

# Waxing of fresh cassava roots to extend the shelf-life and increase marketability

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## Summary

One of the major challenges facing cassava root trade is the rapid postharvest physiological deterioration (PPD) of the roots which normally occurs within two days of harvest. This results into short marketing period, discounted prices, losses in income to growers and traders, and reduced utilization and food security. Waxing of cassava roots, using safe wax and fungicides approved in the country of operation can help to extend the shelf-life of roots to about 14 days or more without any detrimental effect on the eating quality and safety of cassava roots.

## Technical Description

The process for extending the shelf-life of cassava roots through waxing starts right from field preparation to root harvesting and postharvest handling. Producing fresh cassava roots for waxing requires specific agronomic practices in order to obtain commercially acceptable roots in terms of size, shape and appearance. These practices also help in easing root harvesting and thereby minimizing damages or injuries to the roots. This in turn helps to extend the shelf life since avoiding mechanical damage during harvesting delays the onset of postharvest deterioration of cassava roots. Growing cassava roots for waxing involves ridging and planting of sweet varieties that have good eating quality such as taste or texture, and are valued by the consumers for boiling, roasting, frying or other forms of direct cooking into food. At maturity, the leaves of the cassava plants are pruned 6-7 days before harvesting carefully to avoid mechanical damage. The roots are carefully transported to the pack-house for sorting, washing, weighing, disinfection with approved fungicide and surfactant. The roots are dried and waxed using heated food grade wax.

## Uses

The application of the shelf-life extension technique is expected to contribute to an increased consumption of cassava, reduction of postharvest losses for farmers, transporters and traders, increased marketability and, possibly, reduced consumer price of fresh cassava roots in the long-run.

## Composition

The materials for waxing include approved fungicides and food grade wax. Other materials are stainless steel waxing pot, gas burner and cylinder, mild steel for pre- and post-waxing cooling, and waxing basket

### Means of application

A pack-house with facilities for weighing, sorting, grading, washing, disinfecting, drying, waxing, packaging, and loading into distribution vehicle for marketing.

<b>Agroecologies</b>	All Agroecologies.
<b>Regions</b>	Africa South of Sahara.
<b>Developed in Countries</b>	Uganda.
<b>Available in</b>	Tanzania, Uganda.
<b>Solution Forms</b>	Management.
<b>Solution Applications</b>	Post-harvest handling.
<b>Agricultural Commodities</b>	Cassava.
<b>Target Beneficiaries</b>	All farmers.

## Commercialization

### Commercialization Category

Commercially available

### Startup Requirements

A well constructed packhouse is required to apply the technology. A packhouse is a physical structure where fresh cassava roots are consolidated and subjected to the shelf-life extension treatment(s) prior to distribution to markets outlets. The activities in a packhouse include weighing, sorting and grading, washing, disinfecting, drying, waxing, packing in crates and loading into distribution vehicle for marketing. These activities constitute a packhouse operation. A packhouse may be simple or modern that involves more advanced operations and facilities. An individual farmer, smallholder farmers' groups, cooperatives or trader can invest in a simple packhouse. As the business expands and operators gain skills, they can improve, expand or upgrade or build a new modern packhouse depending on availability of space and financial resources.

### Production Costs

The estimated investment cost for an “all-inclusive” packhouse or processing centre, including water supply, is \$3,000-5,000. The investment cost includes the costs of the basic tools such as waxing basket (\$42), waxing pot (\$85), gas cylinder (\$25), gas refill (\$17), grill (\$8), gas burner (\$8) are affordable to smallholders. The wax (\$12.5/ton roots) and the preservative (Thiabendazole, if needed and if approved by the food regulatory authority) are locally available in many countries. Total cost of waxing is \$126/ton (all expenses).

### **Customer Segmentation**

Waxing is a widely used technology in Latin America (Costa Rica, Colombia) for commercial production of waxed roots for export. Waxing can be simple to apply by both women, men and young people and can easily be integrated into the current cassava production and marketing system in Africa. Consumers and food outlets keep waxed roots in cool, dry places and cook them at their convenience. The consumers are willing to pay 23% to 63% higher price than unwaxed roots.

### **Potential Profitability**

The gross profit margin of waxing was estimated at 80% operating income (\$120-\$131/ton) for the waxed roots. The enterprise has a positive Net Present Value and 32% marginal rate of return when compared to unwaxed roots.

### **Licensing Requirements**

No licensing requirements.

### **Innovation as Public Good**

The technology was introduced and tested in Uganda by IITA and partners (NARO, IIRR and others) through a scaling fund from the RTB Research Program. It is classified as a Public Good.

**Solution Images**





# Institutions

