

Tropical Ingredients

Cassava/Yuca/Manioc

Cassava, also called Manioc, Mandioc, or Yuca, is the staple food of around 500 million people. It tolerates drought and low fertility and is primarily grown and eaten by small-scale farmers in areas with poor soils or unfavourable climates. It requires minimal fertilizer, pesticides and water. Also, because cassava can be harvested anytime from 8 to 24 months after planting, it can be left in the ground as a safeguard against



unexpected food shortages.

Its starchy roots produce more calories per unit of land than any other crop in the world, except perhaps sugar cane. The leaves of the plants provide vitamins and proteins when eaten as a vegetable - a common practice in Africa. The leaves are often fed to livestock too.

A cyanide-producing sugar derivative occurs in varying amounts in most varieties. Primitive peoples developed a complex refining system to remove the poison by grating, pressing, and heating the tubers. The poison (hydrocyanic acid) has been used for darts and arrows.

An extremely variable species, cassava probably is a hybrid. It is a perennial with conspicuous, almost palmate (fan-shaped) leaves resembling those of the castor bean but more deeply parted into five to nine lobes. The fleshy roots are reminiscent of dahlia tubers. Different varieties range from low herbs through many-branched, 1-metre- (3-foot-) tall shrubs to slender, unbranched 5-m trees. Some are adapted to dry areas of alkaline soil and others to acid mudbanks along rivers.

All the approximately 160 species of the genus *Manihot* are sun-loving natives of tropical America. Ceará rubber is produced from *M. glaziovii*, from northeastern Brazil. Food items such as the gelatinous fufu of West Africa and the bami mush of Jamaica come from cassava. Additional cassava products include an alcoholic beverage made by Indians in South America, the powdery casabe cakes of Yucatán, and tapioca, the only cassava product on northern markets.

This strange looking tropical crop originated in Central America and was taken to West Africa in the sixteenth century. The Spanish also introduced it to the Philippines and it is now grown in large areas of Africa, Asia and Central America.

It can be processed into different forms for a wide variety of end uses, and much of this processing can be carried out locally, providing jobs and income in rural areas. The cultivated roots are turned into cassava flour, breads, tapioca, a laundry starch, and even an alcoholic beverage can be derived.

Uses

Once harvested, cassava deteriorates quickly, so it must be eaten or processed quickly. Although some varieties can be eaten raw or cooked like potatoes, many contain high levels of cyanogenic glucosides that must be removed before they can be eaten.

The toxins are typically removed from these bitter varieties by peeling and grating the root to make a pulp that

| Nutrition Facts | |
|--------------------------------------|---------------------|
| Serving Size 1 cup raw slices (104g) | |
| Amount Per Serving | |
| Calories 110 | Calories from Fat 0 |
| % Daily Value* | |
| Total Fat 0g | 0% |
| Saturated Fat 0g | 0% |
| Cholesterol 0mg | 0% |
| Sodium 10mg | 0% |
| Total Carbohydrate 28g | 9% |
| Dietary Fiber 4g | 17% |
| Sugars 1g | |
| Protein 2g | |
| Vitamin A 0% | Vitamin C 8% |
| Calcium 4% | Iron 2% |

Cassava is cooking

Primary Preparations and basic recipes

How to prepare Cassava flour

Method

- Harvest cassava and prepare immediately, a delay of more than 4 hours will caused discoloration in the flour. If delays cannot be avoided peel and store tubers in water overnight before processing.
- After harvest, wash and peel fresh cassava tubers. Wash with clean water.
- For Bitter cassava grate tubers using a grater*
- Put the cassava mash into a nylon sack and dewater using a press
- Remove the dewatered cassava cake, re-grate and sun dry
- (For Sweet cassava chip the roots for fast drying)
- Dry on a clean plastic sheet, tray or a raised bed, to prevent contamination by dust and stones, etc.
- When dried, sift to remove the large fibres
- For high quality flour, mill finely, using a hammer mill, manual rotary mill or grinding stone.
- Store the flour in an airtight containers such as a polythene bags or sealed bin.

Note: It is important for the grated cassava or chips to dry in one or two days so that the flour will be white, and free from off flavours and odours.

How to prepare Cassava Leaves

Ingredients

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| Fresh cassava leaves | 1 Kg |
| Palm oil | 150 ml |
| Onions (optional) | 2 small |
| Leek (optional) | 2 small |
| Smoked or salted fish (optional) | to taste |
| Groundnut paste (optional) | to taste |
| Water | 1 litre |
| Salt | to taste |
| Pepper | to taste |

Method:

- Select young and tender cassava leaves from the uppermost leaves of the plant
- Remove stalks from the leaves
- Wash the de-stalked leaves in cold water
- Pound the leaves in a mortar, or blend in a blending machine until all the leaves become a homogenous mash.
- Bring one (1) litre of water to the boil and place the pounded leaves into the pot. Boil for 15 minutes from the time it starts to boil.
- Sauté the onions, add to the cassava leaves and add salt and pepper, and fish if used.
- Add peanut butter if preferred, this can be used as a substitute for palm oil.
- Cover pot and continue to cook for another 15 minutes.
- Serve with rice, fufu, eba or pounded yam.

NB: The consistency of the cassava leaves is a matter of choice. It may be dry i.e. with very little water, with oil seeping out of the vegetable or very wet, with vegetable suspended in a water in oil emulsion. The leaves of cassava contain up to 5 % protein and a considerable amount of minerals, hence using the leaves is a real boost to your nutritional use of cassava.

How to prepare Cassava starch

- Wash and peel cassava tubers.
- Grate the cassava in a fine mash
- Mix the grated cassava with a high volume of clean water (about 10 times the mash volume).
- Remove fibres in the mash by sift the watery mash through a fine muslin cloth or fine mesh sieve.
- Allow the fine particles of starch to settle in water.
- Decant water from the settled starch
- If required wash the starch again with water to get white, odourless and tasteless starch.
- Place the decanted starch on a tray or drying floor to oven or sundry.
- Once dry, mill or sieve the starch again to remove any foreign material.
- Store the dry starch in an airtight container.

How to prepare Fermented Cassava starch

- Follow instructions above until reaching point 6.
- Place decanted starch into a tank and add water
- Allow the starch / water mixture to ferment for 30-40 days.
- After fermentation has slowed, decant the water.
- Sun dry the fermented starch. (NB, you must sun dry the starch for this process)
- Pack into sacks.

Fermented starch has the advantage that it has expansion properties similar to that of wheat flour. The fermented cassava starch can be used to make leaven bread and extrusion / puff like snack foods.

How to prepare grated cassava

- Wash and peel tubers then wash again
 - Grate tubers into a fine mash
 - Remove fibres
 - To de water, (if required), remove water by placing the wet mash into a clean white muslin or a light cotton cloth and squeezing out the water.
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How to prepare cassava gari

- Wash and peel tubers
- Grate tubers into a fine mash
- Place the grated cassava into clean nylon sack
- Place the sack into a press and remove water slowly. This process can take 3-4 days.

(The long de-watering period allows the mash to ferment, which provides the typical fermented flavour)

- Dewater the mash until mash is moist but friable.
 - Sieve the mash to remove large fibres
 - Lightly toast the mash on a hot plate, this is generally done in a shallow metal basin (wok) over a fire.
 - Sieve the mash to remove large fibres
 - Store in a sack or air-tight container
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Cassava based egg Pasta

Ingredients:

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| Cassava Flour | 400g |
| Egg | 2 med. |
| Water | As required |
| Salt | For taste |

Method:

- Cook 100g Cassava flour in boiling water to obtain a sticky dough.
 - Leave the dough to cool.
 - Beat the eggs in a bowl.
 - Mix Cassava flour (300g) with beaten eggs, dough and a pinch of salt.
 - If the mixture is too hard, add a little water.
 - The mix will resemble breadcrumbs.
 - Shape the dough into small balls.
 - Feed the balls into a Pasta extruder.
 - Use different screens according to your preference in shape.
 - Dry the extruded pasta and store in an airtight plastic container.
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Cassava Flour Short Crust Pastry

Ingredients:

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| Cassava flour | 200g | 2 cups |
| Margarine | 50g | ¼ cup |
| Egg | 1 large | 1 large |
| Salt | ¼ teaspoon | 1 teaspoon |

Method:

- Weigh out 150g sieved cassava flour, margarine and salt into a bowl.
 - Cook 50g cassava flour in ¼ cup boiling water for 1 minute.
 - Pour the cooked flour into the weighed ingredients.
 - Mix thoroughly with finger tips, until the mixture resembles bread crumbs.
 - Whisk the egg, add to the mixture.
 - Mix to a stiff dough which leaves the sides of the bowl clean.
 - Use for any recipe which calls for short crust pastry such as meat pies, sausage rolls and jam tarts.
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Rich Yeast Mixture

Ingredients

In Bowl:

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| Dried Yeast | 2 tsp. |
| Warm Milk | 100 ml |
| Cassava Flour | 50 g |
| Wheat Flour | 50 g |

Method 1

- Add the sieved flour to the milk and yeast mixture.
- Mix and knead for 5 minutes.
- Leave to double in size.

Ingredients: 2

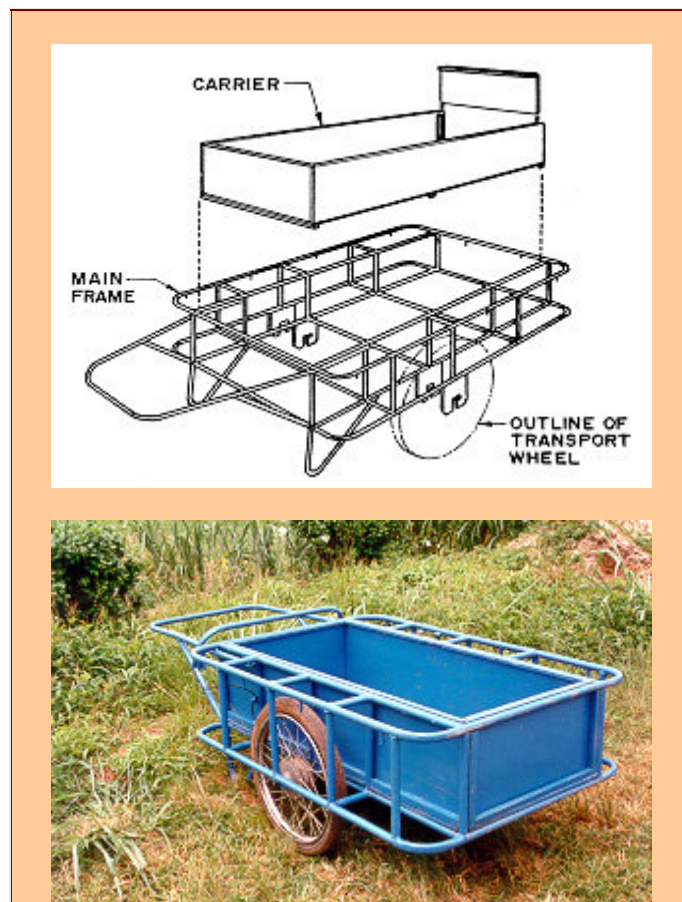
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|---------------|---------|
| Cassava flour | 75 g |
| Wheat flour | 75 g |
| Sugar | 50 g |
| Margarine | 25 g |
| Egg (beaten) | 1 |
| Salt | A pinch |

Method 2

- Add the above ingredients to the risen dough and knead for about 5 minutes.
- The dough should be well mixed at this stage and smooth.

Use in a varies of ways.

-Field Cart (Trailer Type)



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| Application Potential | For any type of load even on rugged terrain |
| Capacity | Loads up to 1000 kg (1 ton) |
| Target client | Household/ Farm-Market Transport |
| Advantage | Pull and push-type, Wheels can be changed depending on load capacity, easy loading and unloading, Can be used uphill and downhill; tyre brakes can be installed for use in steep terrain, Cart floor removable for easy repair and maintenance, Easy to maneuver. |
| Disadvantage | n.a. |
| Estimated cost | n.a. |
| Market potential / Status | n.a |
| Information provided by | Post-Harvest Engineering Unit, IITA - Nigeria |
| Illustrations | Technical Drawing |
| Comments | - |

Jack Press



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| Purpose | Multi-Purpose Batch type press for commercial scale operation, Dewatering Cassava pulp for flour, Extraction of all kind of oil products |
| Capacity | Up to 100 Kg of wet product per batch (10-15 min/batch) |
| Target client | Small-scale commercial user |
| Advantage | Easier to operate, Movable as a wheel-unit can be attached for transporting it to the field Greater sideways stability due to improved design, Provision to transport the press easy with wheels. |
| Disadvantage | Relatively heavy construction, Durability of hydraulic jack; seals proofed to be weak and therefore alternative pressing defice is required (e.g. "Tanyaika" Jack used for lorries or screw) |
| Repair and Maintenance | Washing |
| Cost | Frame with wooden grids: 150-180US\$ (Uganda) |
| Market potential / Status | Currently in use various processing centres in Uganda |
| Information provided by | Post-harvest Group ESARC/NPHP, Uganda |