

Pitaya



Cross section of a ripe white pitahaya



Hylocereus undatus pitahayas at a market stall in Taiwan, between bananas and sugar apples.

A **pitaya** /pɪˈtɑɪ.ə/ or **pitahaya** /ˌpɪtəˈhaɪ.ə/ is the fruit of several cactus species. "Pitaya" usually refers to fruit of the genus *Stenocereus*, while "pitahaya" or "dragon fruit" always refers to fruit of the genus *Hylocereus*.

1 Vernacular names of *Hylocereus*

These fruits are commonly known in English as “**dragon fruit**”, reflecting its vernacular Asian names. These include the Malay *buah naga* (lit. dragon fruit), the Khmer *sror kaa neak* (dragon scale), the Thai *kaeo mangkon* (Thai: แก้วมังกร) (dragon crystal), the Lao *maak mangohn* (Lao: ຫມ້າງມັງກອນ), the Vietnamese *thanh long* (green dragon), and the Chinese *huǒ lóng guǒ* (fire dragon

fruit) or *lóng zhū guǒ* (dragon pearl fruit). Other vernacular names are “strawberry pear” or “nanettika fruit”.

The name 'pitahaya' or 'pitaya' is, according to the Oxford English Dictionary, derived from the Spanish rendition of the Haitian.^[1]

2 Geography

Pitahaya-producing cacti of the genus *Hylocereus* are originally native to Mexico. They were transplanted to Central America and to other parts of the world.

They are cultivated in East Asian, South Asian and Southeast Asian countries such as Cambodia, Thailand, Taiwan, Malaysia, Vietnam, Sri Lanka, the Philippines, Indonesia, and more recently Bangladesh.^{[2][3]} They are also found in Okinawa, Hawaii, Israel, northern Australia, southern China^[4] and in Cyprus.

The fruit was probably introduced by Europeans who brought it from the New World.^[5] In the case of Taiwan, the fruit was brought in by the Dutch.^[6]

Hylocereus blooms only at night; the large white fragrant flowers of the typical cactus flower shape are among those called "moonflower" or "Queen of the Night." Sweet pitahayas have a creamy pulp and a delicate aroma. It is also grown as an ornamental plant, used in gardens as a flowering vine and a house plant indoors.



Stenocereus queretaroensis pitaya prepared for eating



Selling dragon fruit juice in Thailand

3 Pitaya varieties

3.1 *Stenocereus*

Stenocereus fruit (sour pitayas) are a variety that is commonly eaten in the arid regions of the Americas. They are more sour and refreshing, with juicier flesh and a stronger taste. The sour pitaya or **pitaya agria** (*S. gummosus*)^[7] in the Sonoran Desert has been an important food source for Native Americans. The Seri people of northwestern Mexico still harvest the fruit,^[8] and call the plant **ziix is ccaxl** – “thing whose fruit is sour”. The fruit of related species, such as *S. queretaroensis* and the dagger cactus (*S. griseus*),^[9] are also locally important foods. The Organ Pipe Cactus (*S. thurberi*) fruit (called **ool** by the Seris) is the **pitaya dulce** (“sweet pitaya”). It still has a more tart aroma than *Hylocereus* fruit, described as somewhat reminiscent of watermelon; it has some uses in folk medicine.

Fruits of some other columnar cacti (mainly Cereeae) are also called “pitayas” – for example those of the Peruvian apple cactus (*Cereus repandus*), which are very rare.

3.2 Dragon fruit *Hylocereus*

Sweet pitayas come in three types, all with leathery, slightly leathery skin:

- *Hylocereus undatus* (Pitaya blanca or white-fleshed pitaya) has red-skinned fruit with white flesh. This is the most commonly seen “dragon fruit”.
- *Hylocereus costaricensis* (Pitaya roja or red-fleshed pitaya, also known as *Hylocereus polyrhizus*) has red-skinned fruit with red flesh.
- *Hylocereus megalanthus* (Pitaya amarilla or yellow pitaya, also known as *Selenicereus megalanthus*) has yellow-skinned fruit with white flesh.

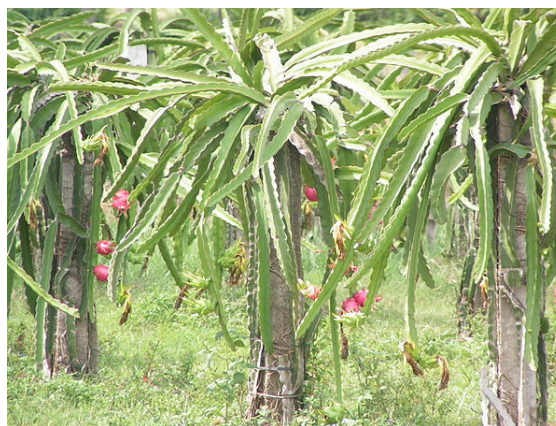


Ripe dragon fruit, Vietnam

Early imports from Colombia to Australia were designated *Hylocereus ocampensis* (supposedly red fruit) and *Cereus triangularis* (supposedly yellow fruit). It is not quite certain to which species these taxa refer, though the latter is probably the red pitahaya.

The fruit can weigh from 150 to 600 grams; some may reach one kilogram.

4 Cultivation



Pitahaya being grown commercially in southern Vietnam

After thorough cleaning of the seeds from the pulp of the fruit, the seeds may be stored when dried. Ideally, the fruit must be unblemished and overripe. Seeds grow well



Pitahaya seedling



Cereus peruvianus (Cereus repandus) Pitahaya plants in Sde Nitzan (Israel)

in a compost or potting soil mix - even as a potted indoor plant. Pitaya cacti usually germinate between 11 and 14 days after shallow planting. As they are cacti, overwatering is a concern for home growers. As their growth continues, these climbing plants will find something to climb on, which can involve putting aerial roots down from the branches in addition to the basal roots. Once the plant reaches a mature 10 pounds in weight, the plant may flower.

Pitaya flowers bloom overnight and usually wilt by the morning.^[10] They rely on nocturnal pollinators such as bats or moths for fertilization. Self-fertilization will not produce fruit in some species, and while cross-breeding has resulted in several “self-fertile” varieties, cross-pollinating with a second plant species generally in-

creases fruit set and quality. This limits the capability of home growers to produce the fruit. However, the plants can flower between three and six times in a year depending on growing conditions. Like other cacti, if a healthy piece of the stem is broken off, it may take root in soil and become its own plant.

The plants can handle temperatures up to 40 °C (104 °F) and very short periods of frost, but will not survive long exposure to freezing temperatures. The cacti thrive most in USDA zones 10-11, but may survive outdoors in zone 9a or 9b.^{[11][12][13]}

Hylocereus has adapted to live in dry tropical climates with a moderate amount of rain. The dragon fruit sets on the cactus-like trees 30–50 days after flowering and can sometimes have 5-6 cycles of harvests per year. There are some farms in Vietnam that produce 30 tons of fruit per hectare every year.^[14]

4.1 Pests and diseases

Overwatering or excessive rainfall can cause the flowers to drop and fruit to rot. Also, extended over-watering can cause maturing fruit to split on the branch. Birds can be a nuisance. The bacterium *Xanthomonas campestris* causes the stems to rot. *Dothiorella* fungi can cause brown spots on the fruit, but this is not common.

5 Consumption

To prepare a pitaya for consumption, the fruit is cut open to expose the flesh. The fruit’s texture is sometimes likened to that of the kiwifruit because of its black, crunchy seeds. The flesh, which is eaten raw, is mildly sweet and low in calories. The seeds are eaten together with the flesh, have a nutty taste and are rich in lipids,^[15] but they are indigestible unless chewed. The fruit is also converted into juice or wine, or used to flavour other beverages. The flowers can be eaten or steeped as tea. The skin is not eaten.

Ingestion of significant amounts of red-fleshed dragon fruit (such as Costa Rican Pitaya) may result in a harmless reddish coloration of the urine (pseudohematuria) and of the feces.^[16]

Several of the Padres who missionized Baja California recorded an unusual form of consumption of pitaya that is also shared in some O’odham stories from southern Arizona. It is called the “second harvest” of pitaya seeds. With the scarcity of fruits in their lands, the pitaya was such a prized fruit that once it was eaten, the natives would wait for their own excrement to dry, then break it apart separating the pitaya seeds. These seeds would be ground into a flour and eaten again, giving the pitaya’s “second harvest” its name. Interestingly, the O’odham name for the Milky Way translates as “the second harvest

of pitaya.”^[17]

5.1 Taste

The mild taste of pitaya flesh is often remarked upon, as it stands in stark contrast to the vibrant exterior. The taste has been described as being “very bland... like a melon or kiwifruit,” with a “mild sweetness.”^[18]

5.2 Seed oils

The fatty acid compositions of two pitaya seed oils were determined as follows:^[15]

6 Preliminary research

Pitaya peel contains polyphenols which are under basic research for their potential to inhibit cancer mechanisms.^[19]

7 Gallery

- Sold at a super market
- Pitahaya blanca, *Hylocereus undatus*.
- Pitahaya amarilla, yellow pitahaya *Hylocereus megalanthus*.
- Pitahaya Roja, *Hylocereus costaricensis*.
- Pitahaya Roja on market.
- Nocturnal flowers.
- Offer of pitahaya in garden center.
- Philippines Pitahaya at the Agricultural Science and Technology School. Muñoz, Nueva Ecija
- Traditional planting.
- Flesh of Costa Rica Pitahayas.
- Pink dragonfruit.
- A close-up of slices of white and red Pitahaya.
- Dragon fruit served in a buffet.
- Sliced Dragon fruit.

8 See also

- List of culinary fruits
- *Opuntia* - prickly pear cacti with edible “cactus figs” or “tunas” fruit

9 Footnotes

- [1] John Simpson, ed. (2009). *The Oxford English Dictionary Second Edition on CD-ROM Version 4.0: Windows/Mac Individual User Version (CD Rom Windows)*. OUP Oxford. ISBN 0199563837.
- [2] Dragon fruit is on its way in Bangladesh. Viddler.
- [3] ""Thanh Long:" The Dragon Fruit". Epiphytic Cacti. November 2006. Retrieved 9 June 2012.
- [4] Everything About Dragon Fruit “What is Dragon Fruit?”
- [5] “Pitaya, Dragon Fruit”. TopTropicals.com. Retrieved 2013-07-14.
- [6] <http://www.taiwan.gov.tw/ct.asp?xItem=35870&CtNode=2181&mp=1005>
- [7] Lauri (2000)
- [8] Felger & Moser (1985)
- [9] Villalobos *et al.* (2007)
- [10] Boning, Charles R. (2006). *Florida's Best Fruiting Plants: Native and Exotic Trees, Shrubs, and Vines*. Sarasota, Florida: Pineapple Press, Inc. p. 185. ISBN 1561643726.
- [11] “Dragon Fruit - *Hylocereus undatus* - Seeds - Seeds”. Tradewindsfruit.com. Retrieved 2013-07-14.
- [12] “Growing Dragon Fruit / Growing Pitaya Fruit | Dragon Fruit Pitahaya Fruit”. Dragon.fruit.pitaya.fruit.foodlywise.com. 2007-09-25. Retrieved 2013-07-14.
- [13] “Growing dragon fruit in containers, Pitaya festival 2005”. Forestmulch.com. Retrieved 2013-07-14.
- [14] Jacobs (1999)
- [15] Ariffin, Abdul Azis; Bakar, Jamilah; Tan, Chin Ping; Rahman, Russly Abdul; Karim, Roselina & Loi, Chia Chun (2008). “Essential fatty acids of pitaya (dragon fruit) seed oil”. *Food Chemistry* **114** (2): 561–564. doi:10.1016/j.foodchem.2008.09.108.
- [16] MMR (2008)
- [17] Yetman, David. *The Organ Pipe Cactus*. University of Arizona Press. p. 40. ISBN 9780816525416.
- [18] “Dragon Fruit: An Exotic, Health-Packed Fruit”. Exotic Fruit for Health. 23 August 2011. Retrieved 18 September 2011.
- [19] Kim, H.; Choi, H. K.; Moon, J. Y.; Kim, Y. S.; Mosadik, A.; Cho, S. K. (2011). “Comparative Antioxidant and Antiproliferative Activities of Red and White Pitayas and Their Correlation with Flavonoid and Polyphenol Content”. *Journal of Food Science* **76** (1): C38–C45. doi:10.1111/j.1750-3841.2010.01908.x. PMID 21535651.

10 References

- Agricultura Sensitiva (AS) [2008]: El cultivo de Pitaya y su posicionamiento en el mercado. Retrieved January 19, 2008.
- Felger, Richard & Moser, Mary B. (1985): *People of the desert and sea: ethnobotany of the Seri Indians*. University of Arizona Press, Tucson
- Jacobs, Dimitri (1999): Pitaya (*Hylocereus undatus*), a Potential New Crop for Australia. *Australian New Crops Newsletter* **11**: 16.3. [HTML fulltext](#)
- Lauri, Bob (2000): Ocean Oasis Field Guide - *Stenocereus gummosus*. Retrieved October 1, 2007.
- Malaysian Medical Resources (MMR) (2008): Pseudo-haematuria due to Dragonfruit ingestion. Retrieved February 24, 2008.
- Villalobos, Soraya; Vargas, Orlando & Melo, Sandra (2007): Uso, manejo y conservación de “yosú”, *Stenocereus griseus* (Cactaceae) en la Alta Guajira colombiana [Usage, Management and Conservation of yosú, *Stenocereus griseus* (Cactaceae), in the Upper Guajira, Colombia]. [Spanish with English abstract] *Acta Biologica Colombiana* **12**(1): 99-112. [PDF fulltext](#)
- Mizrahi, Y., A. Nerd, and Y. Sitrit. 2002. New fruits for arid climates. p. 378–384. In: J. Janick and A. Whipkey (eds.), Trends in new crops and new uses. ASHS Press, Alexandria, VA.

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