

Processing cassava into flour for human food

CASSAVA (*Manihot esculenta* Crantz.) is one of the most important cash crops in Thailand (Figs. 1 and 2). It is planted in about 1.2 million hectares, producing 17.7 million mt each year. About 50-60% of this production serves as a raw material for cassava chips and pellets (Fig. 3). These are exported to be mixed into livestock feeds, mainly to the European Common Market and some countries in Asia.

However, the price of cassava products is unstable, depending on the market demand each year. One way of solving this problem is to add value to the cassava through diversified usage, especially industrial utilization and human consumption. Processing cassava flour for human food is one solution to the problem of unstable prices for cassava products.

Adaptability of the technology

Thailand imports wheat flour for baked goods and other food products to a value of about US\$120 million each year. The use of a locally produced cassava flour to

replace wheat flour as a source of carbohydrate would reduce the cost of production and save on foreign exchange (Fig. 4). The production of cassava flour is a simple technology that farmers can do for themselves. In this way, farmers can increase their incomes.

How to make the flour

To produce cassava flour, first wash the fresh roots then peel them. Wash the peeled roots. The roots are then chopped into small pieces about 5 x 0.5 x 0.2 cm, and sun-dried for two or three days (or dried in a hot air oven at 55°C). After drying, the moisture content of the cassava chips should be less than 8%.

The chips are then milled, and the flour sieved through an 80 mesh sieve. Finally, the flour is packaged in plastic bags. Packaged in this way, the flour can be stored for at least eight months. The yield recovery of flour is about 20-40%, depending on the cultivar, the time of harvest, and the equipment used.



Fig. 1. Cassava plants



Fig. 3. Dried cassava chips



Fig. 2. Cassava roots



Fig. 4. Cassava flour

Food and Fertilizer Technology Center (FFTC)
14 Wenchow St., Taipei, Taiwan ROC
Tel.: (886 2) 2362 6239 Fax: (886 2) 2362 0478
E-mail: fftc@agnet.org Website: www.fftc.agnet.org

FFTC: An international information center for
small-scale farmers in Asia

Cooperating agency for this topic:

Jinnajar Hansethsuk
Rayong Field Crops Research Center
Dept. of Agriculture, Thailand
Tel.: 663-868-1514 Fax: 663-868-1515
E-mail: jinnajar@yahoo.com

Avoiding toxicity problems

Good-quality cassava flour should be white and have a good smell. It should not be contaminated by insects or undesirable microorganisms. If drying takes place outdoors, this should be done on sunny days, otherwise the chips may smell bad and turn brown.

It is best to use cassava cultivars which contain a low level of cyanogenic compounds, since these are potentially toxic. However, the cyanogenic content of fresh roots is not a serious problem in cassava flour production, since it is almost entirely eliminated during flour processing. Furthermore, Thailand's traditional cassava cultivars do not contain a high level of hydrocyanic acid. Our experiments on dried chips of cassava from nine cultivars found that the hydrocyanic content fell from 13.5-114.7 ppm in the fresh roots to

0.40-2.37 ppm in the flour. The level varied according to the cultivar and the time of harvest.

Cassava flour as substitute for wheat flour

Cassava flour does not contain any gluten. If it is used to replace wheat flour 100%, the quality of the product will be different. A suitable ratio for replacing wheat flour that consumers find acceptable depends on the kind of food.

For example, cassava flour can replace 75% of wheat flour in sponge cakes and chiffon cakes, 50% in butter cakes and cookies, 25% in doughnuts and spaghetti, and 20% in bread (Figs. 5 and 6). Cassava flour can be used to replace 25-50% of the rice starch in noodles, and will make the noodles softer and more elastic (Fig. 7).



Fig. 5. Cookies made with different percentages of cassava flour



Fig. 6. Bakery products with cassava flour



Fig. 7. Noodles made with cassava flour