5. Fresh Food Processing

In Africa and some other countries where the crop is grown, it is common practice to eat cassava raw, after removing the skin and rind. Sweet cassava cultivars are grown for this purpose, close to the homestead to discourage theft. Slices of fresh tubers in oil form a common snack in many countries. Cassava cultivars with a high content of cyanogens must be cooked before consumption. The skin and rind are removed from fresh cassava tubers and cut into slices before boiling in water for 10-40 min, depending on the cultivar. The water is decanted after cooking and the boiled tubers are consumed with a suitable dish. Draining the water helps to remove cyanogenic compounds present in the fresh roots. Although boiling destroys the enzyme linamarase and eliminates the hydrocyanic acid, prolonged eating of high-cyanide cassava, because of the presence of linamarin B, can cause chronic cyanide toxicity when cassava is consumed without sufficient protein. Fish is therefore considered as an ideal accompaniment to cassava and this combination is common in coastal and other areas with access to fish.

Fresh cassava may also be cooked by baking. After baking, the charred skin is removed and the cooked flesh eaten. In Brazil, a sweet food is prepared by cooking peeled roots in sugar syrups. It is also a practice in Brazil to make a soup called "scncocho" or "cocido" by boiling cassava tubers with other vegetables.

In South America there are many methods adopted for cassava utilization as food. Cassava tubers are grated on palm roots or spiny palm trunks and pounded into a pulp. The pulp is squeezed by hand and cooked in a variety of ways. The pulp is shaped into pies or cakes and then baked in a fire after wrapping in a protective covering of leaves. Balls of the pulp are sun dried, wrapped in leaves and placed in baskets or buried in the ground. The cassava pulp is boiled either by dropping pies or dumpling made from the pulp into boiling water or by stirring the pulp into water to form a porridge.

- Fufu

Peeled roots after cooking by steaming or boiling are pounded and the sticky dough eaten with soups made out of fish or vegetables. This is common in West Africa, particularly in Ghana.
• Mingao
This drink is prepared in the Amazon region by dissolving fermented starch in boiling water and simmering for a period. In order to mask the unpleasant taste it is flavoured with palm fruit, pineapple or bananas.

• Manicuera
This is a boiled slightly sweet cassava drink available in the northwest Amazon region.

• Dumby
This Liberian food is prepared by placing boiled cassava tubers in a wooden mortar and beating with a heavy pestle. In order to prevent sticking, the pestle is dipped into water. In about 45 min pounding is complete. The dumby is cut into pieces and put in meat or vegetable soup and then swallowed whole.

• Farina
In South America and the West Indies, farina is a common food. Fresh tubers are pressed in a wooden screw press, forcing the pulp through a sieve and finally roasting it on a slow fire. It is preserved for several months and consumed as a cereal in combination with several other foods. In the Amazon region of Brazil, yellow bitter varieties of cassava are soaked in water for 2 or 3 days, then peeled and grated. The resulting mash is mixed with fresh roots and allowed to ferment for several days before toasting.

• Cassareep/tucupay
The juice pressed out from tubers during the preparation of farina is concentrated and spices added to make the sauce known as cassareep that is prepared in the West Indies and as tucupay in Brazil.

• Ampesi
The boiled roots may be eaten alone, mashed and eaten with sauce. In Brazil, ampesi is also cooked with vegetables and meat.

• Landang or cassava rice
Fresh cassava roots are squeezed and after expelling the juice the pulp is made into pellets which are called landang in the Philippines, or cassava rice.
- **Macaroni**
  This is prepared by blending cassava flour and groundnut flour with wheat semolina in the ratio 60:12:15. It contains about 12% protein. Enriched macaroni containing 12-18% protein and fortified with vitamins and minerals has also been developed for feeding children and vulnerable groups.

- **Cassava pudding**
  Cassava roots are grated and mixed with coconut or banana as a pudding.

- **Tiwul**
  This is an Indonesian preparation made from gaplek (dried cassava) after pulverizing and sieving. The meal is kneaded along with a little water into paste, mixed with sugar and steamed. This gritty material is served as a substitute for rice.

- **Oyek**
  Cassava roots are peeled and soaked in water for about one week and then drained and ground. The ground cassava is kneaded with a little water, steamed and sun dried to prepare this Indonesian dish.

- **Gatot**
  In Indonesia, gaplek (dried cassava) is cut into pieces, steamed and spread out on a bamboo mat. The pieces are kept wet for 2-3 days by continuously sprinkling water over them. The pieces turn black in colour and they acquire a characteristic taste. They can be served after steaming.

- **Gari**
  In Ghana, Nigeria, Guinea, Benin and Togo, gari is one of the most important food items. Pulp made from cassava is placed in cloth bags or sacks made from jute and allowed to ferment for 3-10 days. *Corynebacterium manihot* and *Geotrichum candidum* are two organisms which help in the fermentation of cassava in two stages. After the fermentation period, the partially dried cassava pulp is taken out and sieved to remove the fibrous material. It is then heated in shallow iron pans and stirred continuously until it becomes light and crisp. Palm oil can be added to prevent burning. Good quality gari is usually creamy yellow
in colour with uniformly sized grains and should swell to three times its volume when placed in water.

- **Polvilhoazedo**
  Sour cassava starch, known as polvilhoazedo, is a typical Brazilian product obtained by fermentation of raw cassava starch for a period of about 30 days. The fermented starch, which has a strong and characteristic flavour, has many applications in local cookery and in the manufacture of biscuits and cheese breads.

- **Meduame-M-bong**
  This is a preparation of Cameroon. Cassava tubers are peeled, washed and cut into large pieces and boiled for 30 min to 1 h. After discarding the water, the roots are cut into small pieces and soaked in running water for 12-36 h. The final product Meduame-M-bong is then eaten with meat, fish, groundnuts, green leaves, etc.

- **Attieke**
  Roots are peeled, placed in water and ground into a paste and the paste is left to ferment for 2 days in jute sacks and then pressed. Finally the paste is removed from the sacks, crumbled by hand and steamed. The final product is eaten with milk, meat or vegetables. This is a common food in Cameroon.

- **Chick-wangue**
  After removing the rind and skin, cassava is soaked in water, pounded and made into a paste. The paste is sun dried or smoke dried. The wet paste is made into balls and packed in leaves on a screen over the hearth and left for 15 days. The leaves are then removed and the black coating formed is scraped off. The dried paste is ground and sieved to produce flour. This food is found in several West African countries.

- **Kapok pogari**
  This mid-western Nigerian food is similar to gari preparation. The only difference is that the grated and fermented mass is not sieved before roasting. The resultant product has bigger particles. Kapok pogari is consumed with fish, coconut or meat.
• Peujeum
This is a traditional food of Java. The peeled roots are steamed until tender and
allowed to cool and then dusted with finely powdered ragi (mixture of flour and
spices in which fungi and yeasts are active). The cassava mash mixed with ragi
is wrapped in banana leaves in an earthenware pot and left for 1-2 days to
ferment aerobically. This product has a refreshing acidic and alcoholic flavour. It
is eaten as it is or it may be baked.

• Lafun
This fermented food is available in Nigeria. Unpeeled roots are soaked in pots of
water for 4 days, after which the peels are removed and the roots are sun dried
for 4 days.

• Wayana cassava cakes
The Wayana Indians of the Amazon process high cyanide cassava by peeling
and grating the root into mash, then squeezing the mash in a tubular wicker
press hung from overhead beams. Once the poisonous juice has been
extracted, the mash is turned into flour known as cassava and served as
pancakes.

• Tape/flour tape
Cassava roots are cut into pieces 5-10 cm in length, washed until quite clean
and then half cooked. The cooked cassava is then fermented by inoculating with
ragi tape or yeast (*Clamidomucor oryzae* and *Rhizopus oryzae*) and covered
with banana leaves for 2-3 days. During fermentation the starch is converted into
simple sugars by an enzyme produced by *Rhizopus oryzae*. Tape contains
0.5% protein, 0.1% fat, 42.5% carbohydrates and 56% moisture. This is an
Indonesian preparation.