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# Making Sweet Potato Chips and Flour



## Making sweet potato chips and flour

Sweet potato is a popular food in many parts of Eastern Africa. It is drought resistant, 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.

The orange-fleshed sweet potato variety has high beta-carotene content, which boosts the immune system.

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.

This leaflet guides you on how you can make money from sweet potatoes by making and selling high-quality sweet potato chips and flour.

### 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. These mixed flours are 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.

### 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
- Supply of clean water
- Ideally, a manual or motorized sweet potato chipper for chipping or slicing
- Raised open platform for air drying, or ideally a solar dryer, placed in a clean area in full sunshine.

## Procedure for making sweet potato chips and flour

### Step 1: Choosing the roots

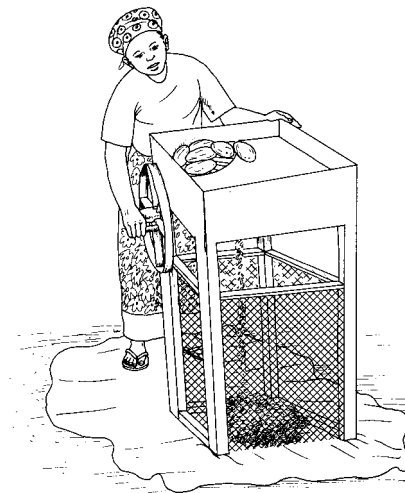
- Use any sweet potato variety.
- The roots should be undamaged and mature – three to four months for the early maturing varieties and five to six months for the late maturing varieties.

### Step 2: Washing

- Wash the sweet potatoes in clean water in large buckets, changing water as frequently as required.
- Alternatively, you can wash 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.

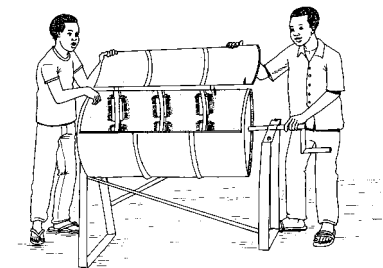
### Step 3: Draining

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



## Tip

Information on availability of fabricators of chippers and solar dryers can be obtained from your local extension officer or national agricultural research station.



### Step 4: Chipping or slicing

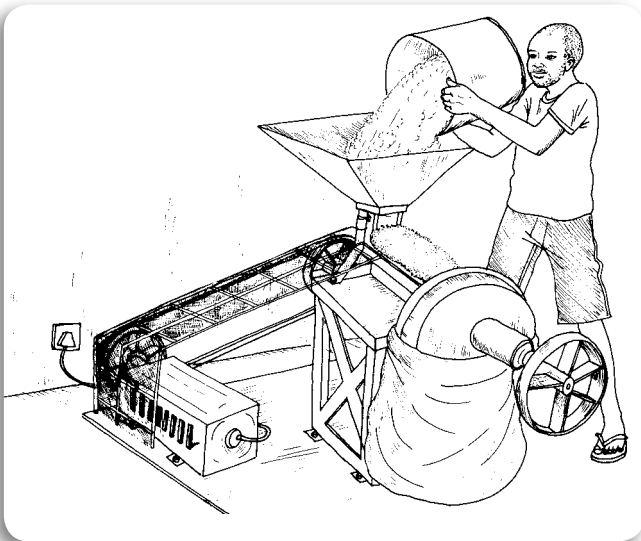
- Chip the washed sweet potatoes to uniform size (3-6 mm thick).
- You can slice them manually with a sharp knife or use a manual or motorized chipper to speed-up the process.

**Step 5: 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 energy 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.

**Step 6: Milling**

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

**Step 7: 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 cardboard cartons to protect them from light.

**Step 8: Storing**

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



**What can go wrong**

Problem	What are the causes?	How is the problem corrected?
Brown or discoloured chips	Drying not complete due to <ul style="list-style-type: none"> <li>• non-uniform chip sizes</li> <li>• mould growth</li> </ul>	Slice the chips into uniform sizes (3-6 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: <ul style="list-style-type: none"> <li>• non-uniform chip sizes</li> <li>• drying not complete</li> <li>• packaging or bags that allow in moisture during storage</li> </ul>	Make chips of the same size (3-6 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	<ul style="list-style-type: none"> <li>• microbial growth</li> <li>• insufficient drying hence high moisture content in product</li> </ul>	Drying thoroughly until brittle
Orange coloration lost in the orange-fleshed varieties	<ul style="list-style-type: none"> <li>• over-exposure of roots or chips to air and light during chipping and drying</li> <li>• using clear or transparent bags</li> </ul>	Chip and dry as quickly as possible  Ideally use an enclosed dryer, such as a solar dryer  Use black bags for storage

Problem	What are the causes?	How is the problem corrected?
Weevils and rodents	<ul style="list-style-type: none"> <li>• storing chips or flour on ground</li> <li>• bushy surrounding</li> </ul>	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

**Case study**

Ekinyu Eugene heads the Abuket sweet potato processor group, a farmers' 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 educate his children in good schools in Kampala. Two of his sons were subsequently admitted to Makerere University. He says the cost of sweet potato chip production is about US\$ 0.27 per kg, transport charges inclusive. The Kenyan buyer bought their chips at US\$ 0.83 per kg, a better price than that in the Ugandan market, which offered only US\$ 0.18. Currently, efforts are being made in Eastern Africa to promote sweet potato flour as a nutritious food and for its income-generating potential.