



Food Safety, Security

Food safety in the home and food preservation for home use is an essential part of the food supply continuum. New fact sheets and workshops have been developed to teach skills on making breadfruit flour and coconut kefir. Extension education stresses hands-on learning with workshops that allow participants to do activities directly related to the subject matter. Materials are located on the web and accessible for all persons that re-enforce all the important aspects of the workshops. The key to all learning avenues is that participants increase their knowledge in skills that keep food safe at the microbial level, as well as during family meal preparation.

If you are interested in learning more about this program, reach out to our Extension Professionals below:

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UNIVERSITY OF GUAM Cooperative Extension & Outreach
MAKE COCONUT KEFIR AT HOME
Jian Yang, PhD, Extension Specialist of Food Science & Sheryl de Jesus, Cooperative Extension & Outreach, College of Natural & Applied Sciences, University of Guam

What is kefir?
Kefir is a milk drink with a creamy consistency fermented by kefir grains. The base of kefir is yogurt. Easy and refreshing like drinking yogurt. Due to yeast fermentation, kefir is slightly carbonated with a small amount of alcohol. Kefir contains various probiotics including lactic acid bacteria, yeasts, and acetic acid bacteria.

The Turkish word "Kefir" means good feeding, health, and well-being. In Eastern Europe, kefir is traditionally consumed for health benefits and longevity.

Generally, there has been multiple research efforts to explore kefir products under health benefits on the host including antimicrobiological and antimutagenic, modulating the immune system, anti-inflammatory activity, lowering cholesterol, antitumor activity, antiproliferative effect, anticancer effect, anticarcinogenic activity, improving lactose intolerance, and promoting wound healing (Pudis et al., 2015; Bana et al., 2017). In addition, kefir contains vitamins, minerals, and amino acids that promote nutrient absorption, maintain healthy bacteria, and improve bone density.

Kefir grains and culture
Milk kefir grains, water kefir grains, and kefir culture are thin or small clusters of microorganism forms with diameter from 3 to 20 mm. Milk kefir grains are obtained from the fermentation of milk in a glass jar. They contain bacteria, yeasts, and cellular debris from a matrix of kefir grains for probiotic culture. The probiotics culture are evenly distributed on the surface and in the center of the kefir grain. Milk kefir grains can grow during fermentation and be reused for making kefir.

Health benefits of kefir
Positive health benefits of kefir result from various genera, species, and strains of probiotics, which are cultured in "live microorganisms that when administered in adequate amounts confer a health benefit on the host" (FDA/CFR 21.101.2). Kefir probiotics, such as lactic acid bacteria, acetic acid bacteria, and yeasts, improve the beneficial microbial balance of the gut. In addition, probiotics, lactin, a unique polysaccharide secreted by L. Kefir-organisms, also promote various functional properties, such as antioxidant, antimicrobial, anti-inflammatory, and immunomodulatory activities (Pudis et al., 2015).

Figure 1. Homemade coconut kefir.

Figure 2. Activated milk kefir grain.

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UNIVERSITY OF GUAM Cooperative Extension & Outreach
MAKING BREADFRUIT FLOUR AT HOME
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Breadfruit is a good source of carbohydrates (70% dry) and protein (2.6% dry) with a high content of amino acids. Breadfruit is also rich in minerals (potassium, magnesium, calcium, iron, zinc, copper, manganese, sodium, phosphorus, and selenium), vitamins (vitamin C, thiamin, riboflavin, niacin, vitamin B6, and B12), antioxidants (carotenoids and flavonoids), and dietary fiber. Breadfruit has a sweeter glucose index. Residents of the Pacific Islands consume breadfruit traditionally as a nutritious staple crop.

Consumption of breadfruit
Breadfruit can be consumed fresh (raw) or through preparation by baking, steaming, boiling, frying, cooking over an open fire, etc. Normally, steamed or water-soaked breadfruit is cooked before consumption. Once cooked, breadfruit can be added to a salad or prepared into dishes. Breadfruit can also be fermented and pickled as a vegetable. Ripe fruit has a unique, coarse flour and sweet taste. It can be eaten raw or added to various dishes.

Shelf-life of breadfruit
Mature breadfruit has a very short shelf life after harvest. The fruit will ripen in 1 to 3 days at room temperature. The ripened fruit has good eating quality, but must be consumed quickly. Although storage in the refrigerator can extend the shelf life of breadfruit for 1 to 10 days, the skin of breadfruit tends to black at the temperature of 4 °C (39 °F).

Breadfruit flour and food security
Breadfruit is an important tropical staple. Unfortunately, the short shelf-life of the fruit limits the use of this tropical resource for consumption. Processing breadfruit into flour could extend the shelf life of breadfruit and create a year-round staple while enhancing food security for the Pacific Islands.

The breadfruit flour contains carbohydrates (76.79%), moisture content (4.56%), protein (1.43%), crude fiber (13.05%), ash (1.43%), and fat (1.13%). The shelf life of breadfruit flour is 4 to 12 months, which can meet the needs of consumers when the fruit is not in season.

Figure 3. Breadfruit tree
Breadfruit tree (Artocarpus altilis) is a tropical evergreen tree that grows throughout the globe, generally classified as a deciduous. Variety 'Sectus' contains varieties and hybrids containing seeds are grown on Guam. Breadfruit is commonly known as 'Taro' in the Chamorro language. The breadfruit tree can grow up to 20-40 ft and produce more than one hundred fruit with a yield of above 100 kg (220 lbs) each year (Eberlich et al., 2014).

Figure 4. Breadfruit
Breadfruit is a round, oblong or oval fruit and has a weight of 0.25-0.5 kg (0.5-1.1 lbs), depending on the variety. During maturation, the skin of the fruit changes from dark green to yellowish green, and the bumpy and spiky characteristics of the skin surface become flat and smooth. The major component of the fruit is starch. When halved or sliced, the fruit exhibits a starchy texture and a reminiscent smell of fresh-baked bread.

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