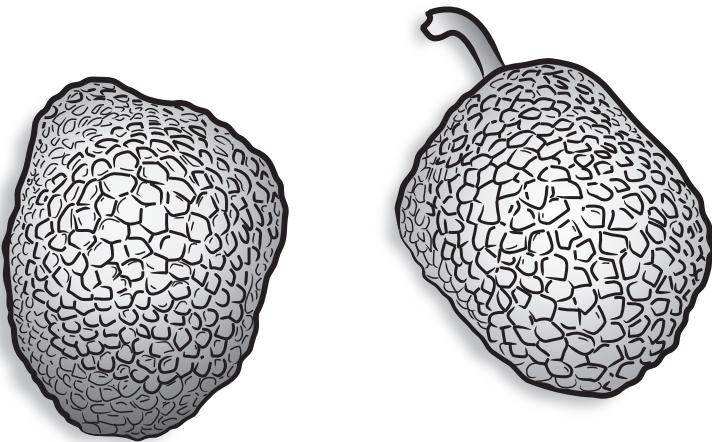




Breadfruit

Pacific food leaflet n° 3

ISSN 1018-0966



how to preserve it. It is possible to preserve larger quantities of breadfruit by adapting the old fermenting and drying methods, or by using new methods such as freezing. Flour made from breadfruit can be combined with wheat flour to make bread.

Combining old and new ways of preparation and preservation could make breadfruit an important food for all seasons. When people make good use of breadfruit, they do not have to buy as many imported foods. Eating breadfruit also improves the diet and may help lower the risk of serious health problems including diabetes, heart disease and cancer.

Varieties of breadfruit

Throughout the Pacific Islands there are both seedless and seeded types of breadfruit (*Artocarpus altilis*). In Micronesia, there is a related species with seeds (*Artocarpus mariannensis*). There are also some variations within these breadfruit types and hybrids.

Seeded breadfruit is a delicacy on many islands. It can be eaten raw as a fruit for a snack or dessert, or cooked as a staple food and eaten as part of the main meal. The seeds, which are eaten cooked, have a pleasant texture and taste. There are many other differences between varieties of breadfruit; for example, the leaves have different

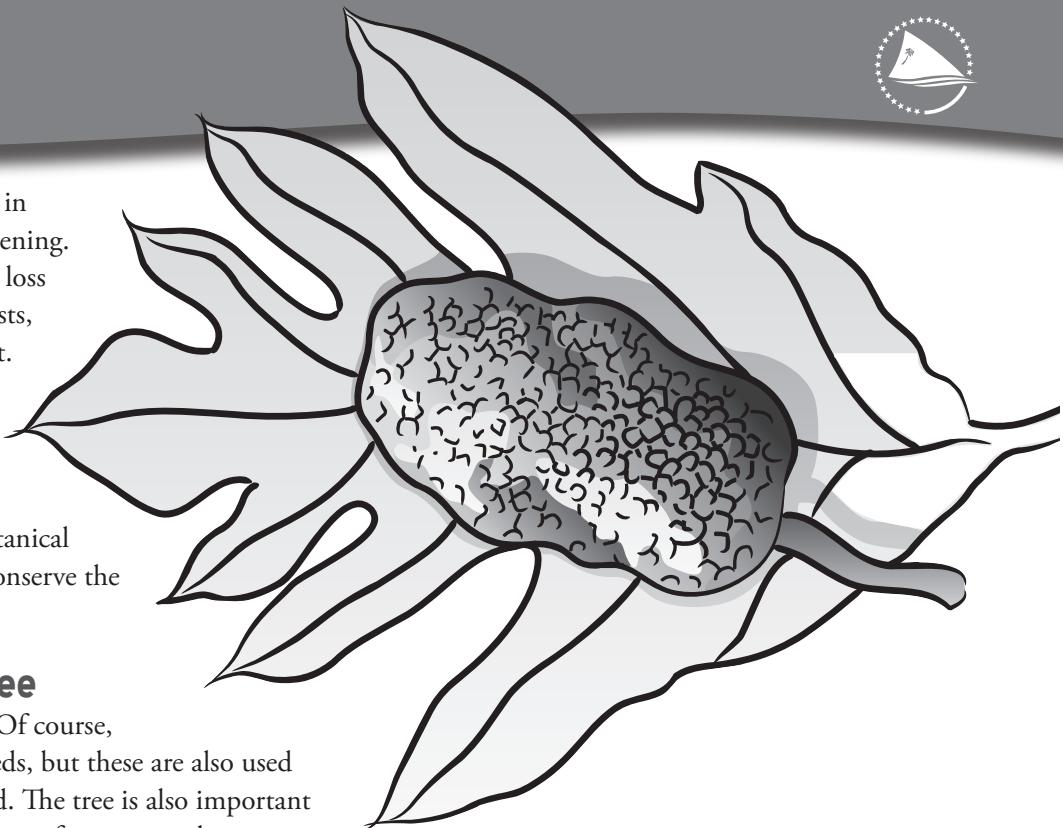
The fruit of the breadfruit tree is an important staple food in the Pacific. As with all foods, it should be remembered that "Fresh is best". However, breadfruit is a seasonal crop and sometimes the crop is so plentiful that it cannot all be eaten fresh. To prevent waste, various methods of preserving breadfruit have been developed. Before Europeans came to the Pacific and introduced their foods, breadfruit was preserved in many different ways including fermenting and drying. In some parts of the Pacific, it is still preserved using these old methods.

Unfortunately, a lot of breadfruit is now wasted because of neglect and because few people remember

Breadfruit



shapes and the fruits differ in shape, size, and time of ripening. There is concern about the loss of some varieties due to pests, disease, old age and neglect. Collections have been started, for example, at the Breadfruit Institute (<http://www.breadfruit.org>), National Tropical Botanical Garden, Hawaii, to help conserve the many varieties.



A multi-purpose tree

Breadfruit has many uses. Of course, people eat the fruit and seeds, but these are also used uncooked for livestock feed. The tree is also important for shade and provides support for crops such as yam. The timber may be used for houses, canoes, furniture and firewood. Its large leathery leaves (over 30 cm long, or 1 ft) can be used to cover cooking pots and earth ovens, to wrap food for cooking or serving, or as fans. Some parts of the breadfruit tree are used for medicine. The sticky latex or breadfruit gum may be used to caulk canoes to make them watertight and to prepare surfaces for painting.

Growing breadfruit

Breadfruit trees grow from 9 to 18 metres (30 to 60 ft) tall. They generally begin bearing fruit after about three years and continue to bear fruit for over 50 years. The trees may be planted by taking young shoots or root suckers that come up around older trees. Young breadfruit trees need protection from hot sun and general management and weed control. Later they need sunshine and grow best in full sunlight.

Breadfruit generally grows well with little care. However, trimming off old branches and diseased leaves is important. Pruning taller branches and cutting off the top also gives trees a better chance of surviving wind storms and cyclones and makes fruit picking easier. Good management, such as cutting away surrounding grass and plants and planting several different breadfruit varieties, will ensure good growth and protect against diseases. On atolls, breadfruit trees are often cared for by adding compost to the soil and watering them sometimes.

Harvesting and ripening

Breadfruit is usually picked when mature but not yet ripe, which may be about one month after the fruit forms. People traditionally use a pole to harvest the fruit. Men and children also climb the trees to pick the fruit, using ropes if the trees are tall. It is best to pick breadfruit from the tree rather than letting it drop to the ground. The fruit gets damaged when it hits the ground and softens sooner than fruit that is handpicked or caught as it falls.

Breadfruit may be eaten at different stages of maturity. Most commonly, it is eaten at the mature green (hard) stage and mature ripe (soft) stage. Half-ripe and ripe breadfruits are specialties in some regions. Breadfruit can be ripened by piercing the core and inserting either salt water, the rotting petiole of *Alocasia* taro, or already ripened breadfruit. It can also be ripened by wrapping it in old cloths and covering it with leaves overnight or for a few days.

Nutrient content

Breadfruit is an important energy food that contains starch and sugar. The levels of these vary according to the stage of ripeness at which the fruit is eaten (see the table). The amount of provitamin A carotenoids, the precursors to vitamin A, also varies with ripeness.



Breadfruit

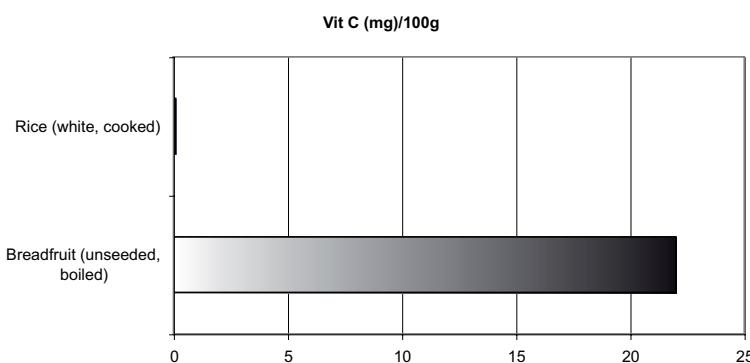
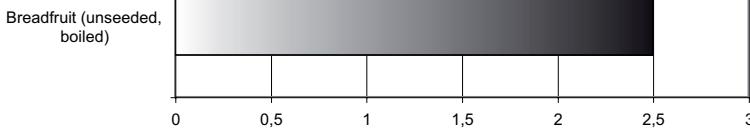
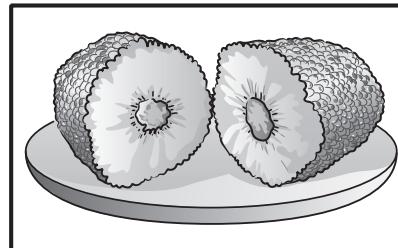
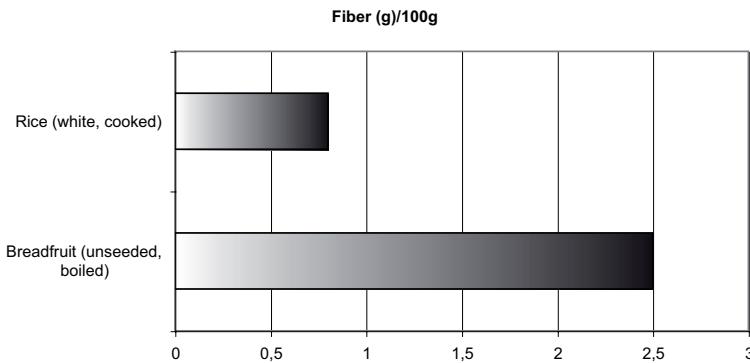
Comparison of nutrient content of 100 gram (g) edible portions of breadfruit and white rice.

	Kcal*	Fibre (g)	Cal-cium (mg)	Iron (mg)	β -carotene equivalents* (μg)	Niacin (mg)	Thiamin (mg)	Vitamin C (mg)
Unseeded flesh mature, boiled [†]	103	2.5	18	0.2	30	0.7	0.08	22.0
Unseeded flesh ripe, boiled ^{3,4}	na	na	na	na	8-157	na	na	na
Seeded flesh ripe, raw ²	122	1.1	24.5	1.4	na	1.9	0.12	34.4
Seeded flesh ripe, boiled ^{3,4}	na	na	na	na	145-939	na	na	na
Preserved, fermented ²	130	2.4	18.8	0.6	na	0.9	0.02	3.2
Preserved, dried paste ²	283	5.1	134.0	0.8	na	7.4	0.14	na
Seeds [†]	155	3.0	69	0.7	0	6.0	0.34	6.1
Rice, white, boiled [†]	123	0.8	4	0.3	0	0.6	0.03	0

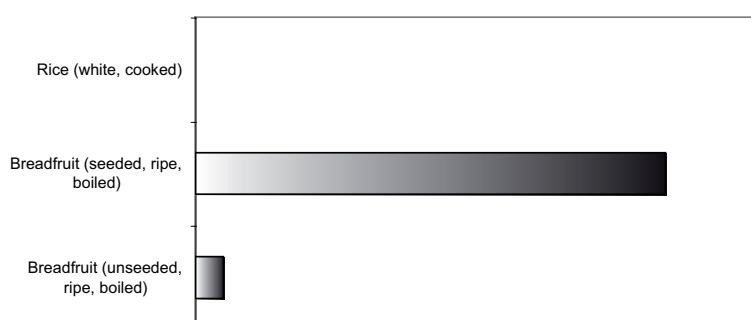
¹Dignan et al. 2004; ²Murai et al. 1958; ³Englberger et al. 2003(a); ⁴Englberger et al. 2003(b); na= not available.

*Energy expressed as kilocalories; †provitamin A carotenoids expressed as the sum of the β -carotene plus half of the α -carotene.

Note: 1 cup of breadfruit is about 250 grams.



β -carotene equivalents (μg)/100g



Note: levels refer to the breadfruit flesh and not the seeds.



Breadfruit is rich in fibre, which is important for a healthy gut. A diet rich in fibre also helps to control blood sugar in diabetics, reduce blood lipids (a risk for heart disease) and control weight.

It is currently recommended that adults consume 20–35 grams of dietary fibre per day. Two cups (500 grams) of boiled breadfruit at lunch and dinner provide around 25 grams of fibre, but a similar serving of white rice provides only 6.8 grams.

Breadfruit compares well with rice for other nutrients. It contains some calcium and is a good source of vitamin C (for fighting infection). In particular, a typical serving of one of the seeded types can meet daily needs for vitamin C. Rice is very low in both nutrients.

The flesh of ripe, seeded breadfruit is particularly rich in provitamin A carotenoids. Consuming these may help protect against infection, diabetes, heart disease, and cancer and help maintain good eye health and vision and strong blood. Two cups of ripe seeded breadfruit eaten at lunch and dinner provides 100% of the estimated daily vitamin A requirements for an adult.

Breadfruit seeds are a fair source of protein (5.3 grams per 100 grams) and have significant levels of the B vitamins, niacin and thiamin, which are important for metabolism.

Breadfruit paste, a traditional dried product that looks like dates and has a similar texture, is rich in energy and contains significant levels of calcium. Fermented

breadfruit is also rich in energy and contains similar levels of nutrients to fresh breadfruit, except for some vitamins such as vitamin C and thiamin, which are less stable.

In some Pacific regions, there is a trend towards adding sugar to breadfruit. This practice should be avoided as too much refined sugar leads to more tooth decay and other health problems including diabetes.

Using breadfruit

Breadfruit is used at different stages of maturity. The earliest stage is when the white milky sap comes to the surface and runs over the outside; the fruit is still hard and green but mature. If the breadfruit is allowed to ripen, some of the starch in the fruit turns to sugar, making it sweeter and giving it a characteristic ripe taste. The seeds, very young leaves, and flowers (if picked when just ripe) can also be eaten.

Breadfruit can be eaten in many ways:

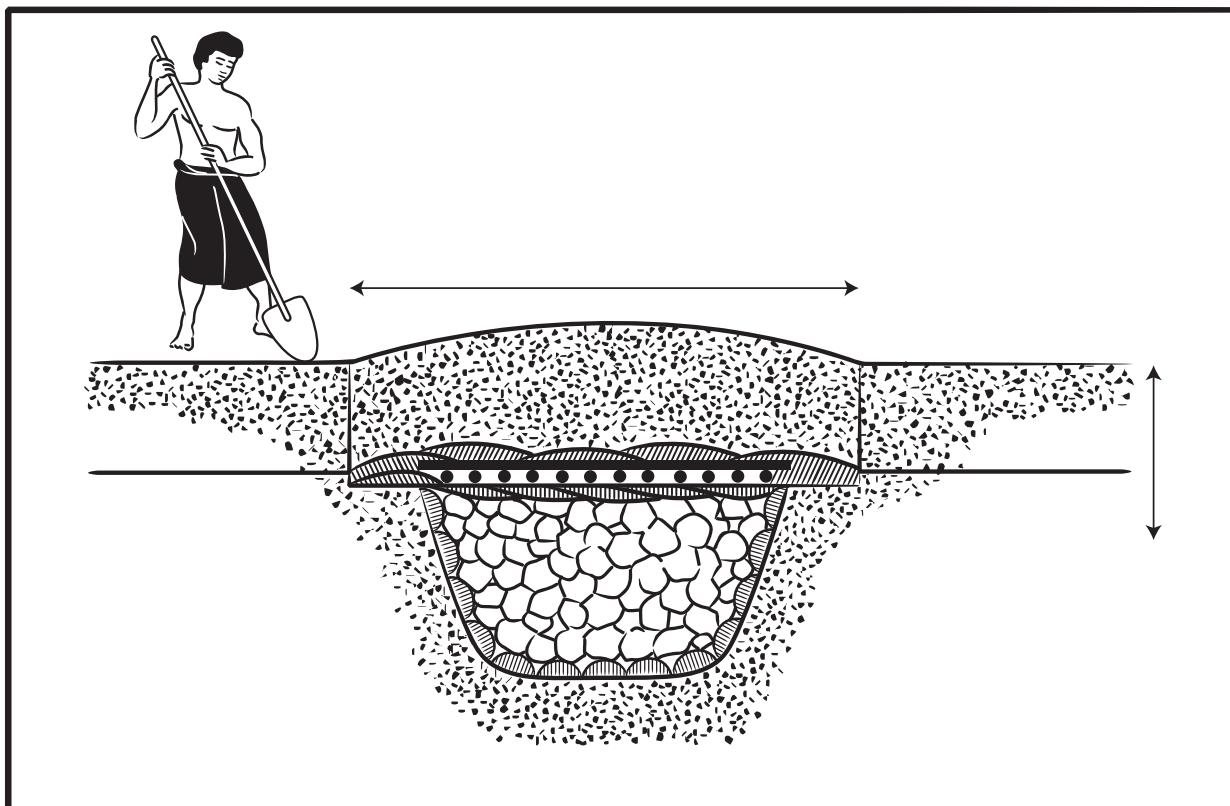
- ⇒ Fresh and raw as a snack (seeded variety). Any variety can be eaten raw when ripe
- ⇒ Boiled, steamed, baked, roasted or fried
- ⇒ Cooked with coconut cream
- ⇒ As an infant food, from about six months of age
- ⇒ As bread made from fermented breadfruit
- ⇒ As a sweet snack made from preserved paste
- ⇒ Seeds cooked as a snack or part of a main meal

Preparation

Traditional methods of preparing breadfruit include baking in earth ovens (see illustration page 5) and roasting over hot coals. Today, breadfruit is also boiled, steamed, or fried. The fruit can be pricked with a fork before baking or roasting so that it does not break up while cooking. Breadfruit may be peeled before or after cooking.

Breadfruit is very versatile and can be used in dishes such as curry and soup, prepared with fish or meat, or served cold in a salad. It can also be made into chips/crisps by frying thin slices in hot oil.

Breadfruit seeds can be baked or boiled with the flesh, or removed and cooked separately.



Preservation

To keep breadfruit for a short period of time, place it in a cool, dark place, or put it in cold water to keep it for a longer period. Baked breadfruit can be kept for one to two days without refrigeration.

Drying: Breadfruit can be preserved by drying, fermenting or freezing. Breadfruit pieces can be dried in the sun, in a slow oven (50°C or 120°F) or in a dehydrator. When well dried and cool, seal it in plastic bags to keep out moisture. Dried breadfruit is excellent in soups and stews. Another way of drying breadfruit is to cook it first, then mash it into a paste. Dry the paste in the sun and store in airtight containers. Breadfruit paste prepared from seeded breadfruit is now rarely made, but it is a tasty sweet snack.

Making flour: To make breadfruit flour, pound dried breadfruit, or grind it if a grinder is available. Sift and repeat. Store the flour in an airtight jar. It can be used instead of wheat flour in many recipes.

Fermenting: Fermented breadfruit is still popular in parts of the Pacific. In traditional methods, breadfruit may be fermented by peeling, coring and cutting up the fruit and burying it in pits lined with banana or breadfruit leaves, which are then covered with more leaves, sacks, earth and stones. In some methods, the breadfruit is first soaked in seawater. Today, breadfruit is usually fermented by placing the peeled fruits in an airtight container, e.g. a plastic container. Once the breadfruit is fermented, which takes about two to three months, it may be used in a number of recipes. To get rid of the strong fermented taste, the dough is rinsed with clean water before being kneaded and mixed with other ingredients such as coconut cream, grated coconut or ripe mashed banana.

Freezing: Freezing breadfruit changes the taste and texture, but still preserves it well for some recipes. Frozen, raw breadfruit can be lightly stir-fried, or boiled and mashed (with some fish) to make tasty breadfruit patties that are then grilled or fried. Frozen, cooked breadfruit can be reheated over steam or used in stews or soups.



Recipes

Breadfruit salad

- ⦿ 2 cups cooked mature breadfruit
- ⦿ 1 cup finely sliced vegetables, such as cucumbers, Chinese cabbage, or carrots
- ⦿ 3 tablespoons chopped onion
- ⦿ 1–2 tablespoons lime or other citrus juice
- ⦿ 1 chopped hard-boiled egg, optional
- ⦿ 1 chopped clove garlic, optional
- ⦿ 1–2 tablespoons oil or salad dressing, optional

1. Cut the cooked breadfruit into cubes.
2. Combine all ingredients.
3. Serve on greens such as watercress, or on edible hibiscus for a decorative touch.

Note: As a variation, root crops such as taro or yam can also be added.

Breadfruit and fish curry

- ⦿ 2 cups raw mature breadfruit, peeled and cut into pieces
- ⦿ 1–2 tablespoons cooking oil
- ⦿ 1 large onion, chopped
- ⦿ 1–2 cloves garlic, diced
- ⦿ 1–2 teaspoons curry powder
- ⦿ ¼ teaspoon pepper and chili, optional
- ⦿ 1 tablespoon tomato paste
- ⦿ 1 cup pumpkin, chopped
- ⦿ 2 cups green leafy vegetables
- ⦿ 1 cup chopped vegetables, such as eggplant, carrot or tomato, optional
- ⦿ 1 cup fresh or canned tuna or mackerel
- ⦿ 1–2 teaspoons lime or other citrus juice

1. Heat oil and lightly cook onion and garlic for 1 to 2 minutes.
2. Add the rest of the ingredients except the fish and lime or other citrus juice.
3. When the breadfruit and vegetables are cooked, add the fish and cook for 1 to 2 minutes, just until cooked.
4. Add the lime or citrus juice shortly before serving.

For health reasons it is best to avoid adding salt or sugar to recipes if possible. Most canned tomato paste and canned fish both contains added salt.

Ripe and mature breadfruit in coconut cream

- ⦿ 1 breadfruit, mature
- ⦿ 1 breadfruit, half ripe
- ⦿ 1 coconut, grated

1. Wash, peel and core breadfruit and cut into pieces.
2. Boil breadfruit in water until cooked, and drain.
3. Mash the breadfruit.
4. Add a little water to the grated coconut and squeeze the coconut cream over the mashed breadfruit.

Breadfruit and coconut balls

- ⦿ 3–5 breadfruit (smooth skinned varieties)
- ⦿ 3–4 coconuts, grated

1. Wash, peel and core breadfruit and cut into pieces.
2. Boil breadfruit in water.
3. Remove a portion of the breadfruit and mash while still hot. The remaining breadfruit should be left cooking over a low heat to keep it warm for mashing (this keeps it sticky and holds the balls together).
4. Roll pieces of mashed breadfruit in freshly grated coconut, forming balls of about 5 centimetres (2 inches) in diameter.

References

Dignan et al. 2004. The Pacific Islands Food Composition Tables. 2nd edition. Rome, FAO.

Englberger et al. 2003. Micronesian banana, taro, and other foods: newly recognized sources of provitamin A and other carotenoids. Journal of Food Composition and Analysis 16:3–19.

Englberger et al. 2003. Further analyses on Micronesian banana, taro, breadfruit and other foods for provitamin A carotenoids and minerals. Journal of Food Composition and Analysis 16:219–236.

Murai et al. 1958. Some tropical South Pacific Island foods. Honolulu, University of Hawaii Press.

Ragone, D. 1997. Breadfruit: *Artocarpus altilis* (Parkinson) Fosberg. Rome, International Plant Genetic Resources Institute.