Gari Revolution Workshop

Roadmap to an Efficient and Equitable Gari Processing System

Ibadan, Nigeria, October 4-6, 2016
Model peeling and gari processing

By

Peter Kolawole¹, Taiwo Samuel², Thierno Diallo¹, Adebayo Abass¹, Crysantus Akem¹, Peter Kulakow¹

1. International Institute of Tropical Agriculture (IITA) Ibadan.
2. Dept of Agricultural Engineering Olabisi Onabanjo University, Ago-Iwoye
1. Introduction

2. Gari processing technology
   (i) Cassava root peeling problems
   (ii) Model Peeling

3. Recommendations

4. Conclusion
Introduction

Gari is a popular food made from peeled, washed, grated/crushed and fermented cassava root.

The fermented mash are dewatered to form mash cake.

Toasted dry granules of pulverized mash is Gari.
In the village method, the capital expenditure is very low, resulting in a low price of gari.
The root peeling section is highly dominated by women.
Cassava storage root cross-section (Rickard, 1985). 1: periderm; 2: sclerenchyma; 3: parenchyma; 4: latex tubes; 5: cambium; 6: parenchyma (The middle); 7: xylem vessels (The middle); 8: xylem bundles (The center).
Need for Root Peeling

- Cassava Peels contain between 200 ppm - 650 ppm of cyanide.
- The pulp contains 38-310 ppm of cyanide depending on the variety.
- Peeling the root helps in the reduction of cyanide by 50%.
- Peeling is no longer a challenge to processors and researchers.
The manual method is very slow and labour intensive.

Peeling by hand is slow and one person can peel between 25-30 kg per hour and about 200 kg per day.

Wastage of cassava flesh can be as high as 40%.
Cassava Root Peelers

IITA's cassava peeling tool;

NCAM’s improved cassava peeling tool;

PRODA’s cassava peeling machine

The 2-Action zone peeler

A & H machine
Cassava Root Peeler models ctn

DORNOW roller peeling machine R-OW-70A

FATAROY’s machine

Brazil developed

The double action/self fed

U.I. Abrasive peelers

WAMABCO

A member of the CGIAR Consortium www.iita.org
● Peeling efficiency of some model peelers has attained 96%
● Flesh losses are getting lowered.
● The most efficient peeler still need further improvements to reduce root losses.
● Manual peeling was the slowest and the most expensive method of peeling, but still gives superior quality peeled roots.
Some machines waste root flesh. This shortcoming is a news to animal feed makers. Many machines have been fabricated to solve this peeling problem than any other process in cassava processing history but without satisfaction.
Grater

Grating: made simple and highly efficient

www.iita.org
Dewatering

Hydraulic bag presses which is simple, have proved to be the most economic means of dewatering the cassava mash with the use of vehicle Jacks. Centrifuges, as used in the pilot plant, are too expensive.
Pulverization and sifting: made simple
IITA technology lead to the discovery of better and acceptable dryer which can roast 60kg to 100 kg of pulverized mash into High Quality Gari within 45 minutes. The dryer has been an item with which considerable savings have been achieved. The substitution of rotary dryer has reduced costs.
Recommendations

- Mechanization of cassava peeling is a solution.
- The limitation of the manual peeling (200kg/per person per day) is a sign that farmers will accept any assistance.
- More efforts are needed to deliver affordable peelers to reduce drudgery.
- Equipment manufacturers need more information to improve their machine designs.
The model machine evaluation gave benchmark results of current peeling technologies in Nigeria.

With science and technology we hope breeders will one day produce cassava roots with
- uniform size
- uniform shape

Then engineers’ work will become simpler like the sugar bits and sugar cane.

Thank you