has the potential to become the raw material base for a number of processed products. That may increase the demand for cassava and contribute to agricultural transformation and economic growth in developing countries. However, the utilization and efficient commercialization of cassava are affected by its short shelf-life. The ease of cultivation of this plant, its ability to adapt to different soil types and its tolerance to drought have contributed to the expansion of its crop. The major problem facing the efficient marketing and processing of fresh cassava in Côte d'Ivoire is its short shelf life. Indeed, enzymatic browning leads to the rapid deterioration of the cassava root just a few days after the harvest causing losses which have an important impact

on the economy and food security. With a view to improving the quality and shelf-life of cassava roots produced in Côte d'Ivoire, a research Development project entitled "Cassava-based cassava valuation project" Initiated by the UEMOA (WAEMU-UEMOA) and implemented by the Laboratory of Food Biochemistry and Tropical Products Technology of Nangui Abrogoua University



Photo 2 : Harvesting cassava roots using daba (Y. Djina)

2- Material and Methods

2-1- Vegetable material

Mature roots (six months) of *Manihot esculenta* CRANTZ (varieties Bonoua 2, TMS 4(2)1425 and Yacé) were harvested from the Biological Garden of Soumalekro (Bonoua 5°16'20''North ; 3°36'3''West, Côte d'Ivoire). Healthy roots of cassava were carefully cleaned, labeled and then split into two groups (controls and trials). The selected roots were subjected to conservation tests.



Yacé



Bonoua 2



TMS4(2)1425

Photo 3: Three varieties of cassava roots(Y. Djina)

3- Results & Discussion

3-1- Bleaching

The bleaching device consists of a gas bottle (fire), a saucepan (50 liters), water and a perforated basket (Photo 4).



Photo 4 : Device for bleaching cassava roots (photos **Y. Djina**)

Bleaching consisted of soaking the cassava roots in hot water (65 ° C) for 15 to 30 seconds (**Photo 5**).



Photo 5: Bleaching of cassava before burying (photos **Y. Djina**)

Storage by cassava root pits

Once cassava roots were selected, they were blanched (soaked in water at 65 ° C for 15 seconds) and then allowed to cool to room temperature. These manioc roots were placed in the pits (dug under cover) and then covered with soil (Photo 6).



Photo 6: Fresh cassava in pit storage (photos **Y. Djina**)

Storage in box of cassava roots

The cassava roots were sorted and the unwounded roots were laid out in a basket, then blanched at 65°C during 30 seconds. They were left to cool down at room temperature (32.81 ± 0.98 °C) then laid out in a box (L: 1m, L: 0.5m and H: 0.5m) whose bottom is covered with wet sawdust (water content: 45%). The roots are then covered with wet sawdust for the conservation in the box. The bleaching of the roots is carried out as before. The roots thus treated are placed in the boxes, the bottoms of which are covered with a layer of wood sawdust moistened with 45%. The roots were then covered with moistened sawdust (Photo 7).



Photo 7: Fresh cassava in box storage (photos **Y. Djina**)

Aspects of the pulp of preserved cassava roots

The heat treatment (bleaching) of cassava roots in the fresh state and their burial in earth or in sawdust (boxes) allowed us to conserve the roots of the Bonoua2, TMS4 (2)1425 and Yacé for six weeks (42 days). This picture

shows the pulp aspect of the roots of the different varieties treated and buried with their control (Photo 8). The results indicate that there is no browning in the pulp of cassava roots which have under gone bleaching and then buried either in pits or in boxes. The results indicate that there is no browning in the pulp of cassava roots which have under gone bleaching and then buried either in pits or in boxes.

Variétés	Témoins	R A L	B F	B C
Bonoua 2				
TMS4(2) 1425				
yace				

Photo 8: Appearance of pulp of cassava roots during storage (photos **Y. Djina**)

RAL: Roots exposed to the open area for 3 days; BF: Bleached roots then buried in pits for 6 weeks; BC: Bleached roots then buried in box for 6 weeks.

4- Conclusion

This study allowed the development of two methods of preserving fresh cassava root. This is the conservation of cassava after bleaching by burial in the earth (pit) and sawdust (crate). These two methods allowed the extension of the shelf life of the roots of three varieties of cassava at 6 weeks.

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