

Dragon Fruit: An Advanced Potential Crop

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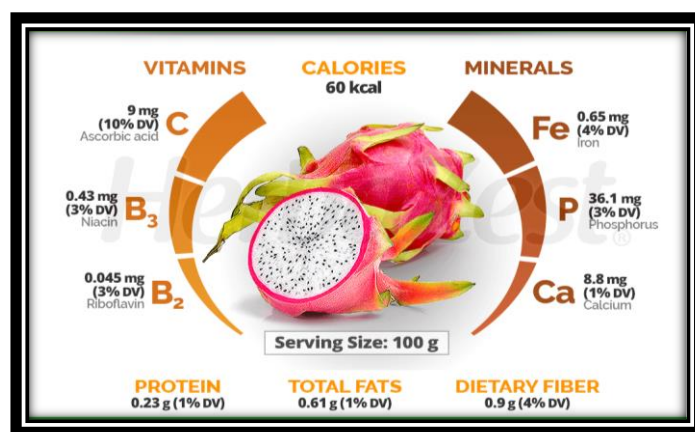
Dragon Fruit is said to have originated in the tropical and subtropical forests of Mexico and Central and South America. Gradually, the fruit spread to other tropical and subtropical regions of the world. Currently, dragon fruit is cultivated in at least 22 countries including Australia, China, Israel, Malaysia, Nicaragua, Taiwan, Sri Lanka, and Vietnam. According to some accounts, the French took the fruit from Nicaragua and Colombia, while other accounts state that the French brought it with them from Guyana (South America) in 1870 as an ornamental plant. In fact, the French introduced the fruit to Vietnam over a hundred years ago. Today, Vietnam is the world's leading exporter of dragon fruit, with revenues from dragon fruit making up 55 percent of the country's fruit export turnover. The fruit is popular across Southeast Asia. It is increasingly being cultivated in several countries including Thailand, Indonesia, Israel, Northern Australia, Southern China, Philippines and Hawaii (Deccan exotics 2017).

Introduction

Dragon fruit (*Hylocereus undatus*) is popular in South East Asia. It is an edible vine cactus species belonging to the family Cactaceae which has received worldwide recognition first as an ornamental plant and then as a fruit crop. It is also called as Pitaya, Strawberry pear, thangloy (Vietnamese), pitayaroja (Spanish), and la pitahaya rouge (French) (Kirti J. et al. 2020). Being a native of Southern Mexico, Guatemala and Costa Rica, dragon fruit was introduced in India during the late 90s and still the area under its cultivation is gradually increasing. Farmers in the Indian states of Karnataka, Kerala, Tamil Nadu, Maharashtra, Gujarat, Orissa, West Bengal, Andhra Pradesh and Andaman & Nicobar Islands have already taken up its cultivation, and the estimated total area under dragon fruit cultivation in these regions may be less than 400 ha. Majority of the dragon fruits presently available in Indian markets are imported from Vietnam, Thailand, Malaysia and Sri Lanka.

Pitaya are fast-growing, perennial, vine-like cacti. They have triangular (3-sided), green, fleshy, jointed, many-branched stems. Each stem segment has 3 flat, wavy wings, with corneous margins and may have 1-3 small spines, or are spineless. The stem section of pitaya forms aerial roots which adhere to the surface upon which they grow or climb (St. Vincent and Grenaddines, 2009)

Nutritional composition of dragon fruit



(Source: St. Vincent and Grenaddines, 2009)

Varieties of dragon fruit

There are three main varieties depending on its appearance.

1. Red skin with white flesh
2. Red skin with red flesh
3. Yellow skin with white flesh



White flesh/pink skin (*Hylocereus undatus*) - The most common of the three varieties of dragon fruit; fruit are slightly to significantly less sweeter than the pink- or red-fleshed pitaya fruit.

Colored flesh/pink skin (*Hylocereus polyrhizus*) - This is sweeter of the two pink skinned varieties; fruit are larger than those of the yellow-skinned dragon fruit.

White flesh/yellow skin (*Selenicereus megalanthus*)

- Typically the sweetest of the three varieties of dragon fruit with relatively smaller sized fruits.

Potential health benefits of dragon fruit

- Dragon fruit is reported to possess many medicinal properties; red fleshed varieties of the fruit are rich in antioxidants like flavonoids, phenolic acid, and betacyanin. These natural substances protect your cells from damage by free radicals molecules that can lead to diseases like cancer and premature aging.
- This fruit is potentially effective in preventing colon cancer and diabetes, neutralize toxic substance (such as heavy metals) and reduce cholesterol and high blood pressure (Gunasena *et al.*, 2007). However, it must be noted that many of these remedial properties are reported based on traditional uses and not based on properly designed clinical studies.
- Extracted oil from two varieties of dragon fruit seeds and analyzed it for fatty acid profile. Essential fatty acid, namely, linolic acid and linolenic acid, formed a significant percentage of the unsaturated fatty acids of the seed oil extract. Both varieties contained about 50 % essential fatty acid and had two oleic acid isomers. Essential fatty acids are important in that they are necessary substrates in animal metabolism and cannot be synthesized in vivo.
- It's naturally fat-free and high in fiber. It makes for a good snack because it can help keep you full for longer between meals.
- It may help lower your blood sugar. Researchers say this might be partly because it replaces damaged cells in your pancreas that make insulin, the hormone that helps your body break down sugar. But the studies were done on mice, not people.
- It contains prebiotics, which are foods that feed the healthy bacteria called probiotics in your gut. Having more prebiotics in your system can improve the balance of good to bad bacteria in your intestines. Specifically, dragon fruit encourages the growth of the probiotics

lactobacilli and bifidobacteria. In your gut, these and other helpful bacteria can kill disease-causing viruses and bacteria. They also help digest food.

- It can strengthen your immune system. Dragon fruit is high in vitamin C and other antioxidants, which are good for your immune system.
- It can boost your iron levels. Iron is important for moving oxygen through your body and giving you energy, and dragon fruit has iron. And the vitamin C in dragon fruit helps your body take in and use the iron (Ariffinet *al.*, 2009).

Table 1: Botanical description of Dragon fruit cultivation

Common Name	Dragon fruit, Pitaya
Botanical Name	<i>Hylocereus undatus</i>
Family	Cactaceae
Origin	South Mexico
Temperature	20-30° C
Soil	Well drained red yellow pedzolic, lateritic soil and reddish-brown earth
pH	5.5-6.5
Propagation	Seed and Vegetative (Cutting)
Spacing	3 x 3, 4 x 3, 3.7 x 3.7 m
Trellising	Vine has to be train to climb concrete or wooden posts, fence, walls and tree for support. post size is 100-150 mm diameter and 2 m high and should be buried 40 cm in the ground
Planting time	Beginning of rainy season
Fertilizers	20 kg FYM, 540 g N, 720 g P and 300 g K
Flowering	April to May
Maturity	Color change green to pink
Harvesting	June to December
Yield	10 - 12 t/ha
Insect-Pest	Ants, scale insect, mealy bug, snail, slugs
Disease	Soft watery stem rot, Brown spot, anthracnose



Stem with spine



Flowering



Fruiting

Table 2 : Physical and chemical properties of two varieties of dragon fruit (Wichienchot *et al.* 2010)

Fruit characteristics	White flesh	Red flesh
Avg. fruit length (cm)	13.4	12.7
Avg. fruit diameter (cm)	9.4	6.6
Avg. fruit flesh weight (g)	305	215
Avg. fruit skin weight (g)	100	75
Sweetness (°Brix)	12.5	14.8
Glucose (g/100 g)	35.3	40.1
Fructose (g/100 g)	23.8	15.8
Oligosaccharides (g/100 g)	8.6	8.9

Conclusion

There is a potential of dragon fruit cultivation in most of the countries where it is currently grown.

This crop could be an asset to smallholders as well as for the establishment of large scale plantations. Dragon fruit is suitable for growing in region that have spells of dry weather with supplementary irrigation. The farmers in these areas will benefit immensely if the species is improved and cultural practices studied for its incorporation into the existing farming system. Dragon fruit has been used for the preparation of different value-added products, nonetheless, there is a dispensable gap in promoting the products in the global market. Good quality dragon fruit product can be prepared from fully ripened variety. If quality product from dragon fruit are developed, it might be welcomed by the consumers who have affinity for dragon fruit round the year due to rich in nutritive value which could help to improve economic status of farmers.

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