

# Bitter Melon

*Momordica charantia* is a member of the Cucurbitaceae (gourd) family, and a relative of squash, watermelon, muskmelon, and cucumber. In the United States, varieties are listed as bitter melon, balsam pear, or fu kwa.

Development of bitter melon varieties has been confined to India and other Asian countries. Many cultivars are available, but little is known about their performance in this country. Cultivars vary in fruit size, shape, and quality, and in yield, maturity, and disease resistance. You should evaluate the varieties available from foreign seed companies and domestic suppliers of oriental vegetable seed to determine which types are best suited to your specific environment.

The plant is a fast-growing trailing or climbing vine with thin stems and tendrils. Male and female flowers are borne separately on the same plant and require insects for pollination. Male flowers appear first and exceed the number of female flowers by about 25 to 1. The flowers open at sunrise and remain open for only one day.

The fruit has a pebbly surface with smooth lengthwise ridges. Immature fruits are light green, oblong, and pointed at the blossom end, and have white flesh. As the fruits begin to mature, their surface color gradually turns to yellow or orange. At maturity, fruits tend to split open, revealing orange flesh and a bright red placenta to which the seeds are attached. Seeds are tan and oval, with a rough etched surface; there are about 150 to 200 seeds per ounce (5 to 7 seeds per gram). The bitter melon probably originated in China or India.

**Other names.** *Bitter gourd*, *balsam pear* (United States); *fu kwa* (Chinese); *kerala* (India); *nigai uri* (Japanese); *ampalaya* (Filipino).

## Market Information

**Current production and yield.** Bitter melon is widely grown in China, India, and Southeast Asia. It is grown in small acreages in the United States, primarily in California and Florida. References from India and Southeast Asia report that good yields there are 10 to 12 fruits per plant, or 5 to 7 tons per acre. In Fresno County, California, growers report yields of 15 tons per acre. Total production costs computed for a small farm in Fresno County in 1990 were almost \$7,200 per acre, or \$4.79 per 20-pound box, assuming 1,500 boxes per acre.



Bitter melon fruit and bunched vine tips. (Photo: Hunter Johnson)



Female bitter melon flowers with developing fruit. (Photo: Hunter Johnson)



Bitter melon at market maturity on the right. Fruit on the left has matured further; its skin has turned yellow and its interior bright red. (Photo: Hunter Johnson)

**Use.** In the United States, bitter melon is grown for its immature fruits, which are used in Asian cooking. In other countries, the young leaves are harvested and used as a potherb. The fruit and leaves have a bitter flavor because they contain morodicine, an alkaloid. Alkaloid content can be reduced somewhat by parboiling or soaking fruit and leaves in saltwater. Immature fruit is least bitter. Ripe fruits are extremely bitter, and are reported to be toxic to humans and animals.

**Nutrition.** Immature fruit is a good source of Vitamin C, and also contains Vitamin A, phosphorus, and iron. The tender vine tips are an excellent source of Vitamin A, and a fair source of protein, thiamin, and Vitamin C.

## Culture

**Climatic requirements.** Bitter melon grows well in warm temperatures similar to those preferred for squash or muskmelons. Frost can kill the plants, and cool temperatures will retard development. Bitter melon normally is grown as an annual crop, but can perform as a perennial in mild-winter areas.

**Propagation and care.** Plantings are commonly established by direct-seeding in the field. Plant seeds about ½ inch deep. In warm soil, seedlings emerge in a week or less. Transplants can also be used, but plants should be grown by a method that does not disturb the root system during planting. Bare-root plants will not survive well.

A trellis is required to support the climbing vine. The trellis should be about 6 feet high, and constructed from stakes 4 to 6 feet apart with a system of vertical strings running between top and bottom horizontal wires. Rows should be spaced 48 to 60 inches apart, with plants 18 to 24 inches apart in the row. Plants are ideally suited to culture along fence lines of 6- to 8-inch wire mesh.

A deep, well-drained sandy loam or silt loam is the ideal soil, but bitter melon can be grown in any good agricultural soil with proper management. Bitter melon requires the same irrigation practices as squash, cucumbers, or muskmelons, maintaining moisture in the soil's upper 18 inches.

In most California soils, plants require only nitrogen and phosphorus fertilization: 150 pounds of nitrogen and 50 pounds of phosphorus per acre should be adequate. The phosphorus and 50 pounds of the nitrogen should be applied before planting, either by broadcasting and tilling in or by applying in a band a few inches deep and to the side of the plant row. The balance of the nitrogen can be applied in two or more side-dressings with furrow irrigation, or in weekly increments by trickle irrigation. Soil analysis can determine the need for other elements.

**Pests and diseases.** Bitter melon is susceptible to many of the same diseases and insect pests that affect squash, cucumbers, and muskmelons. It is a host for watermelon mosaic virus, and may be susceptible to other cucurbit viruses. Powdery mildew can be controlled with sulfur dust. The fruits are subject to attack by various fruit flies and fruit rots.

**Harvest and postharvest practices.** Young fruits should be harvested 8 to 10 days after flowers open, while the fruits are still firm and light green. The fruits will be 4 to 6 inches (10 to 15 cm) long. Beyond this stage, fruits become spongy and more bitter and they lose their market value. The development of mature fruits on the plants may reduce setting of new fruits, so harvesting should be frequent enough to remove fruits at the proper market stage.

The USDA recommends storage at 53° to 55°F at 85 to 90% relative humidity, with an approximate storage life of 2 to 3 weeks. The fruits should be handled and packaged with care, and should be isolated from fruits that produce large amounts of ethylene to prevent postharvest ripening.

Bitter melon is chilling sensitive and should not be held below 50°F. Chilling symptoms include pitting, discolored areas, and a high incidence of decay after the low-temperature storage. Fruits stored at temperatures greater than 55°F tend to continue development and begin to ripen (turn yellow and split open). Controlled atmosphere storage does not provide much benefit toward maintaining green color and overall postharvest quality.

## Sources

### Seed

W. Atlee Burpee & Co., 300 Park Avenue, Warminster, PA 18974

Seeds Blüm, Idaho City Stage, Boise, ID 83706

Sunrise Enterprises, P.O. Box 10058, Elmwood, CT 06110-0058

Tsang and Ma, P.O. Box 5644, Redwood City, CA 94063

### More information

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