



## Kumquat

Scientific name: *Fortunella* species

Family: Rutaceae

Origin: Southern China

**K**umquat (cumquat) means golden (kum) good fortune (quat) in Cantonese Chinese. A potted kumquat tree with fruit is the ornament of choice during the Chinese New Year celebration in Southeast Asia, a tradition similar to the display of Christmas trees. The fruits are used in many Asian ceremonies and as offerings on the home altar. Kumquat is called jinju in Mandarin Chinese and kinkan in Japanese. It was described in Chinese literature as early as 118 BC and was first mentioned in European literature in the early 1600s. Chinese immigrants probably brought kumquat to Hawai‘i, perhaps as early as 1825.

### Types

There are a number of kumquat species, including meiwa (*Fortunella crassifolia*), and nagami (*F. margarita*), the two most common species grown in Hawai‘i. “Hong Kong wild” (*F. hindsii*), marumi (*F. japonica*), *F. obovata*, and *F. polyandra* are other species found from Southeast Asia to Japan.

### Environment

Considered a subtropical tree, the kumquat can be grown from low elevations up to 5000 feet. Newly planted trees at low elevations benefit from shading until well established. Kumquat is slow-growing and will enter periods of winter dormancy. It rarely grows taller than 15 feet.

### Horticulture

Kumquat is sensitive to drought and flooding but tolerant of a wide range of temperatures. It is often grown as a decorative hedge in Japan, planted as close as 3 feet

apart. In orchard plantings in California the trees are spaced 5–12 feet apart. Fertilizer applications every four months with 6-6-6 organic or all-purpose citrus fertilizer will keep the tree healthy and producing. Irrigation is helpful during periods of extended drought.

### Pests and diseases

Kumquat is a fruit fly host, so following the recommendations of the Hawai‘i Area-Wide Fruit Fly Pest Management Program (HAW-FLYPM) is highly advisable. *Phyllocnistis citrella*, the citrus leafminer, can be a problem, and a range of insecticides, including oil-based products, are labeled for use against such leaf pests. If the product label allows, application should be repeated every 2 weeks when the plant flushes. *Phytophthora citrophthora*, a fruit rot, and *Lasiodiplodia theobromae*, a fruit and stem rot, also can affect the plant. Initial symptoms are yellowing and browning of leaves on some branches. These branches as well as any dead wood should be pruned and disposed of.

### Propagation

Kumquat is rarely grown from seed, as seedling roots do not grow well. Commercial orchards in China use shield budding on trifoliolate orange rootstock, although rangpur lime and grapefruit rootstocks are also acceptable. Air-layers and other forms of grafting are also possible. Lemon and sweet orange are not used as rootstock, as they grow too vigorously for the slow-growing kumquat.



Ripe nagami kumquats



Meiwa

### Harvesting and yield

Fruits are harvested when fully ripe and orange. Fruits should be free of defects and inspected carefully for damage from fruit flies. In Hawai‘i, meiwa kumquat is sometimes confused with calamansie (*Citrus microcarpa*), which bears a small, round, orange-colored lime. The meiwa fruit has a much thinner skin and much sweeter taste than the lime. Meiwa also does not fruit as heavily as calamansie, which often produces large clusters of limes. China is the largest producer of kumquats, with more than 18,000 tons harvested yearly.

### Postharvest quality

When stored at 36–39°F, kumquats keep well for 1–2 months in commercial produce storage refrigerators, or about 2–3 weeks in a home refrigerator. Juice and whole or sliced fruits can be frozen for future use. At room temperature the fruit will last only a few days. The thin-skinned fruit should be packaged in blister packs no more than 3 inches deep to prevent compression damage.

### Packaging, pricing, and marketing

Kumquats sold in Asia and Hawai‘i are either sold loose, with or without leaves, or packaged in small blister packs. Packaged fruits should be free of defects and inspected for possible fruit fly damage. Kumquats should be fully ripe and orange when packaged. If sold with leaves attached, the leaves should be free of insect damage. In Hawai‘i, kumquats are more commonly found in farmers’ markets but are occasionally sold in supermarkets around the New Year holiday. Prices in Hawai‘i range from \$2.50 to \$7.00 per pound for both wholesale and retail. Chefs often request the best quality fruit for their culinary creations.



Nagami

### Food uses and nutrition

Kumquats are a good balanced source of vitamins and antioxidants. Cryptoxanthin, zeaxanthin, and lutein are essential for eye and vision care. Kumquats are eaten fresh or made into jams, jellies, and pickles; candied; and used in a wide variety of recipes.

**Nutritional value** per 100 g of edible portion\*

Water .....	80.85 g
Energy .....	71 kcal
Energy .....	296 kj
Protein .....	1.88 g
Total lipid (fat) .....	0.86 g
Ash .....	0.52 g
Carbohydrate, by difference .....	15.90 g
Fiber, total dietary .....	6.5 g
Sugars, total .....	9.36 g

**Minerals**

Calcium, Ca .....	62 mg
Iron, Fe .....	0.86 mg
Magnesium, Mg .....	20 mg
Phosphorus, P .....	19 mg
Potassium, K .....	186 mg
Sodium, Na .....	10 mg
Zinc, Zn .....	0.17 mg
Copper, Cu .....	0.095 mg
Manganese, Mn .....	0.135 mg

**Vitamins**

Vitamin C, total ascorbic acid .....	43.9 mg
Thiamin .....	0.037 mg
Riboflavin .....	0.090 mg
Niacin .....	0.429 mg
Pantothenic acid .....	0.208 mg
Vitamin B6 .....	0.036 mg
Folate, total .....	17 mcg
Folate, food .....	17 mcg
Folate, DFE .....	17 mcg
Vitamin A .....	290 IU
Vitamin A, RAE .....	15 mcg
Vitamin E (alpha-tocopherol) .....	0.15 mg
Carotene, alpha .....	155 mcg
Cryptoxanthin, beta .....	193 mcg
Lutein + zeaxanthin .....	129 mcg

\*Values compiled from various sources



**Kumquat sorbet**



**Kumquat Mongolian beef as served in a restaurant in Captain Cook, Hawai'i**

**Recipe: Kumquat, ginger, and Chinese 5-spice marmalade**

*Chef Paul Heerlein*

- 8 cups thinly sliced kumquats
- ½ cup tangerine juice
- 6 oz pectin
- 5½ cups sugar
- 3 T finely minced fresh ginger
- 1 tsp (heaping) Chinese 5-spice

In a saucepan, combine the kumquat and tangerine juice and bring to a boil. Slowly add the pectin while whisking, and then bring to a second boil. Add sugar while whisking and bring to boil again. Turn off the heat, stir in the ginger and 5-spice, and bottle immediately. Boil the filled jars for twenty minutes.