



## A Review on to Explore the Nutritive and Medicinal Value of Dragon Fruit

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### Abstract :-

The tropical climate of Vietnam is perfect for pitaya plantations to grow because of its excellent flexibility and tolerance to a variety of environmental variables (such as salinity adaption, preferred light intensity, drought resistance, etc.). The dragon fruit's nutritional value. Dragon fruit, also known as pitaya, has many beneficial impacts on human health due to its high nutritional value and bioactive components, including potent natural antioxidants. Extracts from the stems, blossoms, peels, and pulp of dragon fruit have a variety of beneficial biological activities with regard to disorders like diabetes, obesity, hyper lipoedema, and cancer. Moreover, dragon fruit extracts have the potential to be prebiotic and have hepato- and cardiovascular-protective properties.

**Keywords :-** Nutrition, Dragon Fruits, Diseases, Morphology, Cultivation, Anaemia, Inflammatory, Antidiabetic.

### Introduction :-

A promising and lucrative fruit crop is the dragon fruit, a super fruit that was just recently introduced to India. Fruit has a very appealing color, smooth flesh that melts in your mouth, and edible seeds that are a deep black color and extremely nutritious, all of which draw people in the cultivation of this fruit crop, which has its origins in Central and South America and Mexico, is being done by growers from various parts of India.

All dragon fruit varieties. a significant number of edible black seeds. 3, 4, and 5 pointed green shoots. They are made up of aerial roots that cling to rocks and trees. They gather nutrients and provide hydration for the plant. Essential fatty acids and very stable tocopherol are both present in good amounts in pitaya seed oil. For their nutritional and therapeutic properties, study on herbal medications is crucial. Herbal medicines are affordable, safe, and have no side effects. The health and medical properties of dragon fruit are making it a mega crop. A papaya or strawberry pear is another name for it. It belongs to the Cactaceae family and the genus Hylocereus. It is a regional fruit that comes from Mexico, Central America, and South America. The fruit of *Hylocereus undatus* is frequently consumed as food. *H. polyrhizus*, *H. undatus*, *H. consrtaricencis* and interspecific hybrids.

Three primary types of pitaya varieties exist-

- 1) *Hylocereus undatus*:- Pink skin with white flesh.
- 2) *Hylocereus polyrhizus* :- Red flesh with pink skin.
- 3) *Hylocereus consrtaricencis* :- Violet red flesh with pink skin.

### Morphology Of Dragon Fruit :-

Due to their lack of leaves, dragon fruit plants are considered incomplete plants.

Dragon fruit plants have spines along their branches and trunks as a means of adjusting to the desert climate. Dragon fruit trees are attractive climbing plants. The plants in this plant's original habitat grow by climbing other plants. Because of the roots that sprout in the stem, dragon fruit plants can still thrive even while their ground-based roots are depleted. The aerial roots have the capacity to take up food from the atmosphere.

The dragon fruit plant (*Hylocereus* spp.) is an evergreen cactus with thin, leafless vine-like branches that grows quickly and can reach heights of 1.5 to 2.5 meters. It is an epiphytic or terrestrial cactus with succulent three-winged stalks. The stem has several branching segments and is mushy and vine-like. Three wavy wings, one to three spines, or occasionally no spines, are present on each segment. The plant's aerial roots grow on the underside of the stems, absorb water, and hold the stems firmly in place. Often white in color, dragon fruits have a bell shape and are 25 to 30 cm long and 15 to 17 cm wide. The fruit is stunning, with bright red skin covered in green scales, and either red or white flesh that is filled with numerous tiny black seeds. To hold the vine up, it needs a base.



Fig :- Dragon fruit plant

Typically, three different varieties of dragon fruits are grown in various nations. All have skin that is slightly leafy and leathery. These include the red-skinned fruit *Hylocereus undatus* with white flesh, the red-skinned fruit *Hylocereus costaricensis* with red flesh, and the yellow-skinned fruit *Hylocereus megalanthus* with white flesh. A hot topic for research on the dragon fruit plant is the best plant variety for each country as well as the best cultivation practices.

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### Three types of Dragon fruits are :-

- 1) *Hylocereus Undatus* ( red skinned fruit with white flesh )

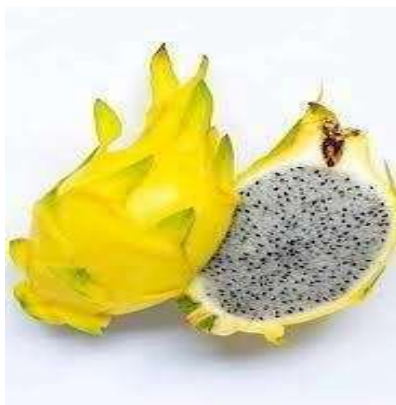


Fig :- *Hylocereus undatus*, white-fleshed

- 2) *Hylocereus costaricensis* (red-skinned fruit with red flesh)



Fig : *Hylocereus undatus*, red-fleshed

3] *Hylocereus megalanthus* (yellow-skinned fruit with white flesh)Fig :- *Hylocereus megalanthus*, Yellow pitahaya fruit with spines removed**Fruit:**

The fruit is a fleshy berry with an oblong shape, an approximate thickness of 4.5 inches (11 cm), and red or yellow skin or peel with scales and with or without spines. Depending on the species, pulp can have the color pink, white, red, or magenta. Small, numerous, and black seeds that are embedded in the pulp.



Fig : Dragon fruit

**Cultivation :-**

The majority of *Hylocereus* species are from Central and South America and Mexico. *Hylocereus* species are now found throughout the world (in tropical and subtropical areas), but *H. undatus* and *H. costaricensis* are the two species that are most widely distributed there. Due to its hardiness, this fruit crop can withstand the harsh climatic conditions of India's arid and semi-arid regions. Since *Hylocereus* species are semi-epiphytes, they typically prefer to grow in the half-shade (conditions provided by trees in nature), though some species, such as *H. undatus*, *H. costaricensis*, and *H. purpose*, can grow in full sun. However, a scorching sun and a lack of water can cause flower buds to fall off and the stems to burn. It was introduced in 1990 for use in commercial agriculture.

Many nations, including Vietnam, China, Mexico, Colombia, Nicaragua, Ecuador, Thailand, Malaysia, Indonesia, Australia, and the United States, are currently experiencing significant fruit production and expansion. Due to its commercial interest and lack of demand, it is now grown everywhere. High drought tolerance, ease of adaptation to high light and temperature, a wide range of soil salinity tolerance, and advantages to human health are all cultivation requirements. With between 1100 and 1350 plants per hectare, commercial plantings can be done densely. *Hylocereus* has been specifically designed to measure in tropical climates with little to no rain.

The dragon fruit develops on the cactus-like trees 30 to 50 days after flowering and can typically have 5 to 6 harvest cycles per year. It is cultivable and assessed as a weed for free in some areas.

**Nutritional content of dragon fruit :-**

As a fruit that is both healthy and medicinal, dragon fruit is becoming more well-liked in India. It is consumed with the justification that it is both highly nutritious and therapeutic for a number of health issues. With high nutritional and therapeutic values, dragon fruit is regarded as a heavenly fruit on earth. that is dietary. The price of dragon fruit varies depending on the species, place of origin, and season of harvest. The influence of the growing environmental conditions has a significant impact on the nutritional composition and phytochemical characteristics of red Dragon fruit. Protein, fat, carbohydrate, crude

fibre, flavonoid, thiamine, niacin, pyridoxine, cobalamin, glucose, phenolic, betacyanins, polyphenol, carotene, phosphorus, iron, and phytoalbumin are all abundant in the plant *Hylocereus undatus*.

In comparison to mangoes, pineapple, and all vitamin sources, dragon fruit has higher concentrations of minerals like potassium, phosphorus, sodium, and magnesium.

Fruit quality is significantly influenced by fruit setting time and flowering, particularly in terms of total soluble solids. According to Rao and Sasanka (2015), dragon fruit is a good source of minerals, glucose, fructose, dietary fiber, and vitamins. It is renowned for having high levels of antioxidants, calcium, phosphorus, and vitamin C. Fresh fruit has 82.5 to 83.0% moisture, 0.16 to 0.23 percent protein, 0.21 to 0.61% fat, and 0.7 to 0.9% fiber. Fresh fruit pulp contains 100 grams and has 6.3 to 8.8 mg of calcium, 30.2 to 36.1 mg of phosphorus, 0.5-0.61 mg of iron, and 8 to 9 mg of vitamin C.

#### ***Health benefits of Dragon fruit :-***

As previously mentioned, dragon fruit is beneficial to human health because it contains important nutrients like vitamins, minerals, complex carbohydrates, dietary fibers, and antioxidants. According to studies, betacyanin, a red or purple pigment with antioxidant properties, and the growth of good gut bacteria were both stimulated by dragon fruit. It minimizes cardio-vascular heart problems and maintains blood pressure because it is low in calories, cholesterol-free, and antioxidant-rich. Polysaccharides and mixed oligosaccharides, which are abundant in dragon fruit flesh, act as growth-stimulating agents for *Lactobacilli* and *Bifidobacteria*. Probiotics are gastrointestinal microflora that prevent the growth of pathogens that affect the digestive system. As a natural probiotic, dragon fruit is also used. The pulp is juicy and has a lot of tiny seeds. Due to its high water content compared to other nutrient levels, dragon fruit is frequently consumed as fresh fruit to quench thirst in addition to serving as a food coloring agent.

According to the desired taste, dragon fruit can also be made into juice, jam, or preserves. Due to its high vitamin C content, dragon fruit consumption regularly aids in the prevention of cough and asthma, as well as the quick healing of cuts and wounds. However, the high levels of vitamin C found in dragon fruit help to boost the immune system and also encourage the body's other antioxidants to work harder.

#### ***Health Benefits From Dragon Fruit :-***

- Dragon fruit promotes healing of wounds and cuts.
- Dragon fruit improve memory.

For the management of diabetes prevention and the treatment of obesity, dragon fruit may be used as an ingredient in functional foods and nutraceutical products. In the meantime, clinical studies should compare the prebiotic effects of dragon fruit's raw and extracted flesh.

#### ***Medicinal content of dragon fruit :-***

*Hylocereus undatus*'s Phytochemical Makeup Due to their appealing colors, sweet, juicy flavor, and reputation as the most attractive in the Cactaceae family, *Hylocereus cacti*'s fruits have greatly increased in popularity in recent years. Global cultivators are highlighting the fruits of *Hylocereus cacti* because of their abundance in polyphenolic components and their antioxidant activity, in addition to their red-purple colouring.

Being low in calories yet abundant in fibre, antioxidants, phytonutrients, vitamins, and minerals, as well as having beneficial fatty acids and probiotics, dragon fruit can be regarded as a superfood. Antioxidants are necessary to shield cells from the harm of free radicals, which result in enduring illness and ageing. Dragon fruit contains a number of important antioxidants, including betacyanins, betaxanthins, hydroxycinnamates, and flavonoids.

#### ***Medicinal activities :-***

There has been an increase in the utilisation of natural antioxidant substrates found in medicinal plants that have protective effects against cellular damage brought on by free radicals, which are linked to many disorders like cancer.

Several in-depth research have been conducted on the antioxidant activity of various species as well as the antioxidant content of various plant parts (such as pulp, peel, stem, and leaves) in order to better understand the widely recognised anti-oxidant capabilities of dragon fruit. Two *Hylocereus* species—*H. polyrhizus* and *H. undatus*—that stand out in cultivation and distribution have received the majority of attention in studies. 2, 2'-diphenyl-picrylhydrazyl (DPPH) and 2, 2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) are two of the most popular techniques for assessing antioxidant activity (Re et al. 1999). These are spectrophotometric methods based on the quenching of stable coloured radicals (DPPH or ABTS+), which assess the antioxidants' capacity to scavenge free radicals even in complicated biological mixtures.

#### ***Antidiabetic properties :-***

One of the most prevalent systemic diseases in the world, diabetes mellitus is caused by an insufficient sensitivity of cells to the effects of insulin and/or hyperglycaemia as a result of an issue with the pancreas' ability to produce insulin. Many studies have been conducted on the anti-diabetic properties of dragon fruit. Red pitaya (*Hylocereus polyrhizus*), which is used to treat insulin resistance, was studied by Omidzadeh et al. (2014) in insulin resistant

rats with a fructose supplement. The findings of this study indicated that pitaya reduced insulin resistance, indicating that the antioxidant and soluble dietary fibre components of red pulp pitaya are what give it this ability to counteract insulin resistance.

#### **Anti-anaemia activity :-**

Essential nutrients found in pitaya include precursors needed for erythropoiesis, including iron (Fe), vitamins C, E, B12, thiamine, and riboflavin. A study was done by Rahmawati et al. (2019) to determine how dragon fruit affected postpartum mothers, who are thought to be more susceptible to anaemia. For 14 days, postpartum mothers received 400 cc of *H. polyrhizus* fruit juice (made from 500 g of pitaya). The findings demonstrated that levels of erythrocytes, haematocrit, and hemoglobin significantly increased in the treatment group when compared to the control group. The high vitamin C content of dragonfruit is thought to be the cause of its antianaemia activity, as it makes it easier to absorb the iron and nonheme iron required for the production of blood, according to Rahmawati et al. (2019).

#### **Anti-inflammatory activity :-**

Due to its chemical makeup, which contains substances like squalene and betalains, dragon fruit has been shown to have antioxidant and anti-inflammatory properties. Maltodextrin-encapsulated and non-encapsulated betalains from *H. polyrhizus* peel extract have been shown to have anti-inflammatory activity. Betalains can have their bioactivity extended by encapsulation by adding a barrier that is both protective and impermeable. Betalains are unstable and sensitive to degradative factors such as temperature, pH, oxygen, or light.

Betalains prevented the chorioallantoic membrane (CAM) of duck embryos from becoming irritated by sodium dodecyl sulphate (SDS). Maltodextrin-gum Arabic or maltodextrin-pectin matrices that encapsulated betalains showed five- to sixfold higher anti-inflammatory activity than those that did not. The potent antioxidant activity of the betalains from *H. polyrhizus* peels may be the cause of their potent anti-inflammatory properties. The elimination of the mediators results in a reduction in the inflammatory response because free radicals may be the primary pro-inflammatory mediators.

#### **Anti-hyperlipidaemic and anti-obesity activities:-**

Dyslipidaemia is a complicated condition that increases the risk of adverse cardiovascular events because it is known to encourage atherosclerosis. In order to assess the impact of red dragon fruit peel powder (*H. polyrhizus*) on blood lipid levels, Herniate et al. (2018) fed various groups of hyperlipidaemia Blab-C male mice different doses of pitaya peel powder, ranging from 50 to 200 mg kg<sup>-1</sup> body weight (BW), over the course of 30 days. Total cholesterol, triglycerides, and low-density lipoprotein cholesterol (LDL-c) levels in blood samples from each group were examined after the treatment, and the results revealed that all these parameters decreased as red dragon fruit peel powder dosages increased.

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#### **Conclusion :-**

The dragon fruit has many health advantages for people because of its nutritional and therapeutic qualities, especially for managing and controlling oxidative stress. All the various parts of the pitaya, including the stems, flowers, peels, and pulps, contain bioactive compounds that have a variety of advantageous biological effects, such as antioxidant, antimicrobial, and anticancer properties. These include betalains, flavonoids, polyphenols, terpenoids, steroids, saponins, alkaloids, tannins, and carotenoids, which have been shown to be superior to synthetic drugs in terms of effectiveness, health, safety, and sustainability for the treatment and prevention of a wide range of illnesses, including diabetes, cancer, obesity, hyperlipidaemia, and pathogenic organisms like viruses, bacteria, and fungi.

A natural source of colorants with potential applications in the food and cosmetic industries, the pitaya's compounds also have medicinal value. Due to its ecological traits, health benefits, and commercial value, the dragon fruit has emerged as a cost-effective product for the Vietnamese economy and a catalyst for the nation's sustainable development, particularly when it comes to promoting the sustainable use of ecosystems and the biodiversity of the country's southwest, which is more vulnerable to the effects of climate change. The success of the experimental planting model of this climbing cactus in the mangrove areas (high salinity environment) of the Mekong Delta region is attributable to the pitaya's high adaptability and tolerance to a wide range of severe environmental conditions.

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