Food and Agriculture Organization of the United Nations

Making sweet potato chips and flour

Source	Apoolo Na Angor Women Development
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Summary

Sweet potato is a popular food in many parts of Eastern Africa. It is drought tolerant, hardy and can grow in marginal areas, thus contributing to improved food security. The young leaves and vines can be consumed as vegetables or fed to livestock. In some communities in Eastern Africa, sweet potatoes are preserved for the dry season by sun-drying to make amukeke – dried sweet potato chips. The following provides facts about dried sweet potato chips and flour, the requirements for making them, a detailed step by step procedure and a case study from Uganda highlighting the benefits of this preservation technique.

Description

Sweet potato is a popular food in many parts of Eastern Africa. It is drought-resistant and can grow in marginal areas, thus contributing to improved food security. The young leaves and vines can be consumed as vegetables or fed to livestock. During bumper harvests, farmers often sell sweet potatoes at throw-away prices. Losses after harvesting are high due to perishing. In some communities in Eastern Africa, sweet potatoes are preserved for the dry season by sun-drying to make amukeke – dried sweet potato chips. The dried chips are boiled and mashed with beans, milled or pounded to make flour, which can be mixed with either millet or cassava flours to make stiff porridge.

1. Some facts about dried sweet potato chips and flour

- Any sweet potato variety can be dried to make chips, which can then be milled into flour.
- Dried sweet potato chips can be stored for up to six months when packaged in airtight, strong, black plastic bags
- Sweet potato flour is used to make doughnuts and pancakes
- Flour made from the chips can also be used to make high-value flours by mixing with millet, maize or soybean flour. wih are then used to make porridge and baby foods, which are easily digestible.
- Some bakeries are already using new flour mixes to make bread and cakes
- The poultry feed industry is showing interest in using orange-fleshed chips in their feeds to improve yolk colour and vitamin A content of eggs.

2. Requirements for making sweet potato chips and flour

- Mature sweet potato roots. On average, 4 kg of fresh sweet potato roots give about 1 kg of dried sweet potato chips.
- A clean area, ideally a room with raised working surfaces, such as tables – not on the ground.
- Large plastic containers, preferably 10 to 20 litre buckets with lids.

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- A supply of clean water.
- A manual or motorized sweet potato chipper for chopping or slicing.
- A raised open platform for air drying, or ideally a solar dryer placed in a clean area in full sunshine.

3. Procedure for making sweet potato chips and flour

3.1 First step: choosing the roots

- Use any sweet potato variety.
- The roots should be undamaged and mature - here to four months for the early maturing varieties and five to six months for the late maturing varieties.

3.2 Second step: washing

- Wash the sweet potatoes in clean water in large buckets, changing water as frequently as required.
- Alternatively, you can ash the roots in a sweet potato drum washer when processing large quantities to speed-up the process.
- Do not peel the roots because the peel is rich in nutrients.

3.3 Third step: draining

- After washing, drain by placing the sweet potatoes on a raised, perforated rack.

3.4 Fourth step: chipping or slicing

- Chip the washed sweet potatoes to uniform size (3 to 6 mm thick).
- You can slice them manually with a sharp knife or use a manual or motorized chipper to speed-up the process.

3.5 Fifth step: drying

- Sweet potato chips should be evenly spread on a raised platform, preferably on a clean black plastic sheet, to sun dry under maximum sunshine for about six to eight hours. It is best to do this during the hot, dry season.
- To ensure high quality chips, solar dryers can be used. A modified solar dryer, called a hybrid solar dryer has an additional source, such as charcoal and can be used to dry chips.
- Chips should be dried until they are brittle.
- If drying in the open, cover chips with netting to keep off flies and birds.
- Pack chips or continue processing to flour.

Figure 1. Washing and draining of sweet potato

3.6 Sixth step: miling

- Mill dried chips to flour using a hammer mill (village “posho” mill).

3.7 Seventh step: packaging and labeling

- Pack dried chips or flour in strong (thick gauge) black polyethylene bags. Flour can be packaged in 2 kg packs for distribution to shops and other retail outlets.
- Label product to state source, date of manufacture and expiry date (after six months).
- Place bags of dried chips or flour in card board cartoons to protect them from light.

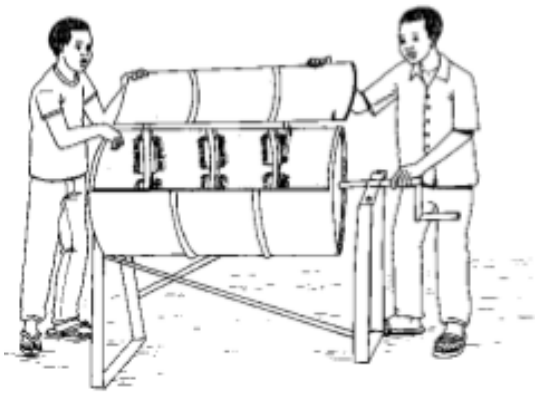
Table 1. What can go wrong

Problem	What are the causes?	How is the problem corrected?
Brown or discoloured chips	Drying not complete due to: • non-uniform chip sizes • mould growth	Slice the chips into uniform sizes (3 to 6 mm thick) Use solar dryer with alternative energy source Start as early as possible on a sunny day and complete drying on same day
Chips are rubbery	Chips contain high moisture: • non-uniform chip sizes • drying not complete • packaging or bags that allow in moisture during storage	Make chips of the same size (3 to 6 mm thick; half thumb nail size) or use a chipping machine Start as early as possible on a sunny day and complete drying on same day Use strong plastic bags that are water- proof
Bad or fermented smell	• microbial growth • insufficient drying hence high moisture content in product	Drying thoroughly until brittle
Orange coloration lost in the orange-fleshed varieties	• over-exposure of roots or chips to air and light during chipping and drying • using clear or transparent bags	Chip and dry as quickly as possible Ideally use an enclosed dryer, such as a solar dryer Use black bags for storage
Weevils and rodents	• storing chips or flour on ground • bushy surrounding	Pack chips and flour in strong plastic bags Store packed chips and flour in cartons on racks or raised surface Ensure storage area is free of pests and rodents Clear area around store
Burnt or charred chips	Drying temperature too high	Control drying temperature

Source: FAO 2010

Figure 2. Chipping or slicing

Figure 3. Washing and draining of sweet potato



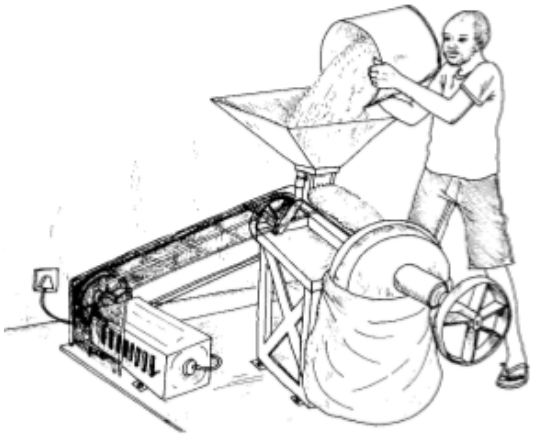
3.8 Eighth step: storing

- Store in a cool, dry place off the ground, preferably on pallets or raised surfaces.
- Flour can be stored for six months.

4. Case study

Ekinyu Eugene heads the Abuket sweet potato processor group, a farmer's group based in Soroti, Uganda. Ekinyu has been growing and eating sweet potatoes since childhood. His desire to turn sweet potatoes into an income-generating activity led him to attend several training sessions on adding value to sweet potatoes, which he and other farmers received through a Farmer Field School organized by the International Potato Centre. As a group they identified a market for dried chips in Kenya. Ekinyu greatly gained from the first sales of orange-fleshed sweet potato chips and he managed to give his children a good education in good schools in Kampala.

Figure 3. Milling



5. Objectives fulfilled by the project

5.1 Women-friendly

Sweet potato production in Africa is usually a women activity.

5.2 Resource use efficiency

Sweet potato not only is a source of nutrition, its non consumable parts can be turned into livestock feed. Converting sweet potato into flour and chips allows it to also be used in other forms of food.

5.3 Pro-poor technology

Sweet potato is drought tolerant, hardy and can grow in marginal areas, thus contributing to improved food security. The technology prevents harvest losses thanks to preservation techniques such as chips and flour. This can also be used in other food items and sold at just prices.