



A Review on Salubrious and Pharmacognostic Properties of Dragon Fruit

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Abstract: -

Dragon fruit is the most widely grown vine cactus in the Cactaceae family, originally from Mexico and America. It is also known as "Hylocereus undatus" or "pitaya" in the Philippines., is an exotic tropical plant that provides numerous health benefits due to its high nutritional value and bioactive ingredients, which include powerful natural antioxidants. The fruit has a very attractive colour and mellow mouth melting pulp with a black colour seed embedded in the pulp along with tremendous nutritive properties. Depending on the variety, pitaya fruits may have sweet- or sour-tasting flesh that can be red, white, or yellow in color. Extracts of dragon fruit stems, blossoms, peels, and pulps have a variety of therapeutic biological effects against pathogenic microbes such as bacteria, fungi, and viruses, as well as disorders such as diabetes, obesity, hyperlipidemia, and cancer. Dragon fruit extracts also contain cardioprotective and hepatoprotective qualities, as well as prebiotic potential.

Key words: - Hylocereus undatus, hypocholesterolemia, anti-microbial, antioxidant

Introduction: -

Drug name: - Dragon fruit

Synonyms: - Pitaya

Pitahaya

Biological Source: - Dragon fruit grows on the Hylocereus cactus, also known as the Honolulu queen, whose flowers only open at night.

Family: - Cactaceae.(1)

Nutrition Content: -(2)

Dragon fruit contains small amounts of several nutrients. It's also a decent source of iron, magnesium, and fiber.

Here are the nutrition facts for a serving of 3.5 ounces, or 100 grams (1Trusted Source):

Calories: 60

Protein: 1.2 grams

Fat: 0 grams

Carbs: 13 grams

Fiber: 3 grams

Vitamin C: 3% of the RDI

Iron: 4% of the RDI

Magnesium: 10% of the RDI

Given the high amount of fiber and magnesium, as well as the extremely low-calorie content, dragon fruit can be considered a highly nutrient-dense fruit.

Popular types of dragon fruit: -(3)

1. Hylocereus undatus: -

- Also known as Pitahaya.
- Variety has a white flesh with pink skin and green scale.
- Edible black seeds. Shown in fig. 1



Fig 1: Hylocereus undatus

2. *Hylocereus costaricensis*:-

- Violet red flesh and pink skin.
- It's also known as Costa Rican Pitaya.
- It's native to Costa Rica.
- The fruit is magenta and the seeds are pear shaped. Shown in Fig 2



Fig 2: *Hylocereus costaricensis*

2. *Hylocereus megalanthus* :-

- Native to South America.
- White flesh with yellow skin. Shown in fig 3



Fig 3: *Hylocereus megalanthus*

3. *Hylocereus polyrhizus*:-

- Also known as Red Pitaya.
- Variety has a red flesh with its pink skin.
- Native to Mexico.
- Most popular type now grown in many countries. Shown in fig 4



Fig 4: Hylocereus polyrhizus

Chemical Constitutents :-

It is a rich source of nutrients and minerals such as vitamin B1, vitamin B2, vitamin B3 and vitamin C, protein, fat, carbohydrate, crude fiber, flavonoid, thiamin, niacin, pyridoxine, cobalamin, glucose, phenolic, betacyanin's, polyphenol, carotene, phosphorus, iron and phytoalbumin(4). It is rich in Phyto albumins which are extremely valued for its antioxidant properties .(5)

Botnical Description:-

Fruit

The fruit is a fleshy berry that is oblong and about 4.5 inches (11 cm) thick, with red or yellow skin/peel, scales, and spines. Depending on the species, pulp might be pink, white, red, or magenta in color.

The seeds are very little, abundant, and black, and are imbedded in the pulp.(6)

Flowers

Flowers are hermaphroditic; however, some pitaya species and cultivars are incompatible with one another. The incredibly spectacular, edible white blossoms are enormous, fragrant, nocturnal, bell-shaped, and can grow to be inches long (36 cm) and 9 inches wide (23 cm). Cream stamens and lobed stigmas are seen. Normally, 3 to 5 spherical buttons form on the stem border; two to three of them can develop into flower buds in around 13 days. The pale green, cylindrical flower buds reach approximately 11 inches after 16-17 days, when anthesis occurs.(7)



Phytochemicals present in Dragon fruit

Seeds:

Dragon fruit contains black, small seeds embedded in white or pink flesh. Attempts have been made to determine the composition of the oil extracted from these seeds of dragon fruit (Ariffin et al., 2009)(8).

Certain studies even revealed that dragon fruit flesh is rich in polysaccharides (Xu et al., 2016)(9) and mixed oligosaccharides (Wichienchot et al., 2010)(10) that were found capable of stimulating the growth of Lactobacilli and Bifidobacteria.

Phytochemicals present in Dragon fruit (*Hylocereus undatus*): -(5)

Components	Reagent	Note	Results of fruit extract tests
Proteins	Biuret test	Purple blue	Positive
Steroids	Liebermann Burchard test	Yellow ppt	positive
Carbohydrates	Molisch test	Violet ring	positive
	Benedict test	Orange ppt	
Alkaloids	Mayer's reagent	White ppt	positive
	Wagner's reagent	Brown ppt	
Phenolic compounds	Ferric chloride test	Green ppt	Positive
Tannins and Flavonoids	Lead acetate	Yellow white ppt	Positive
Saponins	Fast stirring	Dense foam for long time	Positive ⁷

Pharmacological actions of Dragon fruit (*Hylocereus undatus*):-**Medicinal Uses:- (11)**

The fruits are used as hypocholesterolemic, anti-microbial, antioxidant, in constipation. Anti-cancer, to boost immune system, in diabetes, to maintain cholesterol level, to promote healthy hair and skin, to prevent anemia, to improve appetite, vision and brain function

Antioxidant activity: -

The peel contains more flavonoids than the meat, it was claimed that ethanolic extracts of the *H. undatus* peel and flesh have differing antioxidant capabilities.

Anti-cancer activity: -

Several research have revealed that the polyphenols, flavonoids, and betanins present in *Hylocereus undatus* are responsible for its anticancer activities. The peel of *H. undatus* was extracted using ethanol-water (50:50wv). The solvent system's anti-proliferative efficacy was demonstrated.

Antimicrobial activity: -

The antibacterial activity of *H. undatus* peel extracts in ethanol, chloroform, and hexane were investigated.

Hypocholesterolemic Effect: -

Polyphenol contents in *H. polyrhizus* flesh were proven to be able to reduce cholesterol level in the body.(12)

Cardio-protective Effect: -

Polyphenol contents in *H. polyrhizus* flesh also possessed anti-thrombotic effects which further enhanced its cardioprotective properties.(13)

Prebiotic Effect:-

The ethanolic extract of *H. undatus* meat contained about 85% mixed oligosaccharides. In comparison to inulin, these oligosaccharides were more resistant to human salivary - amylase. This is not digested in the stomach, but it acts as a prebiotic, promoting the growth of good bacteria such as lactobacilli and bifidobacteria. These microbes will aid digestion and strengthen the immune system.(14)

Global leading suppliers and market :-**Major dragon fruit supplier countries:- (15)**

Asia: Vietnam, China, Thailand, Taiwan, Indonesia, Malaysia, Philippines, Cambodia, India and Sri Lanka.

Middle East and Europe: Israel, Switzerland and EU.

America: Mexico, Colombia, Ecuador, Guatemala and Costa Rica.

Dragon fruit systematic position

Domain: Eukaryota

Kingdom: Plantae (Haeckel 1866)(16)

Subkingdom: Tracheobionta

Superdivision: Spermatophyta (Seed plants) (Willkomm 1854)

Division: Magnoliophyta (Flowering plants) (Cronquist et al. 1966)(17)

Class: Magnoliopsida (Dicotyledons) (Cronquist et al. 1966)(17)

Subclass: Caryophyllidae (Takhtajan 1966)(18)

Order: Caryophyllales (Jussieu 1789 ex Berchtold and Presl 1820)(19)

Family: Cactaceae (Cactus family) (Jussieu 1789)(19)

Subfamily: Cereoideae (Schumman 1898 published in Schumann 1899)

Tribe: Hylocereae (Buxbaum 1958)(20)

Genus: *Hylocereus* (A. Berger) (Britton and Rose 1909)

Common / Vernacular Name: (21)

Chinese	huǒlóngguǒ (fire dragon fruit)
French	Cierge-lézard, Pithaya rouge, Pitaya
Mexico	Junco, Flor de caliz, Pitajava, Pitahaya roja
English	Strawberry Pear, Dragon fruit, Red pitaya, Night Blooming Cereus, Belle of the Night, Cinderella Plant, Queen of the Night, Jesus in the Cradle
German	Distelbirne, Echtestachelbrin
Spanish	Flor de caliz, Junco tapatio, Pitahaya orejona, Pitajava, Reina de la noche
Hindi	Dragon Fruit

Propagation:

The *H. undatus* is most often propagated through cuttings, obtained by severing foot-long, lateral branches at a stem segment. Making a slant cut on the stem end to be inserted into the soil to improve rooting. Cutting should be cured in a cool, dry area for 5-7 days before planting. Mature stems are preferred for cutting, as they are more resistant to insect and snail damage. Cutting may be planted directly in the field or in pots using a well-drained potting medium.(22)

Cultivation: -

Commercial plantings can be done at high density with between 1100 and 1350 plants per hectare. Plants can take up to five years to come into full commercial production, at which stage yields of 20 to 30 tons per hectare can be expected. ⁷ *Hylocereus* has custom-made to measure in dry tropical climates with a moderate quantity of rain. The dragon fruit sets on the cactus-like trees 30–50 days once flowering and might typically have 5-6 cycles of harvests each year. In various regions, it's free cultivation to become a weed and is assessed as cuckoo nvasive weed in some countries.(23)



Propagation cycle

Conclusion :-

A prospective source of complementary and alternative medicine, the fruit *H. undatus* may have antibacterial, hypocholesterolemic, cardio-protective, antioxidant, and prebiotic properties. The fruit is rich in a variety of chemical components, including glucose, phenolic, polyphenol, betacyanins, iron, phosphorus, carotene, flavonoids, thiamin, niacin, pyridoxine, and phytoalbumin. Additionally, it has a lot of phytoalbumins, which are prized for their potent antioxidant qualities. In addition to these, a great deal of study on this fruit has been conducted, demonstrating the plant's numerous pharmacological properties.

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