PRACTICE ABSTRACT nº 32

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Vegetable drying

Fruits and vegetables are essential components of the human diet, providing vital micronutrients, vitamins and minerals. Due to their high-water content, vegetables are particularly prone to microbial spoilage and biochemical processes. To mitigate these risks, methods that reduce water activity are employed, with solar drying or dehydration being among the most effective. Solar drying removes moisture from vegetables, inhibiting biochemical reactions and preventing microbial growth, thereby extending shelf life and ensuring availability during off-seasons. This study focus on three widely consumed vegetables (Figure 1) commonly found in Kilombero Food Hubs: amaranthus, cassava, and sweet potato leaves.

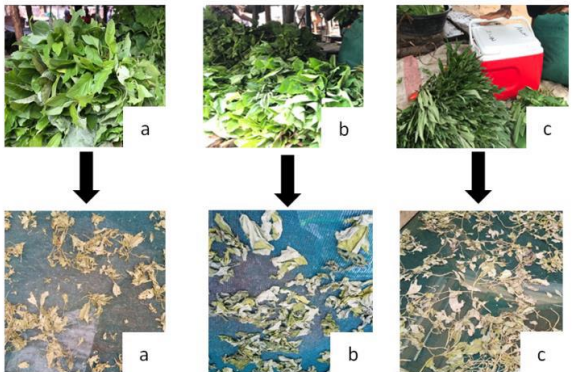
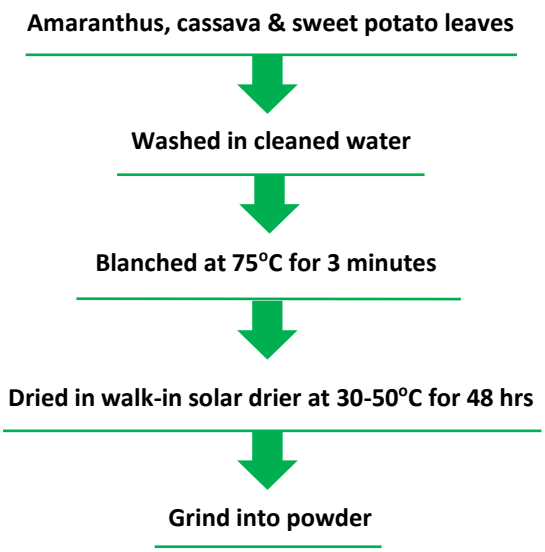


Figure 1: (a) Amaranthus, (b) cassava, and (c) sweat potato leaves



The walk-in solar dryer was designed to quickly dry vegetables, reducing post-harvest losses and enhancing the quality of fruits and vegetables. The walk-in solar (Figure 2) dryer is a large, enclosed structure that uses solar energy to dry fruits and vegetables and allows users to easily walk inside.

This technology was incorporated to optimize drying efficiency. Testing and validation have demonstrated its effectiveness in drying vegetables like amaranthus, sweet potato, and cassava leaves while preserving their nutritional quality. The results of dried vegetables samples (triplicate) are shown in Table 1.

Figure 2. Walk-in solar drier (3m x 5m x 2.5m)

The dryer harnesses sunlight through passive heat, reducing the reliance on electricity or fuel. It is an energy-efficient and environmentally friendly solution, particularly effective in preserving fruits and vegetables and minimizing post-harvest losses in areas with abundant sunlight, such as Kilombero Food Hubs.

Table 1. Nutritional Profile of the three dried vegetables

Name	Oxalate (%)	Folic acid (ug)	Phenolic (mgGAE/100g)	Vitamin E (mg/L)	Flavonoids (mg/100g)	Phytate (g/100g)
Amaranthus	1.84±0.05	0.25±0.023	5871.37±93.17	37.15±6.67	104.37±3.39	0.076±0.014
Cassava leaves	1.56±0.19	0.25±0.011	5995.72±189.65	66.47±56.26	73.52±0.66	0.077±0.057
Potato leaves	2.73±1.11	0.27±0.02	6384.054±139.55	38.19±9.01	129.34±6.61	0.046±0.014

These cost-effective techniques, implemented in developing countries to reduce postharvest losses and extend the shelf life of vegetables, help preserve their nutritional composition. This approach plays a crucial role in improving food security and combating malnutrition in these regions.

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