WOUND HEALING AND DRY MATTER OF ORANGE-FLESHED SWEETPOTATO CULTIVARS AS INFLUENCED BY CURING METHODS

Richard Atinpoore Atuna
Francis Kweku Amagloh
Edward Ewing Carey
Jan W. Low

fkamagloh@uds.edu.gh

Background

- Sweetpotato is an important food staple in SSA*
- Orange-fleshed sweetpotato (OFSP) –vitamin A power house**
- OFSP making inroads in developing countries to address vitamin A deficiency (VAD)

*van Oirschot, Q. E. A., Rees, D., & Aked, J. (2003). Sensory characteristics of five sweet potato cultivars and their changes during storage under tropical conditions. *Food Quality and Preference, 14*(8), 678-680. doi: http://dx.doi.org/10.1016/S0950-3293(02)00209-4

** Low, W. J., Arimond, M., Osman, N., Cunguara, B., Zano, F., & Tschirley, D. (2007). A food-based approach introducing orange-fleshed sweet potatoes increased vitamin A intake and serum retinol concentrations in young children in rural Mozambique. *Journal of Nutrition, 137*(5), 1320–1327.

The issue

- Non-availability of fresh OFSP during lean season due to poor storage life
- Curing is crucial for long-term storage*
  - Promotes wound healing
- The dry matter of cultivars influences the wound healing efficiency
- Curing is rarely used due to:
    - Lack of knowledge
    - Expensive to regulate temperature and relative humidity

*van Oirschot, Q. E. A., Rees, D., & Aked, J. (2003). Sensory characteristics of five sweet potato cultivars and their changes during storage under tropical conditions. *Food Quality and Preference, 14*(8), 678-680. doi: http://dx.doi.org/10.1016/S0950-3293(02)00209-4

And the good news

- Tropical ambient conditions may be similar to commercial curing conditions
  - Temp = 29-33°C; RH = 90-95%[#]
  - *Incidental* curing could occur in the tropics

- Potential alternative curing option for farmers in the tropics:
  - Field-piled and dehaulming

[#] Edmunds, B. A., Boyette, M. D., Clark, C. A., Ferrin, D. M., Smith, T. P., & Holmes, G. J. (2008). *Postharvest handling of sweetpotatoes*. North Carolina State University Cooperative Extension Service.

Study focus

To investigate cultivars response to wound healing and changes in dry matter content during curing

Materials and methods

Experimental design

2×2 factorial design

- Cultivars used

Apomuden

Nane

Curing methods

Field-piled

- Roots covered with fresh vine and kept for 7 days.

Dehaulming (In-ground)

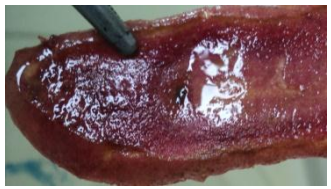
- Canopy removed 7 d before harvest

Materials and methods *Contd.*

- Wound healing score
  - Wounds were created with a potato peeler on 21 roots from each curing method
  - Wound healing score was determined daily using phloroglucinol test as described elsewhere (van Oirschot et al., 2001).
  - Based on the presence or absence of lignin a score of 0, 0.5 and 1 was given. Where *; 0=no lignification, 0.5=partial lignification and 1=complete lignification*

0

0.5



1

  - Dry matter was determined daily for seven days using AOAC (2005)

Findings

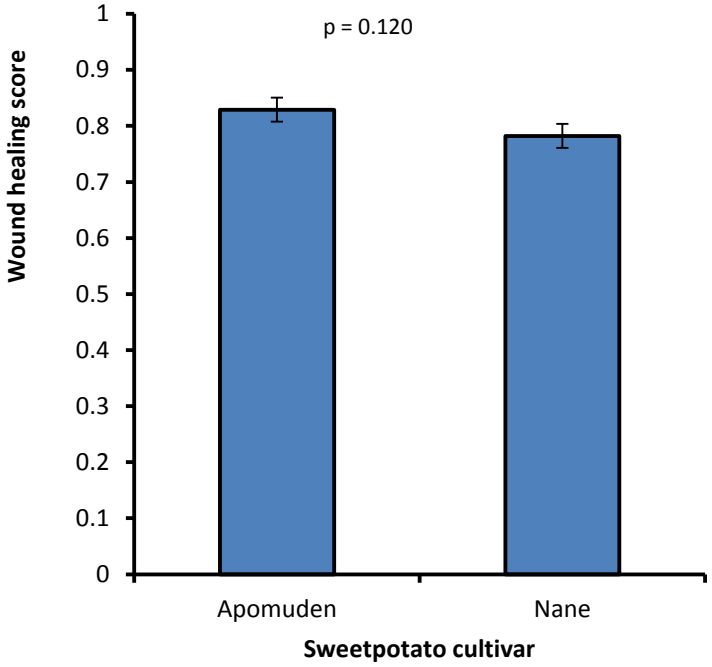


Figure 1a wound healing efficiency score of sweetpotato cultivars
Error bars represent standard error of the means (SEM)

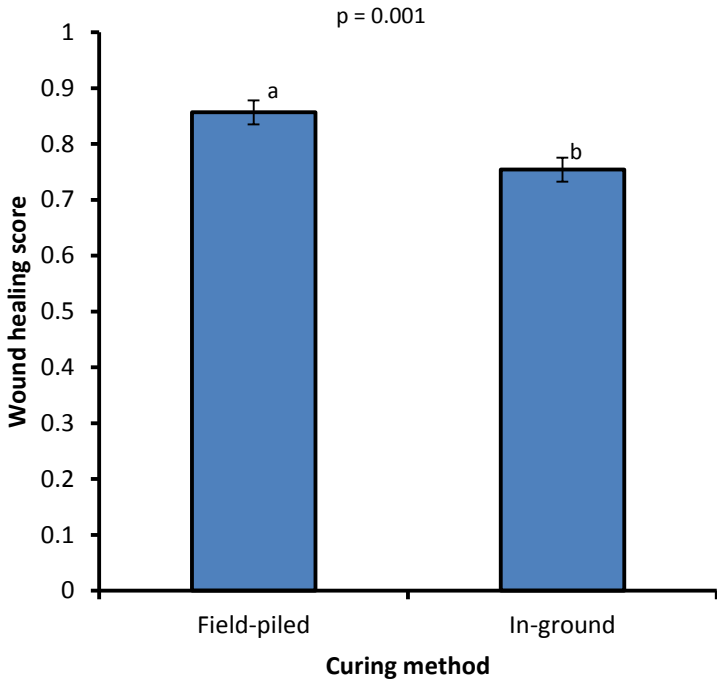
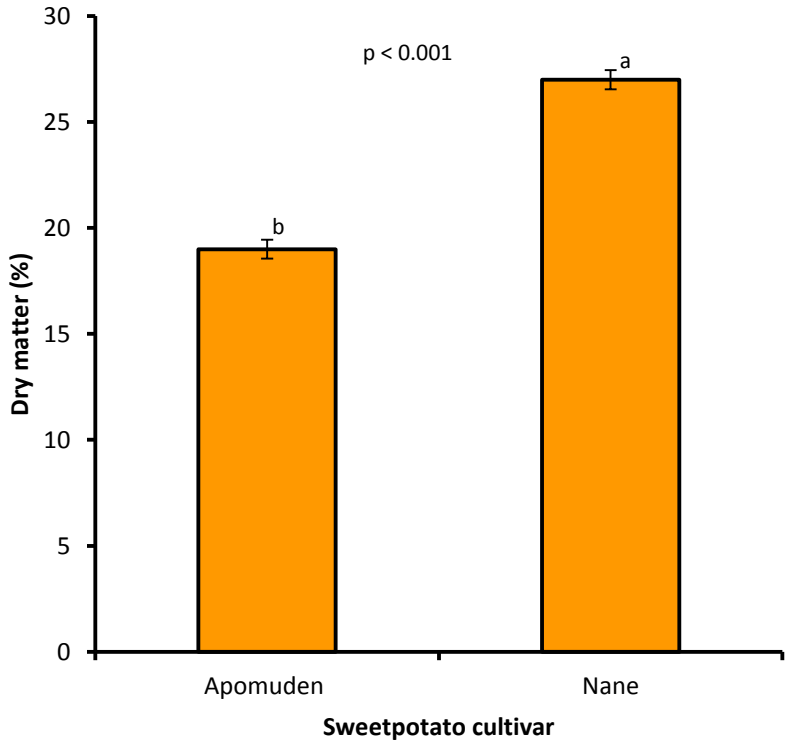
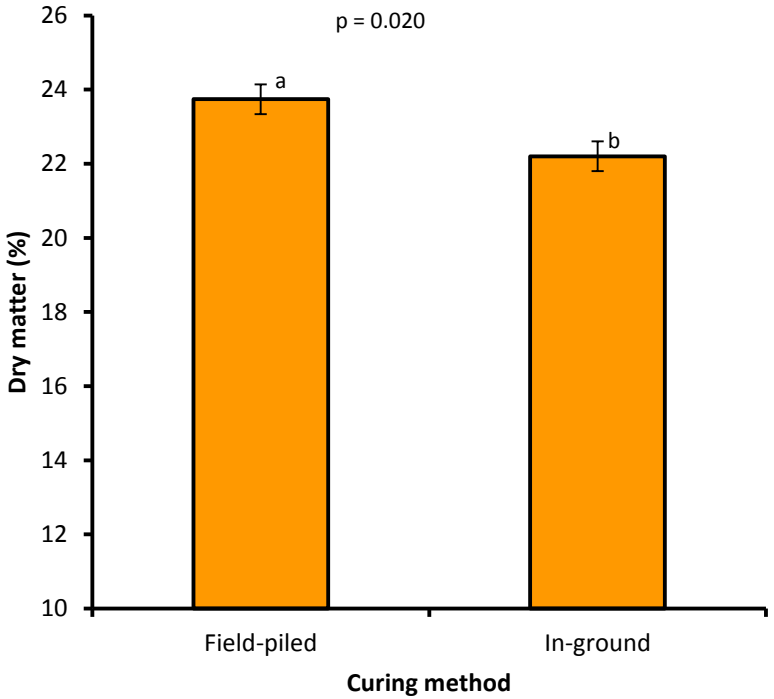


Figure 1b wound healing efficiency score with curing
Error bars represent standard error of the means (SEM)

Findings *Contd*.





Findings *Contd.*

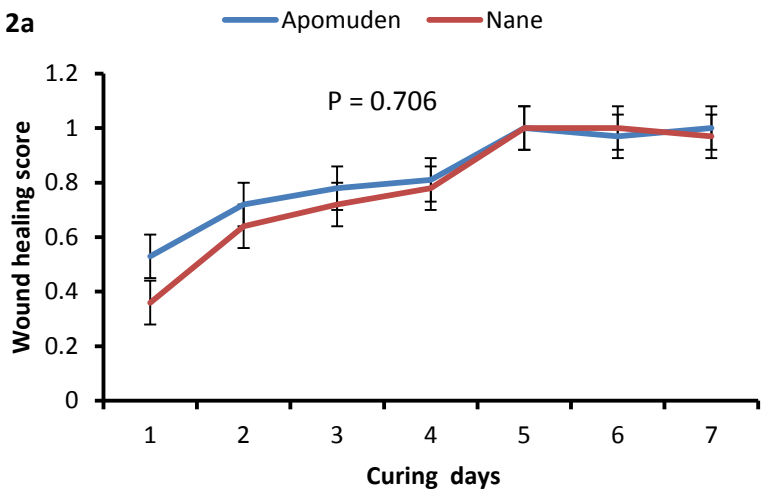


Figure 2a wound healing score of sweetpotato cultivars over seven day curing period
Error bars represent standard error of the means (SEM)

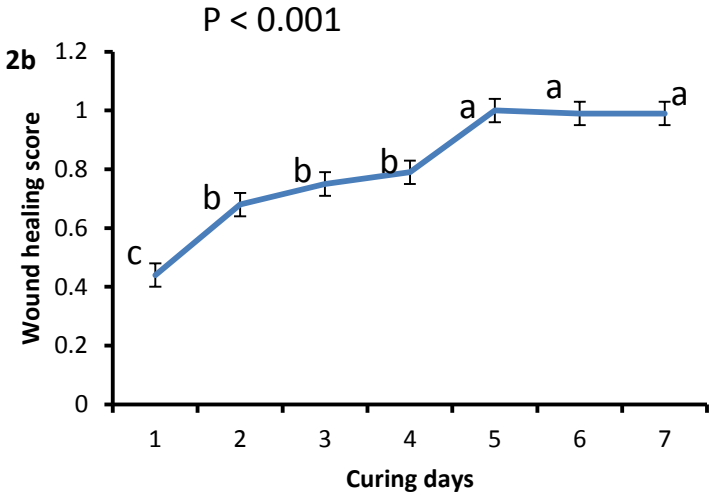


Figure 2b wound healing score over seven day curing period
Error bars represent standard error of the means (SEM)

Conclusions & Recommendation

- Apomuden and Nane could have similar storage properties

- Field-piled curing generally increased the dry matter of roots and could enhance storage quality of root

- The high dry matter content of Nane is a desirable quality for OFSP. Hence efforts should be intensified for its release as a cultivar in Ghana

Acknowledgements

- Funding received from International Potato Center under the project SASHA II: Sweetpotato Action for Security & Health in Africa is heartily valued and acknowledged.

Healthy, Happy Ghanaian kid

Thank you