Original Article

International Journal of Food, Nutrition and Dietetics
Volume 10 Number 3, September – December 2022
DOI: http://dx.doi.org/10.21088/ijfnd.2322.0775.10322.5

Dragon Fruit: An Exotic Super Future Fruit of India

Neelesh Kumar Maurya

How to cite this article:
Neelesh Kumar Maurya/Dragon fruit: An exotic super future fruit of India/Int J Food Nutr Diet. 2022;10(3):107–111.

Abstract

Hylocereusundatus is the most widely cultivated vine cactus in the Cactaceae family, with native populations in Mexico and America. It is commonly known as "dragon fruit" or "pitaya" in the United States. In Malaysia, it is also known as "Buahnaga," which means dragon fruit. Aside from their appealing color, Hylocereusundatus fruits are prized around the world for their high content of polyphenolic components and antioxidant activity. Scientists have found that a wide range of phytochemicals, such as betalains, polyphenolic compounds, and carotenoids, protect against oxidant stress in the body and keep the right balance between antioxidants and oxidants to improve human health.The goal of this review's conclusion is to impart an understanding of Hylocereusundatus and its functional phytochemicals, as well as implications for its potential health benefits in the context of future research and application. More environmentally friendly antioxidant and antibacterial agents were proposed, which are important in the sectors of healthcare, food processing, nutraceuticals, and cosmeceuticals. To grow the global market for dragon fruit, experts will collaborate to enhance the importance of this fruit to worldwide cultivars. In the 1990s, dragon fruit became trendy in India. Agriculturists favored it for its low input costs and high profitability.

Keywords: Antioxidant; Betalains; Dragon fruit; Pitaya; Polyphenol.

INTRODUCTION

It is a fruit native to tropical regions that has a distinct appearance, a crisp consistency, and a palatable taste. Its appearance was based on that of a dragon that breathes fire. It has a lot of different antioxidants. Cacti belong to the Cactoideae subfamily of the Cactaceae family of plants, and the Hylocereus genus is part of that subfamily (*Sonawane et al., 2017; Day et al., 2022*).[1,2] Due to the extraordinary skills of the Crassulacean Acid Metabolism, the members of the family Cactaceae exhibit an extraordinarily high water use efficiency despite having minimum water requirements (CAM) (*Jalgaonkar et al., 2022; Batista-Silva et al., 2020; Alzim et al., 2022*).[3-5] Cactus plants with fruit known as the Red Dragon Fruit or Red Pitaya Fruit is the Hylocereusundatus, which is the species of vine cactus that is cultivated the most frequently. Because of the bracts or scales that cover the surface of the fruit, it is sometimes referred to as the Red Pitaya or the Strawberry Pear Cactus Fruit. The common name for this fruit is pitaya, which translates to "the scaly fruit". In addition, CAM plants are able to produce more biomass in response to increased amounts of carbon dioxide (CO2) in the environment.[3,4] *Arivalagan et al., 2022; Al-Mekhlafi et al., 2021* described the dragonn fruit also known as a night blooming flower, due to the

Author Affiliation: Assistant Professor, Department of Home Science, PK University, Shivpuri, Madhya Pradesh 222001.

Corresponding Author: Neelesh Kumar Maurya, Assistant Professor, Department of Home Science , PK University, Shivpuri, Madhya Pradesh 222001.

E-mail: neeleshkumar.maurya@gmail.com

Received on: 09.10.2022

Accepted on: 10.12.2022

fact that it only blooms at night and has enormous, fragrant blossoms that often only last for one night. This attribute gives the flower its name. Over the course of the past few decades, this fruit has been cultivated on a large scale for commercial purposes in the countries of Malaysia, Vietnam, Thailand, Taiwan, Nicaragua, Colombia, Australia, and the United States.[6-7] *Le and colleagues, 2021 Babar et al., 2021; Badam et al., 2018*, observed that majority of the world's supply of dragon fruit comes from the Indian states of Karnataka, Kerala, Tamil Nadu, Maharashtra, Gujarat, Odisha, and Andhra Pradesh, as well as the Andaman and Nicobar Islands. The production of this peculiar fruit is relatively new in the state of West Bengal. It may be grown in any kind of soil, as long as there is sufficient drainage and a high concentration of fertiliser in the soil where it is grown. It cannot be cultivated on terrain that is too wet. The growth of dragon fruit thrives best in warm, humid environments.[8-11]

Planting

The dragon fruit is a semi-epiphytic plant, which means that it prefers a dry tropical or subtropical climate with an average temperature of 21–29°C. However, it is able to withstand temperatures as high as 38–40°C and can even survive brief bouts of cold temperatures.[12-14] This crop requires continuous exposure to sunlight and between 600 and 1300 millimetres of precipitation annually, with distinct wet and dry seasons (*McMahon, 2003*).[14] In subtropical and tropical regions, fruit harvests can be grown throughout the entire year. Plants that produce dragon fruit require favorable climatic conditions, including, but not restricted to, a tropical climate a tropical or subtropical photoperiodic climate, enough rainfall, moist sandy soil, and other similar characteristics. In addition, each of these components is necessary for flowering and fruit formation (*Hossain 2021*). [15] *Barbar, 2021, Badma., 2021 and Jadhav., 2019* studied that the cultivation of dragon fruit is possible in almost any type of soil; however, sandier soils that receive adequate irrigation are recommended. It is recommended that the pH of the soil should be between 5.5 and 6.5 to have a productive crop. Bed frames ought to have a height of at least 40 to 50 centimeters. Even though they thrive best in a tropical climate with an annual rainfall of 40–60 centimeters, one of the most significant benefits of these plant species is that they can thrive in temperatures that are quite high and in really poor soil is generally agreed that temperatures in the 20°C to 30°C range are optimal for the growth of crops. It is recommended that mounds of fertilizer be spread across the area. Before planting dragon fruit plants, 20 kilograms of organic fertilizer, 0.5 kilos of superphosphate, and 1 kilogram of NPK16-16-8 should be applied every 50 relocations.[10-12]

Jiang, et al 2020., described that there are two distinct strategies for cultivating dragon fruit. The first method is to grow the plant from its seeds, and the second method is to take a cutting from an actual plant. Since seeds require three years to mature before producing a plant that is large enough to be useful, farmers frequently favor the method of cutting rather than sowing seeds. Before being planted in the field, the seedling should be 20 centimeters in length, removed from the mother plant, and then kept in the shade for five to seven days. The climate of Bangladesh is classified as subtropical monsoon, characterized by significant yearly variations in temperature and humidity level, as well as high temperatures.

Dragon Fruit varieties (Le Bellec, 2016)

- *Hylocereusundatus:* This type, sometimes known as Pitahaya, has white flesh with pink skin. The fruit measures 6-12 cm in length and 4-9 cm in thickness, and it contains delicious black seeds.
- *Hylocereus Polybius:* Also known as Scarlet Pitaya, this species is distinguished by its red meat and pink skin. It is native to Mexico, but it is currently grown in many nations across the world.
- *Hylocereuscostaricencis:* This species is distinguished by its violet red flesh and pink skin. Because it is native to Costa Rica, it is also known as Costa Rican Pitaya. The fruit is magenta in color, with pear shaped seeds.
- *Hylocereus (Selenicerus) megalanthus:* This South American variation is distinguished by its white flesh and yellow skin.[17]

Dragon fruit plant morphology

The Dragon fruit plant, also called as Hylocereus spp., is a fast growing evergreen cactus that may reach heights of up to 2.5 metres in length and features leafless, thin branches that resemble vines. It is either a terrestrial or an epiphytic cactus, and its stems are succulent and three winged. The colour of the stems is green (*Hossain 2015*). [15] The stem is pliable and vining like, and it branches out multiple times. Each segment consists of three undulating wings and anywhere from one to three spines, or it may not have any spines at all (*Jalgaonkar 2022*).[4] Aerial roots of the plant have several functions: they take in water, they grow on the underside of the stems, and they support the stems so that they remain upright. The flowers of the dragon plant are normally white, and its fruits have a bell like form and measure between 25 and 30 centimetres in length and 15 to 17 centimeters in diameter (*Merten, 2003*). [18] The fruit is gorgeous, with bright red skin studded with green scales and white or

crimson flesh that contains a bevy of microscopic black seeds. The skin of the fruit is studded with green scales. It is necessary to provide the vine with support in order to prevent it from falling.

Nutritional Value of Dragon Fruit

The nutritional value of dragon fruit varies according to species, provenance, and harvesting season .The nutritional composition and phytochemical qualities of red Dragon fruit differ greatly as a result of the developing environmental circumstances. Dragon fruit has higher levels of minerals such as potassium, phosphorus, sodium, and magnesium than mangosteen, mango, and pineapple as well as all kinds of vitamins. Flowering and fruit setting times have a major impact on fruit quality, particularly total soluble solids content Mature Dragon fruits have greater TSS, which is especially noticeable in fall fruits compared to summer fruits (*Arivalagan 2021*). Dragon fruit contains minerals, glucose, fructose, dietary fibre, and vitamins.

An interesting fact about this fruit is that the Chinese believe it was created by the fire of a dragon during a battle. Undermining the myth surrounding this fruit, there is something that makes it extremely healthy for us. Here is a list of 15 health benefits of eating dragon fruit.[23]

Component	Units(FW)	H. polyrhizus from Malaysia (Ramli and Rahmat 2014)[21]	H. polyrhizus from Australia(Ramli and Rahmat 2014)21	H. polyrhizus from Malaysia (Ruzainah et al. 2009)[22]	H.undatus from Brazil (Jerônimo et al. 2015)
Moisture	$g100g^{-1}$	85.05	89.98	82.5–83.00	86.03
Ash	$g100g^{-1}$	0.54	1.19	nd	nd
Carbohydrate	$g100g^{-1}$	12.97	8.42	nd	10.79
Total sugar	$g100g^{-1}$	nd	nd	nd	5.92
Protein	$g100g^{-1}$	1.45	0.41	0.159–0.229	2.27
Fat	$g100g^{-1}$	nd	nd	0.21–0.61	0.16
Total dietary fibre	$g100g^{-1}$	2.65	nd	nd	nd
Crude fibre	$g100g^{-1}$	nd	nd	0.70–0.90	1.15
Energy	$kcal100g^{-1}$	62.95	35.36	nd	53.68
Iron	$mg100g^{-1}$	0.30	0.03	nd	nd
Magnesium	$mg100g^{-1}$	26.40	13.70	nd	nd
Potassium	$mg100g^{-1}$	158.29	437.35	nd	3.09
Sodium	$mg100g^{-1}$	35.63	14.30	nd	0.14
Zinc	$mg100g^{-1}$	0.40	0.09	nd	nd
Calcium	$mg100g^{-1}$	6.72	1.55	nd	nd
Phosphorus	$mg100g^{-1}$	nd	nd	nd	0.003
Vitamin A	$mg100g^{-1}$	0.085	0.89	nd	nd
Vitamin C	$mg100g^{-1}$	0.024	0.03	8.00–9.00	0.84

Dragon Fruit Health Advantages (Le Bellec, 2006, Kiranmai, M., 2022,)[17,23]

1. Minimizes the incidence of diabetes

This fruit contains a lot of fibre, which helps people with diabetes keep their blood sugar levels stable and avoid spikes. Regular consumption of this fruit can help diabetics balance their blood sugar levels and avoid further medical consequences.[17]

2. Reduces Cancer Risks

This fruit contains anti-cancer properties that may reduce the risk of colon cancer. Its high vitamin C content helps to boost the immune system. Vitamin C is a potent antioxidant that protects against chronic diseases such as diabetes, Alzheimer's, Parkinson's, and cancer.[23]

3. Aids in Immune System Boosting

This fruit is high in vitamin C, which helps to boost immunity and keep you healthy. More Vitamin C means that your body is capable of fighting deadly infections that you may be prone to. All you need to do to stay healthy is consume 1 cup (200 grammes) of this fruit every day.

4. Beneficial to Digestion

This fruit contains a high concentration of oligosaccharides (a carbohydrate) that promotes the growth of beneficial bacteria such as flora, which aids in digestion. It is high in fibre, which promotes digestive health and lowers the risk of cancer and cardiovascular disease.[23]

5. Heart Healthy

The red pulp of dragon fruit contains betalains, which reduces bad cholesterol (LDL cholesterol). The tiny dark black seeds inside the fruit are high in omega-3 and omega-9 fatty acids, which are good for the heart and lower the risk of cardiovascular disease.[17]

6. Fights Skin Aging

Stress, pollution, and other factors such as poor diet can all contribute to accelerated ageing. It is, however, high in antioxidants, which can be used to treat sunburn, dry skin, and acne. Its vitamin C content can help with skin radiance. You can make dragon fruit juice and drink it once a day to get glowing skin.[23]

7. Hair Benefits

Do you require thick, black, and shiny hair? Try dragon fruit powder mixed with a glass of milk (250ml) once a day, and you'll be fine. The high nutrient content of this fruit extract powder reduces hair damage caused by artificial hair colouring and improves hair texture, leaving it soft and shiny. All you have to do is consume this once a day to see results.[17]

8. Healthy Bones

Good bone health can help with a variety of things, including avoiding injuries and joint pain. This superfruit contains 18% magnesium, which helps to build stronger bones and maintain good bone health. All you have to do is drink one glass of dragon fruit smoothie every day.[23]

9. Beneficial for the Eyes

This fruit contains beta-carotene (the pigment that gives the fruit its colour), which helps to prevent eye problems like cataracts and macular degeneration. Every day, consume one cup (220 grammes) of dragon fruit.[23]

10. Beneficial During Pregnancy

This fruit contains vitamin B, folate, and iron, making it an excellent choice for pregnant women. B vitamins and folate help to prevent birth defects and boost energy levels during pregnancy. Its calcium content is responsible for the development of the fetus's bones. Its magnesium content aids in the prevention of postmenopausal complications in women.[17]

The market for Dragon Fruit in India

Der et al., 2022 and *Nor et al., 2020*, studied crispy skin and scaly spikes that are seen on the fruits of the American dragon fruit (Hylocereusundatus) which give the fruit its name. In addition to these names, it is sometimes referred to as the strawberry pear, the noblewoman, and the queen of the night. In the 1990s, India experienced a surge in demand for dragon fruits.[2,4] *Jadhav et al., 2019* described that the high profitability of the venture and the low cost of the necessary inputs, it quickly gained favor among farmers. The plant is appropriate for use in processing businesses, has a yield that lasts for 20 years, and is abundant in nutraceuticals. The cultivation of dragon fruit is common in India since it requires little care and produces a large amount of fruit.[12]

As a result, the cultivation of dragon fruit has seen a significant increase in the states of Maharashtra, Karnataka, Andhra Pradesh, and the Andaman and Nicobar Islands, in addition to other states in the northeast. According to the Indian Council of Agricultural Research, National Institute of Abiotic Stress Management in Baramati, Maharashtra, the total area devoted to the cultivation of dragon fruit in India is somewhere between 3,000 and 4,000 hectares. The nation's yearly production of fruit totals 12,000 MT on average. The fruit is eligible for export to the United States, Europe, and the Persian Gulf. In June of 2021, a farmer from Maharashtra provided Dubai, United Arab Emirates, with its first shipment of dragon fruit. In order to adequately compensate farmers, PEDA is seeking to expand the export of dragon fruit to other nations in Europe. In the program of "Mann Ki Baat" that aired on All

India Radio in July 2020, the Prime Minister lauded the farmers of Kutch for ensuring that India would have sufficient supplies of fruit. When the fruit is exported to the United Kingdom and Bahrain, PM's desire will finally be accomplished. The first shipments of dragon fruit, grown by farmers in Gujarat and West Bengal, have now made their way to London, the UK and Bahrain, helping to improve the overall export of exotic fruits. In India, people commonly refer to it as Kamalam (dragon fruit). It was obtained from farmers in the Kutch region, and it was transported through APEDA-approved packhouses in Bharuch and Kolkata.[24]