



# Momordica charantia

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*Momordica charantia*, known as **bitter melon**, **bitter gourd**, **bitter squash**, or **balsam-pear**,<sup>[1]</sup> is a tropical and subtropical vine of the family Cucurbitaceae, widely grown in Asia, Africa, and the Caribbean for its edible fruit. Its many varieties differ substantially in the shape and bitterness of the fruit. Bitter melon also has names in other languages which have entered English as loanwords, e.g. **kŭguā** (𑖕𑖄𑖥) from Chinese, **nigauri** (𑂔𑂗𑂢𑂰) from Japanese, **gōyā** (𑀓𑀺𑀕𑀸𑀓)<sup>[2]</sup> from Okinawan, **kaipakka/paavakka** (കൈപ്പക/പാവക) in Malayalam, **kakarakaya** (కకరకాయ) in Telugu, **Hāgala** (ಹಾಗಲಾ) in Kannada, **pākal** (பாகல்) in Tamil and **karela** (කරෙලා and كاريل) or **kareli** (කරෙලි and كریلی) in Hindustani (Hindi and Urdu), coming from Sanskrit. In Bengali, it is known as **uchche** (উচ্চৈ). Those from the Caribbean island of Jamaica commonly refer to the plant as **cerasee**. In Brazil this plant is called **Saint Cajetan's Melon** (melão-de-são-caetano). In Guyana the plant is referred to as corilla. In the Philippines it is called ampalaya or amargoso.

Bitter melon originated in India and was introduced into China in the 14th century.<sup>[3]</sup> It is widely used in East Asian, South Asian, and Southeast Asian cuisine.

## Description

This herbaceous, tendril-bearing vine grows up to 5 m (16 ft) in length. It bears simple, alternate leaves 4–12 cm (1.6–4.7 in) across, with three to seven deeply separated lobes. Each plant bears separate yellow male and female flowers. In the Northern Hemisphere, flowering occurs during June to July and fruiting during September to November.

The fruit has a distinct warty exterior and an oblong shape. It is hollow in cross-section, with a relatively thin layer of flesh surrounding a central seed cavity filled with large, flat seeds and pith. The fruit is most often eaten green, or as it is beginning to turn yellow.

### Momordica charantia



### Scientific classification

Kingdom:	<u>Plantae</u>
(unranked):	<u>Angiosperms</u>
(unranked):	<u>Eudicots</u>
(unranked):	<u>Rosids</u>
Order:	<u>Cucurbitales</u>
Family:	<u>Cucurbitaceae</u>
Genus:	<u>Momordica</u>
Species:	<b><i>M. charantia</i></b>

### Binomial name

***Momordica charantia***  
L.

At this stage, the fruit's flesh is crunchy and watery in texture, similar to cucumber, chayote or green bell pepper, but bitter. The skin is tender and edible. Seeds and pith appear white in unripe fruits; they are not intensely bitter and can be removed before cooking.

Some sources claim the flesh (rind) becomes somewhat tougher and more bitter with age, but other sources claim that at least for the common Chinese variety the skin does not change and bitterness decreases with age. The Chinese variety are best harvested light green possibly with a slight yellow tinge or just before. The pith becomes sweet and intensely red; it can be eaten uncooked in this state, and is a popular ingredient in some Southeast Asian salads.

When the fruit is fully ripe, it turns orange and mushy, and splits into segments which curl back dramatically to expose seeds covered in bright red pulp.



Ripe fruit

## Varieties

Bitter melon comes in a variety of shapes and sizes. The cultivar common in China is 20–30 cm (7.9–11.8 in) long, oblong with bluntly tapering ends and pale green in color, with a gently undulating, warty surface. The bitter melon more typical of India has a narrower shape with pointed ends, and a surface covered with jagged, triangular "teeth" and ridges. It is green to white in color. Between these two extremes are any number of intermediate forms. Some bear miniature fruit of only 6–10 cm (2.4–3.9 in) in length, which may be served individually as stuffed vegetables. These miniature fruit are popular in Bangladesh, India (common name 'Karela'), Pakistan, Nepal and other countries in South Asia. The sub-continent variety is most popular in Bangladesh and India.



Chinese variety



Indian variety

## Culinary uses

Bitter melon is generally consumed cooked in the green or early yellowing stage. The young shoots and leaves of the bitter melon may also be eaten as greens.

In Chinese cuisine, bitter melon (Chinese: 苦瓜, pinyin: *kǔguā* or *kugua*) is valued for its bitter flavor, typically in stir-fries (often with pork and douchi), soups, dim sum, and herbal teas (See Gohyah tea). It has also been used in place of hops as the bittering ingredient in some beers in China and Okinawa.<sup>[5]</sup>



A small green bitter melon (front) and a scoop of Okinawan stir-fried *gōyā chanpurū* (back)

Bitter melon is very popular throughout India. In North Indian cuisine, it is often served with yogurt on the side to offset the bitterness, used in curry such as *sabzi* or stuffed with spices and then cooked in oil.

In South Indian cuisine, it is used in the dishes *thoran/thuvaran* (mixed with grated coconut), *mezhukkupuratti* (stir fried with spices), *theeyal* (cooked with

roasted coconut) and *pachadi* (which is considered a medicinal food for diabetics). Other popular recipes include preparations with curry, deep fried with peanuts or other ground nuts, and *Pachi Pulusu*, a soup with fried onions and other spices. In Karnataka, which is known as Hāgalakāyi (ಹಾಗಲಕಾಯಿ) in Kannada language similarly in Tamil Nadu, it is known as *paagarkai* or *pavakai* (பாவகாயி) in Tamil,<sup>[6]</sup> a special preparation called *pagarkai pitla*, a kind of sour *koottu*, variety is very popular. Also popular is *kattu pagarkkai*, a curry that involves stuffing with onions, cooked lentil and grated coconut mix, tied with thread and fried in oil. In the Konkan region of Maharashtra, salt is added to finely chopped bitter gourd, known as *karle* (करले) in Marathi, and then it is squeezed, removing its bitter juice to some extent. After frying this with different spices, the less bitter and crispy preparation is served with grated coconut. In Kannada it is known as *haagalakaayi*. It's known as *Karate* (Konkani: ಕರಾಟೆ) in Goa, it's valued for its health benefits and used widely in Goan cuisine.

In northern India and Nepal, bitter melon, known as *tite karela* (तिट्टे करेला) in Nepali, is prepared as a fresh pickle. For this, the vegetable is cut into cubes or slices, and sautéed with oil and a sprinkle of water. When it is softened and reduced, it is crushed in a mortar with a few cloves of garlic, salt and a red or green pepper. It is also eaten sautéed to golden-brown, stuffed, or as a curry on its own or with potatoes.

In Sri Lanka it is known as *karavila* (කරවිලා) in Sinhala, and is an ingredient in many different curry dishes (e.g., Karawila Curry and Karawila Sambol) which are served mainly with rice in a main meal. Sometimes large grated coconut pieces are added, which is more common in rural areas. Karawila juice is also sometimes served there.

In Pakistan, known as *karela* (کربلا) in Urdu-speaking areas, and Bangladesh, known as *korola* (করলা) in Bengali, bitter melon is often cooked with onions, red chili powder, turmeric powder, salt, coriander powder, and a pinch of cumin seeds. Another dish in Pakistan calls for whole, unpeeled bitter melon to be boiled and

## Bitter gourd pods boiled, drained, no salt

Nutritional value per 100 g (3.5 oz)		
<b>Energy</b>	79 kJ (19 kcal)	
<b>Carbohydrates</b>	4.32 g	
Sugars	1.95 g	
Dietary fiber	2 g	
<b>Fat</b>	0.18 g	
<b>Protein</b>	0.84 g	
<b>Vitamins</b>	<b>Quantity</b>	<b>%DV<sup>†</sup></b>
Vitamin A equiv.	6 µg	1%
beta-Carotene	68 µg	1%
lutein zeaxanthin	1323 µg	
Thiamine (B <sub>1</sub> )	0.051 mg	4%
Riboflavin (B <sub>2</sub> )	0.053 mg	4%
Niacin (B <sub>3</sub> )	0.28 mg	2%
Pantothenic acid (B <sub>5</sub> )	0.193 mg	4%
Vitamin B <sub>6</sub>	0.041 mg	2%
Folate (B <sub>9</sub> )	51 µg	13%
Vitamin C	33 mg	37%
Vitamin E	0.14 mg	1%
Vitamin K	4.8 µg	4%
<b>Minerals</b>	<b>Quantity</b>	<b>%DV<sup>†</sup></b>
Calcium	9 mg	1%
Iron	0.38 mg	2%
Magnesium	16 mg	4%
Manganese	0.086 mg	4%
Phosphorus	36 mg	3%
Potassium	319 mg	11%
Sodium	6 mg	0%
Zinc	0.77 mg	7%
<b>Other constituents</b>	<b>Quantity</b>	
Water	93.95 g	
Link to USDA Database entry ( <a href="http://ndb.nal.usda.gov/ndb/search/list?qlookup=11025&amp;format=Full">http://ndb.nal.usda.gov/ndb/search/list?qlookup=11025&amp;format=Full</a> )		
<sup>†</sup> Percentages estimated using US recommendations for adults. <sup>[4]</sup>		

then stuffed with cooked minced beef, served with either hot tandoori bread, naan, chappati, or with khichri (a mixture of lentils and rice).



A soft drink made from bitter melon

Bitter melon, known as *gōyā* (ゴーヤ) in Okinawan, and *nigauri* (ニガウリ) in Japanese (although the Okinawan word *gōyā* is also used), is a significant ingredient in Okinawan cuisine, and is increasingly used in Japanese cuisine beyond that island. It is popularly credited with Okinawan life expectancies being higher than the already long Japanese ones.

In Indonesian cuisine, bitter melon, known as *pare* in Javanese and Indonesian (also *paria*), is prepared in various dishes, such as *gado-gado*, and also stir fried, cooked in coconut milk, or steamed. In Christian areas in Eastern Indonesia it is cooked with pork and chile, the sweetness of the pork balancing against the bitterness of the vegetable.

In Vietnamese cuisine, raw bitter melon slices known as *mướp đắng* or *khổ qua* in Vietnamese, eaten with dried meat floss and bitter melon soup with shrimp are popular dishes. Bitter melons stuffed with ground pork are served as a popular summer soup in the south. It is also used as the main ingredient of "stewed bitter melon". This dish is usually cooked for the Tết holiday, where its "bitter" name is taken as a reminder of the bitter living conditions experienced in the past.

In Thai cuisine, the Chinese variety of green bitter melon, *mara* (มะระ) in Thai, is prepared stuffed with minced pork and garlic, in a clear broth. It is also served sliced, stir fried with garlic and fish sauce until just tender.

In the cuisine of the Philippines, bitter melon, known as *ampalaya* in Tagalog, and *parya* in Ilokano, may be stir-fried with ground beef and oyster sauce, or with eggs and diced tomato. The dish *pinakbet*, popular in the Ilocos region of Luzon, consists mainly of bitter melons, eggplant, okra, string beans, tomatoes, lima beans, and other various regional vegetables all stewed together with a little *bagoong*-based stock.

In Trinidad and Tobago bitter melons, known as *caraille* or *carilley*, are usually sautéed with onion, garlic and scotch bonnet pepper until almost crisp.

In Mauritius bitter melons are known as 'margose' or 'margoze'.

## Traditional medicinal uses

They are in use since a very long time in Hindu medicine or Ayurveda . Bitter melon has been used in various Asian and African herbal medicine systems for a long time.<sup>[7][8][9]</sup> In Turkey, it has been used as a folk remedy for a variety of ailments, particularly stomach complaints.<sup>[10]</sup> In traditional medicine of India different parts of the plant are used as claimed treatments for diabetes (particularly Polypeptide-p, an insulin analogue), and as a stomachic, laxative, antibilious, emetic, anthelmintic agent, for the treatment of cough, respiratory diseases, skin diseases, wounds, ulcer, gout, and rheumatism.<sup>[11]</sup>

*Momordica charantia* has a number of purported uses including cancer prevention, treatment of diabetes, fever, HIV and AIDS, and infections.<sup>[12]</sup> While it has shown some potential clinical activity in laboratory experiments, "further studies are required to recommend its use".<sup>[12]</sup> In 2012, the germplasm and chemical constituents, such as momordicin within several varieties of the gourd were being studied.<sup>[13]</sup>



For fever reduction and relief of menstrual problems, there is no scientific research to back these claims.<sup>[12]</sup> For cancer prevention, HIV and AIDS, and treatment of infections, there is preliminary laboratory research, but no clinical studies in humans showing a benefit.<sup>[12]</sup> In 2017 the University of Peradeniya researchers revealed that bitter gourd seeds can be potentially used to destroy cancer cells and was successfully administered to patients in Kandy General Hospital<sup>[14]</sup> Cancer Unit.



A close up view of an Indian bittergourd.

With regard to the use of *Momordica charantia* for diabetes, several animal studies and small-scale human studies have demonstrated a hypoglycemic effect of concentrated bitter melon extracts.<sup>[15][16][17]</sup> In addition, a 2014 review shows evidence that *Momordica charantia*, when consumed in raw or juice form, can be efficacious in lowering blood glucose levels.<sup>[18]</sup> However, multiple reviews have found that *Momordica charantia* does not significantly decrease fasting blood glucose levels or A1c, indicators of blood glucose control, when taken in capsule or tablet form.<sup>[18][19]</sup> *Momordica charantia* may be beneficial in diabetes, however the effects seem to depend on how it is consumed.<sup>[18]</sup> More studies need to be performed in order to verify this effect.<sup>[18]</sup> The Memorial Sloan Kettering Cancer Center concludes that bitter melon "cannot be recommended as a replacement therapy for insulin or hypoglycemic drugs".<sup>[12]</sup>

## Adverse effects

Reported side effects include diarrhea, abdominal pain, fever, hypoglycemia, urinary incontinence, and chest pain. Symptoms are generally mild, do not require treatment, and resolve with rest.<sup>[19]</sup>

## Pregnancy

Bitter melon is contraindicated in pregnant women because it can induce bleeding, contractions, and miscarriage.<sup>[12]</sup>

## Gallery

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### Plant



Plant



Leafbud



Leaves and Flower



Flowers



Female flower



Male flower



2 days old fruit with  
flower



3 days old fruit



10 days old fruit



Immature fruit



Immature fruit



Unripe fruits



Seeds



Bitter melon plant growing in a container.



Commercial crop of bitter melon is grown on trellises made out of plastic netting.

## Dishes and other uses



*Aloo karela bhaaji*, bitter gourd and potato dish, from India.



Bitter gourd dish with sauce



Bitter gourd cleaned and sliced for cooking



Bitter gourds being fried in Kaohsiung, Taiwan



An Indonesian-style bitter melon dish, cooked with *sambal*, onion, and red bird's-eye chili peppers



Filipino *ampalaya con carne* with egg, La Familia of Baliuag, Bulacan



Bitter melon food supplement capsules



Okinawan style *goya chanpuru* (ゴーヤチャンプルー), a stir-fried dish



Bitter melon fry with potato

## See also

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- *Momordica cochinchinensis* (gac)
- *Momordica cymbalaria*
- *Momordica foetida*

## References

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1. "BSBI List 2007" (<http://www.bsbi.org.uk/BSBIList2007.xls>) (xls). Botanical Society of Britain and Ireland. Retrieved 2014-10-17.
2. Tritten, Travis J. (March 9, 2011). "State Dept. official in Japan fired over alleged derogatory remarks" (<http://www.stripes.com/mobile/news/state-dept-official-in-japan-fired-over-alleged-derogatory-remarks-1.137181>). Stars and Stripes. Retrieved September 12, 2012.
3. Bagchi, Indrani (11 April 2005). "Food for thought: Green 'karela' for Red China" ([http://articles.timesofindia.indiatimes.com/2005-04-11/india/27857106\\_1\\_karela-india-and-china-white-horse-temple](http://articles.timesofindia.indiatimes.com/2005-04-11/india/27857106_1_karela-india-and-china-white-horse-temple)). *Times of India*.
4. United States Food and Drug Administration (2024). "Daily Value on the Nutrition and Supplement Facts Labels" (<https://www.fda.gov/food/nutrition-facts-label/daily-value-nutrition-and-supplement-facts-labels>). Retrieved 2024-03-28.
5. For example, Goya Dry (<http://helios-syuzo.co.jp/docs/products/goyadry/>) by Helios (<http://helios-syuzo.co.jp/>) brewery of Okinawa



6. Lim, T. K. (2013). *Edible medicinal and non-medicinal plants*. Dordrecht: Springer. pp. 331–332. ISBN 9789400717640.
7. Grover, J. K.; Yadav, S. P. (2004). "Pharmacological actions and potential uses of *Momordica charantia*: A review". *Journal of Ethnopharmacology*. **93** (1): 123–132. doi:10.1016/j.jep.2004.03.035 (<https://doi.org/10.1016%2Fj.jep.2004.03.035>). PMID 15182917 (<https://pubmed.ncbi.nlm.nih.gov/15182917>).
8. Beloin, N.; Gbeassor, M.; Akpagana, K.; Hudson, J.; De Soussa, K.; Koumaglo, K.; Arnason, J. T. (2005). "Ethnomedicinal uses of *Momordica charantia* (Cucurbitaceae) in Togo and relation to its phytochemistry and biological activity". *Journal of Ethnopharmacology*. **96** (1–2): 49–55. doi:10.1016/j.jep.2004.08.009 (<https://doi.org/10.1016%2Fj.jep.2004.08.009>). PMID 15588650 (<https://pubmed.ncbi.nlm.nih.gov/15588650>).
9. Ananya Paul and Sarmistha Sen Raychaudhuri (2010). "Medicinal uses and molecular identification of two *Momordica charantia* varieties – a review" (<http://www.ejbio.com/pps/2010/43.pdf>) (PDF). *Electronic Journal of Biology*. **6** (2): 43–51.
10. "Kudret Nari Faydaları" (<http://www.beslenmedestegi.com/bitkisel-ilaclar/kudret-nari-faydolari>). Beslenme Desteği. Retrieved 2011-10-03.
11. Wang, Limei; Waltenberger, Birgit; Pferschy-Wenzig, Eva-Maria; Blunder, Martina; Liu, Xin; Malainer, Clemens; Blazevic, Tina; Schwaiger, Stefan; Rollinger, Judith M.; Heiss, Elke H.; Schuster, Daniela; Kopp, Brigitte; Bauer, Rudolf; Stuppner, Hermann; Dirsch, Verena M.; Atanasov, Atanas G. (2014). "Natural product agonists of peroxisome proliferator-activated receptor gamma (PPAR $\gamma$ ): a review" (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4212005>). *Biochemical Pharmacology*. **92** (1): 73–89. doi:10.1016/j.bcp.2014.07.018 (<https://doi.org/10.1016%2Fj.bcp.2014.07.018>). PMC 4212005 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4212005>). PMID 25083916 (<https://pubmed.ncbi.nlm.nih.gov/25083916>).
12. "Bitter Melon" (<http://www.mskcc.org/cancer-care/herb/bitter-melon>). Memorial Sloan-Kettering Cancer Center. Retrieved 17 October 2013.
13. MURALI KRISHNA YELCHURI, BALA (22 January 2012). "India-Tanzania-Thailand Scientists to Study 'Bitter Gourd' for anti-diabetes" (<http://www.zmescience.com/research/india-tanzania-thailand-scientists-to-study-bitter-gourd-for-anti-diabetes/>). zmescience.com. Retrieved 30 May 2017.
14. "Bitter gourd seeds cure cancer: Research" (<http://www.dailymirror.lk/article/Bitter-gourd-seeds-cure-cancer-Research-125767.html>). dailymirror. Retrieved 20 March 2017.
15. Wang, B. L.; Zhang, W. J.; Zhao, J.; Wang, F. J.; Fan, L. Q.; Wu, Y. X.; Hu, Z. B. (2011). "Gene cloning and expression of a novel hypoglycaemic peptide from *Momordica charantia*". *Journal of the Science of Food and Agriculture*. **91** (13): 2443–8. doi:10.1002/jsfa.4485 (<https://doi.org/10.1002%2Fjsfa.4485>). PMID 21626510 (<https://pubmed.ncbi.nlm.nih.gov/21626510>).
16. Lo, H. Y.; Ho, T. Y.; Lin, C.; Li, C. C.; Hsiang, C. Y. (2013). "Momordica charantia and its novel polypeptide regulate glucose homeostasis in mice via binding to insulin receptor". *Journal of Agricultural and Food Chemistry*. **61** (10): 2461–8. doi:10.1021/jf3042402 (<https://doi.org/10.1021%2Fjf3042402>). PMID 23414136 (<https://pubmed.ncbi.nlm.nih.gov/23414136>).
17. Chen, Q; Chan, L. L.; Li, E. T. (2003). "Bitter melon (*Momordica charantia*) reduces adiposity, lowers serum insulin and normalizes glucose tolerance in rats fed a high fat diet". *The Journal of Nutrition*. **133** (4): 1088–93. PMID 12672924 (<https://pubmed.ncbi.nlm.nih.gov/12672924>).
18. Bachok, M. F.; Yusof, B. N.; Ismail, A; Hamid, A. A. (2014). "Effectiveness of traditional Malaysian vegetables (ulam) in modulating blood glucose levels". *Asia Pacific journal of clinical nutrition*. **23** (3): 369–76. doi:10.6133/apjcn.2014.23.3.01 (<https://doi.org/10.6133%2Fapjcn.2014.23.3.01>) (inactive 2017-01-20). PMID 25164446 (<https://pubmed.ncbi.nlm.nih.gov/25164446>).
19. Ooi, C. P.; Yassin, Z; Hamid, T. A. (2012). "Momordica charantia for type 2 diabetes mellitus". *The Cochrane Library*. **8** (8): CD007845. doi:10.1002/14651858.CD007845.pub3 (<https://doi.org/10.1002%2F14651858.CD007845.pub3>). PMID 22895968 (<https://pubmed.ncbi.nlm.nih.gov/22895968>).

## External links

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- *Momordica charantia* ([http://www.westafricanplants.senckenberg.de/root/index.php?page\\_id=13&preview=true&searchTextMenue=Momordica+charantia&search=Wikitemplate](http://www.westafricanplants.senckenberg.de/root/index.php?page_id=13&preview=true&searchTextMenue=Momordica+charantia&search=Wikitemplate)) in [West African plants – A Photo Guide](#). (<http://www.westafricanplants.senckenberg.de/>)
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