



Preserving green leafy vegetables and fruits

Source	Technical Centre for Agricultural and Rural Cooperation (CTA)
Keywords	Fruits, vegetables, dried fruits, dried vegetables, cool pots, sun drying
Country of first practice	Kenya
ID and publishing year	7359 and 2011
Sustainable Development Goals	No poverty, zero hunger, responsible consumption and production and life on the land

Summary

This practice describes how dried fruits and vegetables can be prepared either using cool pots or sun drying. Dried fruits and vegetables have the potential to generate additional income besides their nutrition value.

Description

Did you know that:

- In season, vegetables and fruits may be cheap in your village, yet people pay a lot of money for them in towns and cities?
- When cooked, dried vegetables can taste similar to fresh ones?
- Dried tropical fruits, such as mangoes, papayas and bananas, are becoming very popular with consumers in some African, European and Asian markets, where they are sold pre-packed in small polythene bags as tasty snacks? There is also a market for bulk quantities of these dried fruits.

1. Benefits drying fruits and vegetables

1.1 Benefits of green leafy vegetables and fruits

- Leaves of cassava, sweet potato, papaya and pumpkin are widely eaten in Africa.

- They are nutritious (rich in beta-carotene and minerals), tasty and inexpensive and can help to reduce hunger and malnutrition.
- Fruits are also popular and tasty, rich in minerals and vitamins, especially Vitamin C. Minerals and vitamins are essential for a balanced diet, especially for children, nursing and pregnant women, the elderly and sick.

1.2 Benefits of preserving vegetables and fruits

- Fresh green leafy vegetables and fruits start to lose their quality immediately after harvest, becoming damaged, wilted and eventually rotten.
- Storing fresh vegetables and fruits in cool conditions allows them to stay in good condition for a longer period.
- Drying fresh vegetables and fruits reduces bulkiness and weight and so eases storage and transportation, and avoids wastage.
- Storing and drying fruits and vegetables can provide your family with a better diet year round and earn you extra income.

2. How to start

To dry fruits and vegetables, you will need fresh green leafy vegetables and fruits harvested from a garden or a

TECA

TECHNOLOGIES
and PRACTICES
for SMALL
AGRICULTURAL
PRODUCERS



Nutrition for Better Life

farm or bought from neighbours or the local market.

2.1 Equipment

To start drying fruits and vegetable, the following equipment are required:

- knife;
- clay pots (one large and one small pot - smaller pot must fit inside the larger one, which should have a wide neck);
- black and clear polythene sheets;
- a drying platform;
- plastic bags; and
- cardboard cartons.

2.2 Preserve fresh green leafy vegetables and fruits using cool pots

- Step 1: Carefully harvest vegetables and fruits and wash them with clean water to remove any dirt, sand, stones, or other impurities.
- Step 2: Place the smaller pot inside the larger pot
- Step 3: Pour clean sand in the space between the two pots and add water to make the sand moist
- Step 4: Loosely pack washed vegetables or fruits in plastic bags.
- Step 5: Place the packed vegetables or fruits inside the smaller pot.
- Step 6: Cover the tops of the two pots with a damp sack to keep it cool.

2.3 Preserve green leafy vegetables and fruits by sun drying

2.3.1 Vegetables

- Chop or slice your green leafy vegetables and place them in hot water for 2 to 5 minutes – this helps them to keep their green colour when dried.
- Remove and drain. Then spread thinly on a clean black polythene sheet placed on a raised platform in full sun.
- Cover with netting to keep off flies and

birds. Leave until they are very dry and crack easily.

2.3.2 Fruits

- Spread sliced fruits that are not quite ripe (such as three-quarter ripe mangoes, pineapples or bananas) thinly on a clean black polythene sheet placed on a raised platform in full sun and dry until brittle.
- Cover with netting to keep off flies and birds. For a higher-quality product, immerse sliced fruits in water containing an anti-browning substance (10 mg of sodium metabisulphite added to each litre of water – available from your local chemist) for 5 minutes before drying.
- Rather than drying in the open, other types of dryers can be used such as a simple solar tent dryer or a stove dryer. Although more expensive than open sun drying, they will speed-up the drying process and produce a more hygienic product.

2.4 Packaging and storage

This method enables you to keep fruits and vegetables fresh for up to 6 months.

- Pack dried vegetables and fruits in airtight moisture-proof black plastic bags.
- Seal the bags using a burning candle. Alternatively you may use a polysealer.
- Label fruit and vegetable bags with date produced and expiry date (6 months later).
- Pack bags in a carton to protect them from damage caused by light.
- Store the cartons in a dry, cool place.

3. Marketing

Dried, green leafy vegetables and fruits can be sold directly to neighbours, local markets, hotels, restaurants, shops, supermarkets, schools, hospitals and local famine relief



Table 1: What can go wrong

Potential problems	Causes	How to avoid the problem
Fresh vegetables & fruits		
Heat damage	Harvesting and leaving in the heat of the sun	Harvest green leafy vegetables and fruits in early morning and late afternoon
Bruised, cut or damaged vegetables and fruits	Rough handling or careless use of implements	For vegetables, use a sharp knife to carefully cut plant by the stem with minimum soil contact. Handle fruits carefully
Crushed vegetables and fruits	Over-packing containers and inappropriate stacking or loading	Loosely pack vegetables and fruits in cool, ventilated bags or boxes.
Dried vegetables & fruits		
Mouldy vegetables or fruits	Inadequate drying	Make sure the vegetables are dry and crumble easily and that dried fruits are brittle. If there is little sunshine or during heavy rains, use a stove dryer
Discoloration	Inadequate processing	Dip vegetables in hot water before drying
	Scorching	Use anti-browning agent for fruits Cover with netting or a polythene sheet while drying
Infestation by weevils and damage by rats	Poor packaging and storage conditions Store not rat-proof	Use clean, strong packaging materials Keep store clean Control rats

Source: CTA 2015

agencies, especially during the dry season. Additionally, when farmers cooperate and sell their products together, they can often bargain for a better price. They can also

enjoy lower transport costs. As a group you may also be able to reach distant markets and even export to regional and international markets.



4. Case study

A major problem with pumpkin leaves and many other vegetables is that they are seasonal and highly perishable. During the peak season they are often sold at throw-away prices and some are simply wasted.

In Kenya, fresh pumpkin leaves are traditionally mixed with mashed potatoes to make a very popular local dish known as mukimo. However, the proprietors of Aftek Products – a medium-sized food processing company based in Nairobi, realized that pumpkin leaves were not available in a processed form in the Kenyan market. They thought this might represent a promising opportunity.

In 2004, they therefore approached the Kenya Industrial Research and Development Institute (KIRDI), which is based in Nairobi. KIRDI provided them with technical assistance and training on how to preserve, process, package and market pumpkin leaves.

After a series of production trials and training sessions, Aftek staff started processing and packaging pumpkin leaf powder and selling it to local supermarkets. This created extra employment and additional income for the company. The pumpkin leaf powder, which can be stored for up to a year, has proved popular with its consumers. Sales have steadily increased.

One customer, Naomi N. Mwangi, a caterer at the University of Nairobi, remarked: “Aftek’s pumpkin leaf powder is affordable and very convenient to use and tastes just

like fresh pumpkin leaves when cooked. I sincerely recommend this product to other consumers”.

5. Validation of the practice

This practice has been tested in Kenya. Aftek staff – a medium-sized food processing company - received technical assistance and training on how to preserve, process, package and market pumpkin leaves from KIRDI. This training helped Aftek staff to started processing and packaging pumpkin leaf powder and selling it to local supermarkets. This created extra employment and additional income for the company.

6. Minimum requirements for the successful implementation of the practice

Equipment as mentioned in sub section 2.1, and following of the preparation steps are necessary.

7. Agro-ecological zones

- Tropics, warm