Effectiveness of cassava stem pruning for inducing delay in postharvest physiological deterioration (PPD) of fresh roots

By

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Introduction

- **Cassava** (*Manihot esculenta* Crantz) is an important food for low-income populations.
- It is a staple food raw material for many value-added products.
- Increasingly fresh root consumption is on the rise and projected to increase in Uganda.
- However, postharvest losses on the crop are high and estimated at over 25% in Uganda.
- Major cause of PH losses is PPD.
Post-harvest physiological deterioration

➢ PPD Manifests as blue-black vascular streaks in a ring along periphery/sometimes vertically, off flavours and less palatable cassava products

➢ It occurs within 48 hours of harvest caused by production of phenolic compounds (scopoletin) induced at harvest by mechanical damage

➢ is the main cause of fresh cassava root losses
PPD......

• Results in increased market rejects
• Poor product yield and Market quality; Poor commercialisation possibilities
• Significant economic losses (to farmers and retailers)

✓ Enhanced shelf life would result in increased fresh root market access and incomes from fresh cassava sales and increased food security at HH level
✓ Thus need for effective and affordable technologies that can ensure enhanced root shelf life and assure fresh root quality
Objectives of the study

- To investigate the effect of cassava stem pruning on level of PPD of Ugandan cassava varieties
- To evaluate the effect of Pruning when combined relative humidity storage on cassava root shelf life
Methodology

- Leaves were removed from 10 mature plants of six varieties including: Nyaraboke, Bao, Mercury, NASE 14, Tim tim and Hoima using a sharp knife. Another set of 10 plants for each variety were left un-pruned.
- The plants were then left for 7 days.
- After one week, both pruned and un-pruned plants from all the varieties were harvested and taken to the lab for analysis. Roots were washed dipped in fungicide (Ridomil) + surfactant sufsilwet Gold100% in (1 ml/ litre) for 2 minutes.
- They were then analysed for PPD after 7 days.
- Another lot was treated similarly but the roots were stored in high relative humidity bags (hermetic bags) for the 7 days prior to assessment for PPD.
- Data was analysed using Excel.
Pruning process and root harvesting
Root assessment
Scoring PPD

Proximal end of the treatment roots was cut and covered.
7 slices were assessed for PPD per root.

Numerical values are assigned according to a scale of 0 to 10 on the proximal surface of each cut.
The scale values correspond to 0%, 10% 20% 30% to 40% and so on corresponding to 10 up to 100% deterioration.
Results

• There was significant reduction in PPD on pruned compared to un-pruned cassava roots of the same varieties
• Pruning maintained root quality for over 7 days of cassava storage
Effect of pruning on PPD levels

% PPD

Pruned
Unpruned

Bao
Hoima
Mercury
NASE14
Nyaraboke
Tim Tim
Results
PPD effect after 14 days

- Bao
- Hoima
- Mercury
- NASE14
- Nyaraboke
- Tim Tim

- Pruned
- Unpruned
Effect of pruning + Relative humidity storage at 7 days
Results..

• Thus pruning results in reduced PPD on cassava
• The effect was enhanced when roots were stored at high relative humidity conditions resulting in zero loss
• It resulted in increased sugar to starch ratio for -sweeter varieties
• Increased root shelf life
• Made roots more acceptable to consumers when tested up to 14 days of storage
• No specific changes in other properties especially cyanide
• These findings also those of confirm earlier studies on varieties in Latin America
Implications....

- Pruning thus can increase general output of fresh root cassava business
- Could result increased marketability of fresh roots especially at retail level
- Reduces postharvest losses and waste thus can increase HH food security
- Lowers cost of production
Conclusion

• Pruning significantly reduced the rate of PPD in cassava
• When combined with relative humidity storage can result in complete elimination of deterioration up to 2 weeks storage in some varieties
• It can thus be used to reduce the high economic losses caused by PPD especially at retail level
Recommendations

✓ More research to pilot this and other shelf life enhancing technologies needs to be done especially to pilot the technology at enterprise level
✓ Cost benefit analyses need to be done to evaluate the technology especially when combined with other shelf-life enhancing options
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