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Review Article

Nutrition and Therapeutic Potential of the Dragon Fruit: A Qualitative Approach

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ABSTRACT

The climbing vine cactus *Hylocereusundatus*, which is a native of the tropical woods of Mexico, Central America, and South America, grows the fruit known as dragon fruit, also referred to as red pitaya. With a rich cultural heritage, it has been used as a traditional medicine for centuries to treat various degenerative diseases, including arthritis, arteriosclerosis, inflammation, and brain dysfunction. Moreover, dragon fruit has exhibited promising anti-bacterial and anti-microbial properties. Dragon fruit is noteworthy for its impressive antioxidant capacity, which plays a crucial role in mitigating the likelihood of chronic illnesses. Within the fruit, a wide variety of phytochemicals are present, functioning as antioxidants that counteract detrimental free radicals. This protective action serves to safeguard the body against the effects of oxidative stress. Notably, the bark of the dragon fruit exhibits an even higher concentration of bioactive compounds with potent antioxidant properties. This distinctive feature holds significant interest from both a pharmacological and nutritional standpoint, suggesting a potential source of natural antioxidants for various therapeutic applications. This comprehensive review delves into the nutritional and medicinal value of dragon fruit, highlighting its various health benefits. The fruit's nutritional composition is rich in essential vitamins, minerals, and dietary fiber, which contribute to overall well-being and support various bodily functions. Moreover, the emerging evidence of dragon fruit's medicinal properties points to its potential as a complementary approach in managing certain health conditions. The fruit's anti-inflammatory properties have been associated with mitigating chronic inflammation, and its neuroprotective effects show promise in addressing brain dysfunction. As the demand for natural remedies and functional foods increases, understanding the health-promoting properties of dragon fruit becomes even more relevant. This review aims to provide valuable insights into the potential applications of dragon fruit as a nutritional and medicinal resource, encouraging further research and exploration of its diverse health benefits. In conclusion, dragon fruit's nutritional richness and medicinal attributes make it a compelling candidate for enhancing human health and well-being. By incorporating this fruit into a balanced diet, individuals can harness its therapeutic potential and reduce the risk of chronic diseases, benefiting from nature's bountiful offerings.

Keywords: Dragon fruit, Red pitaya, Tropical fruit, Antioxidant potential, Inflammation.

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INTRODUCTION

The climbing vine cactus *Hylocereusundatus*, which is native to the tropical forests of Mexico, Central America, and South America, produces the fruit known as dragon fruit or red pitaya as shown in Figure 1.[1-3] It goes by several alternative names, such as Pitaya, Moon lovers, Night blooming Cereus, Strawberry Pear, Belle of the Night, and Conderella plant. It is epiphytic and thrives on soil that has a lot of organic matter. Four to six fruiting cycles can occur on pitaya plants in a single year. The dragon fruit is shaped like a circle, an ellipse, or a pear and has varieties with bright pink and yellow skin.[4-6] According to Ritarwan K, Nerdy N study shows that both the peel and flesh of the fruit are rich in polyphenols and also good sources of antioxidants.[7] In the customs of certain ancient tribes, the leaves and flowers of *H. undatus* were conventionally employed for their diuretic, hypoglycemic, and cicatrizing properties.[8,9] The three different commercially available varieties are *Hylocereusmegalanthus* (Yellow pitaya), which has white flesh and yellow-skinned fruit with edible black seeds all over, *Hylocereuspolyrhizus* (Red pitaya), which has red skin and red-skinned fruit, and *Hylocereusundatus* (Red pitaya) (as shown in Table 1), which has white flesh and red-skinned fruit. Recently, farmers all over the world have paid close attention to *H. undatus* and *H. polyrhizus* due to their potent antioxidant activities and other characteristics.[10]

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According to Nalinee P, Naeti S, and their colleagues, mature dragon fruit is characterized by a noteworthy content of total soluble solids, abundant organic acids, protein, and a diverse array of minerals, including magnesium, calcium, potassium, among others.[11] One of the study quoted by Farid Abdul A, *et al.*: has claimed that different betaxanthins and betacyanins have structure-activity relationships that show free radical scavenging capacities, which increases interest in *H. polyrhizus* as a good source of antioxidant.[12]

Dragon fruit are rich in fibers, vitamins and antioxidants that help to relieve digestion problems as well as to prevent diabetes, cancer, and heart diseases; reduces cholesterol and high blood pressure and neutralizes toxic substances such as heavy metals. The antioxidative attributes of dragon fruit contribute to the mitigation of various degenerative conditions, including arthritis, arteriosclerosis, inflammation, and cognitive impairments.[13,6] Studies have shown an astonishing number of phytonutrients and antioxidants, containing polyunsaturated fatty acids, Vitamin C, and Vitamin B that are helpful for carbohydrate, protein and carotene metabolism.

Due to their high polyunsaturated fat content, dragon fruit seeds may help lower the risk of developing a variety of diseases. There are various other benefits, from faster healing of bruises and wounds, a strengthened immune system and fewer respiratory problems.[13,6] The extract of dragon fruit leaves harbors a diverse array of phytochemicals, encompassing alkaloids, flavonoids, tannins, saponins, glycosides, steroids, terpenoids, and more.[14-29] With its enticing deep purple colored pulp, the exotic aesthetic attributes of dragon fruit make it extremely attractive in the markets and commonly grown in countries such as Malaysia, Okinawa, Taiwan, Vietnam, China, India, Southern China and Israel.[30]

CULTIVATION

Mexico is the native home of the Hylocereus genus, which includes the pitaya cactus. They were most likely introduced to Central America by Europeans. Morton defined formalization in 1987. The United States, Israel, Australia, Cyprus, and the Canary Islands are among the countries that grow this kind of cactus, as do Thailand and Vietnam in Southeast Asia, Israel, and Cyprus.[7]

Dragon fruit, a semi-epiphytic plant, flourishes in tropical or subtropical regions with dry circumstances and normal temperatures of 21 to 29°C. The plant can withstand freezing temperatures (as low as 0°C) for short periods of time as well as temperatures as high as 38 to 40°C. The cultivar needs bright sunshine, alternating wet and dry seasons, and 500–1400 mm of yearly rainfall.[31,32] In soils with a slightly heavy texture, dragon fruit plants thrive. Although plants do well in moist tropical climates, fruit set issues do occasionally occur.[33]

Driven by economic incentives, dragon fruit has garnered global attention, leading to its cultivation across more than 20 tropical and subtropical countries. These nations include the likes of the Bahamas, Bermuda, Indonesia, Colombia, Israel, the Philippines, Myanmar, Malaysia, and Mexico, among others.[33,34] Predominantly, the epicenter of dragon fruit production is Southeast Asia, notably encompassing key players such as Thailand and Vietnam.[33]

Harvesting

After the first year of planting, the first harvest is begun. The major pruning is done after the first planting year, and the crops need to be irrigated often. After 24–28 days of the fruit embarking in the maturity stage, the dragon fruit's skin becomes red or pink like a rose.[35] The dragon fruit's colour peaks 4-5 days later, but to allow for sweetness and size growth, it is advisable to wait until around 2 months from fruit set before harvesting. Cuttings take less time to reach the fruiting stage than plants grown from seed, which typically take three years after planting. After this phase is complete, the dragon fruit, which frequently damages fruit peel, can be harvested by sampling and twisting.[35] Dragon fruit can be kept at 4°C for 25–30 days, however at room temperature, it may only last for 10 days or less.[32,35]

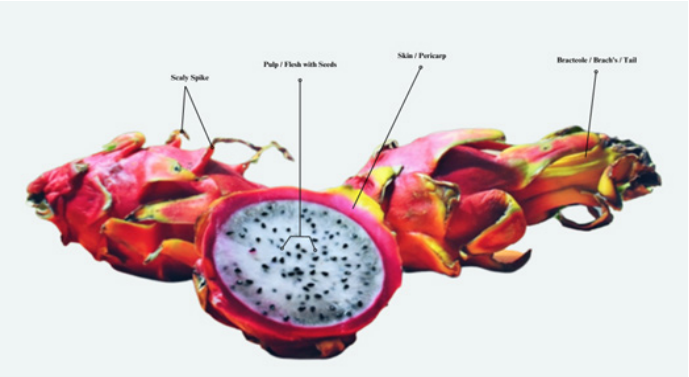


Figure 1: Dragon fruit.

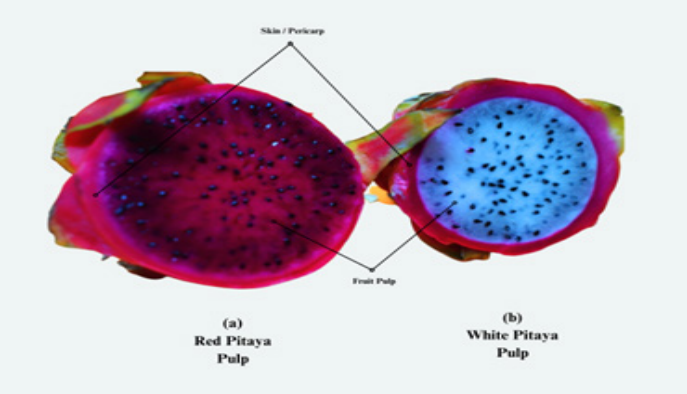


Figure 2: Fruit peel.

ATTRIBUTES OF DRAGON FRUIT

The characteristics of dragon fruit pulp (flesh) was examined in order to better comprehend its quality. Due to the fruit's juicy nature, both dragon fruit pulps had relatively low dry matter levels (10 g/100 g). According to some experts, the pH values of the pulps from creatures with red meat were equal.[32] But they were little lower than their peel. The density and fat content of the dragon fruit pulp did not differ significantly. Red dragon fruit pulp has much greater levels of amino acids and overall fiber in it than the white-flesh pulp, in comparison. The red-fleshed dragon fruit pulp boasts twice the amount of Vitamin C compared to its white-fleshed counterpart. On the other hand, compared to red fleshed dragon fruit pulp, white fleshed dragon fruit pulp has higher carbohydrates per 100 g.[35]

In contrast to those with red flesh, which include betacyanin pigment, which gives them a reddish-purple colour, the dragon fruits with white pulp are obviously white fleshed. Therefore, the sample of red-fleshed dragon fruit had a notably high value of redness.[36] Because of the extremely low concentration of betacyanin in the white-flesh dragon fruit pulp, some researchers were unable to measure it through a spectrophotometer. Therefore, direct comparison of colour criteria is the most effective method for identifying the colour of these fruits.[37]

The red meat pulp showed a comparatively high total betacyanin content, as reported in Table 2.[38] However, it was a bit lower than the peels. The possibility of using it as a natural source of the food additive betacyanin has been raised. The betacyanin levels in the tested dragon fruit are less than those found in an extracted, acidic red beetroot, which is a readily accessible natural source of betacyanin in the market. To optimize the betacyanin content in dragon fruit, a highly recommended approach involves either removing or concentrating the pigment.

In terms of antioxidative capabilities, the collective phenolic content score of the red dragon fruit pulp distinctly surpassed that of the white pulp. They were about two times as abundant as the white dragon fruit pulp higher, (as shown in Table 2).[39] The red-flesh dragon fruit is thought to have antioxidant capabilities because of the pigment betacyanin's availability. Since the pigment molecule contains a phenol structure, betacyanin helps to add to the entire number of phenolic compounds. The pigment thus can serve as an antioxidant. Due to the significant levels of nutritional and functional elements identified in dragon fruit, the results are useful in marketing it as a fruit that is high in health.[32]

NUTRITIONAL VALUE

Species, place of origin, and time of year of harvesting all affect the nutritional content of dragon fruit.[40] The growth environment has a substantial impact on the nutritional makeup and phytochemical characteristics of red Dragon fruit.[32] More potassium, phosphorus, sodium, and magnesium are found in dragon fruit than in mangosteen, pineapple, or mangosteen[38,41,42] all of which are sources of vitamins.[43] Flowering and fruit setting times have a significant impact on fruit quality, particularly TSS content.[24] Total soluble solids in mature dragon fruits are higher than those in summer fruits, with the exception of fall fruits.[44] Dragon fruit stands as a notable reservoir of minerals, glucose, fructose, dietary fiber, and vitamins.[45] Its renowned attributes encompass abundant vitamin C, phosphorus, calcium, and a noteworthy array of antioxidants.[46] Fresh fruit contains a moisture content between 82.5 and 83.0%, 0.16 to 0.23 percent protein, 0.21 to 0.61 percent fat, and 0.70 to 0.99% fiber. Per 100 g of fresh fruit pulp, the composition includes approximately 6.3–8.8 mg of calcium, 30.2–36.1 mg of phosphorus, 0.5–0.61 mg of iron, and 8–9 mg of Vitamin C.[47] Additionally, the red flesh is rich in betalains, which satisfies the market's increasing demand for antioxidants and natural food dyes.[36]

Abundant in vitamins such as B1, B2, B3, C, along with essential minerals, the red outer layer of the fruit serves as a valuable source.[48] Furthermore, in contrast to other subtropical fruits, this fruit showcases a comparatively elevated level of antioxidant activity.[36] The dragon fruit is low in carbs and free of fats, but it is abundant in nutrients including vitamin B1, B2, B3, C, fiber, and minerals like Ca, Fe, and P. Whereas, the essential fatty acids linoleic acid and linolenic acid, which are found in 50% of seeds.[49] Compared to the flesh of the dragon fruit, the early stem has a higher ascorbic acid content, which may help lower the risk of developing certain illnesses like scurvy, anemia, and weakness.[7] Dragon fruit possesses the potential to serve as a significant pectin source within the realm of fruit production.[50,51] Because of their abundant amounts of polyphenolic compounds and antioxidant qualities, dragon fruits are well-liked on a global scale. These fruits numerous little black seeds were rich in

Table 1: Botanical Classification Nomenclature of *Hylocereusundatus*.

Rank	Specific Name
Kingdom	Plantae (Plants)
Sub Kingdom	Trachebionata (Vascular Plant)
Super division	Spermatophyta (Seed plants)
Division	Magnoliophyta (Flowering plant)
Class	Magnoliopsida (Dicotyledons)
Order	Caryophyllales
Family	Cactaceae (Cactus Family)
Subfamily	Cactoideae
Tribe	Hylocereae
Genus	*Hylocereus* (A. Berger) Britton and Rose
Species	*Hylocereusudantus* (Haw) Britton and Rose

superior essential fatty acids.[52] Phytochemical substances found in dragon fruit pulp and peel extract have antibacterial action and can be used as a natural antioxidant. According to all of the above study, dragon fruit contains a number of vitamins and minerals crucial for a healthy body.[53]

Composition of Fatty Acids

The composition of fatty acid of the oil is an extremely important qualitative aspect to consider. The fatty acid makeup of the red and white dragon fruit seed fats was thus also investigated. Both dragon fruit seed oils contained the identical fatty acid elements, but their absolute levels fluctuated substantially.[32]

Table 2: Characteristics of the dragon fruit pulp.

Characteristic	White-flesh dragon fruit	Red-flesh dragon fruit
pH	4.57 ± 0.006[a]	4.40 ± 0.003[b]
Density (g/cm^3)	1.00 ± 0.02[a]	0.97 ± 0.02[a]
Dry matter (g/100 g)	10.93 ± 0.24[a]	10.01 ± 0.17[a]
Protein (g/100 g)	0.18 ± 0.02[a]	0.26 ± 0.004[b]
Ash (g/100 g)	0.96 ± 0.01[a]	1.18 ± 0.01[b]
Crude fat (g/100 g)	0.45 ± 0.02[a]	0.42 ± 0.02[a]
Carbohydrates (g/100 g)	9.34 ± 0.07[a]	8.15 ± 0.07[b]
Total dietary fibre (g/100 g)	0.45 ± 0.03[a]	0.87 ± 0.06[b]
Vitamin C (mg/100 g)	4.90 ± 0.32[a]	9.85 ± 0.53[b]
Betacyanin (mg/100 g)	Not detected	16.53 ± 0.17
Colour parameter	39.09 ± 0.77[a]	26.25 ± 0.65[b]
L* (lightness)	-0.34 ± 0.06[a]	9.15 ± 0.68[b]
a* (redness)	-3.55 ± 0.13[a]	-1.93 ± 0.42[b]
b* (yellowness)		
Total plate count (104 CFU/g)	2.89 ± 0.15[a]	3.51 ± 0.18[b]
Total phenolic (mg GA/100 g)	10.21 ± 0.13[a]	16.33 ± 0.49[b]
FRAP index	0.3467 ± 0.0058[a]	0.5533 ± 0.0057[b]
DPPH (µg GA/g)	17.56 ± 0.56[a]	22.65 ± 0.67[b]

Values are given as mean ± SD (n=3) and the contents are based on fresh weight basis. The superscripts within each row indicate significant differences ($p < 0.05$).

(As shown in Table 4) In both the red and white skinned dragon fruit seed oils, the dominant fatty acid is linoleic acid, rendering it a suitable option for culinary applications. Among the fatty acids in the white-fleshed dragon fruit seed oil, oleic acid held the highest proportion, followed by palmitic acid and stearic acid. However, this specific composition was not observed in the seed oil of the red-fleshed dragon fruit. As a result, PUFA made up the bulk of the dragon fruit seed oil, with the white-flesh variety having a somewhat higher PUFA concentration than the red-flesh variety. In comparison to the seed oil of red-flesh dragon fruit, the seed oil derived from white-flesh dragon fruit contains notably reduced quantities of saturated fatty acids and monounsaturated fatty acids. In terms of Unsaturated Fatty Acids (UFAs), the white-flesh dragon fruit seed oil exhibited a higher overall content compared to the red-flesh dragon fruit seed oil.[32]

Linoleic acid constitutes nearly all the PUFAs in both red and white fleshed dragon fruit seed oils (99%), whereas linolenic acid was only present in trace amounts (0.2%). Human metabolism is unable to synthesize linoleic acid (C18:2) and linolenic acid (C18:3) from other fatty acids, making them a vital fatty acid that must be ingested. As a result, dragon fruit seed is particularly attractive from a health perspective. Like maize oil, the dragon fruit seed fats have a similar quantity of vital fatty acids,[5] however, it is more than the amount of sesame oil[54] and olive oil.[55] On the other hand, linseed oil,[13] berry seed oils,[56] and grape seed oils are known to contain greater levels of vital fatty acids.[57,58,32]

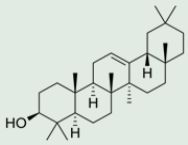
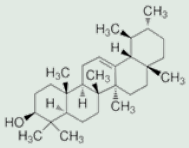
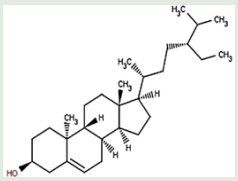
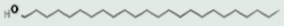
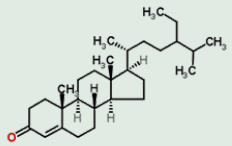
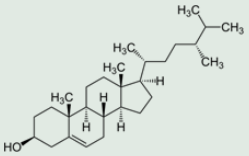
MEDICINAL AND NUTRITIONAL IMPORTANCE OF FRUIT

The dragon fruit is thought to be a supernatural fruit with extremely nutritional and healing properties. Its efficacy in reducing blood sugar levels in individuals diagnosed with Type 2 diabetes is widely acknowledged. As a result, dried dragon fruit is included in diabetes patients' diets. Fruit is thought to be beneficial for nutrient absorption, bone and tooth strength, heart muscle, blood and tissue development, immune system enhancing, rapid healing from injuries and wounds, pulmonary diseases, and as a mild laxative due to its high amounts of fiber. According to some theories, dragon fruit can lower cholesterol levels, control blood sugar levels, prevent colon cancer, boost the functioning of the brain, improve bone and kidney functions,

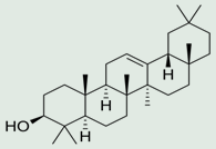
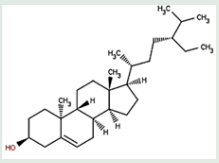
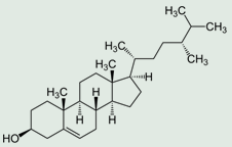
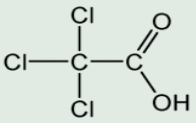
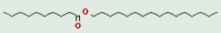
Table 3: Content of 100 g edible portion of Dragon fruits.

Component	Amount	Component	Amount
Water	87 g	Vitamin B1	0.04 mg
Protein	1.1 g	Vitamin B2	0.05 mg
Fat	0.4 g	Vitamin B3	0.16 mg
Fibre	3.0 g	Vitamin C	20.5 mg
Carbohydrate	11.0 g	Calcium	8.5 mg
Iron	1.9 mg	Phosphorus	22.5 mg

Table 4: Chemical Components in Dragon Fruit. *H. polyrhizus*.

Sl. No.	Chemical Components	Structure
1	β-amyrin - 15.87% ($C_{30}H_{50}O$)	
2	α-amyrin - 13.90% ($C_{30}H_{50}O$)	
3	octacosane - 12.2% ($C_{28}H_{58}$)	
4	γ-sitosterol - 9.35% ($C_{29}H_{52}O_2$)	
5	octadecane - 6.27% ($C_{18}H_{38}$)	
6	1-tetracosanol - 5.19% ($C_{24}H_{50}O$)	
7	stigmast-4-en-3-one ($C_{29}H_{48}O$) - 4.65%	
8	campesterol - 4.16% ($C_{28}H_{48}O$)	

H. undatus.

Sl. No.	Chemical Components	Structure
1	β-amyrin - 23.39% ($C_{30}H_{50}O$)	
2	γ-sitosterol - 19.32% ($C_{29}H_{52}O_2$)	
3	octadecane - 9.25% ($C_{18}H_{38}$)	
4	heptacosane - 5.52% ($C_{27}H_{56}$)	
5	campesterol - 5.27% ($C_{28}H_{48}O$)	
6	nonacosane - 5.02% ($C_{29}H_60$)	
7	trichloroacetic acid ($C_2HCl_3O_2$)	
8	hexadecyl ester - 5.21% ($C_{26}H_{52}O_2$)	

increase visual acuity, and contain compounds that are good for the skin.[7,59] The pulp of fruit is high in Vitamin C and antioxidants, as well as polyunsaturated fatty acids, B vitamins, carotenoids, proteins, and minerals including calcium, iron, and salt. According to investigations, the Vitamin C level of fruit pulp can reach 6000mg/100 g (as shown in Table 3).[7,60]

Abundant in polyunsaturated fats (including omega-3 and omega-6 fatty acids), dragon fruit seeds contribute to lowering triglyceride levels and mitigating the susceptibility to cardiovascular ailments. Eating dragon fruit can help the body keep natural functions like removing toxic heavy metals and improving vision. Lycopene, which is required for the crimson color of dragon fruit, is believed to be linked to a decreased risk of prostate cancer.[7]

Pulp

As per the following Table 3, 100g of dragon fruit pulp (as shown in Figure 2) contains several nutrients such as Trans soluble phenolics, trans ascorbic acid, trans dietary fibre, as well as pectin were impacted by the nutritional composition of dragon fruit as well as its antioxidant activities (as indicated in Table 5), since they were influenced by desired features. It is presumed that red

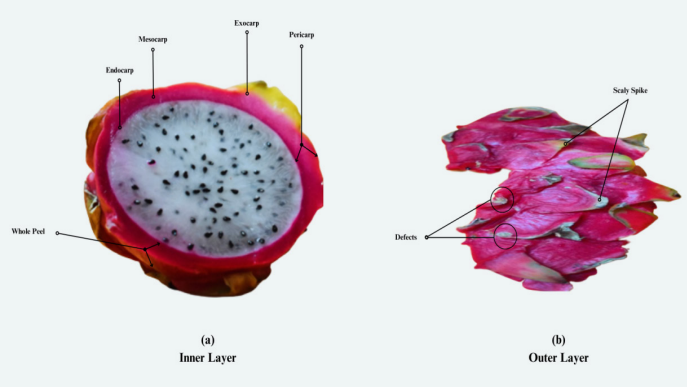


Figure 3: Fruit peel.

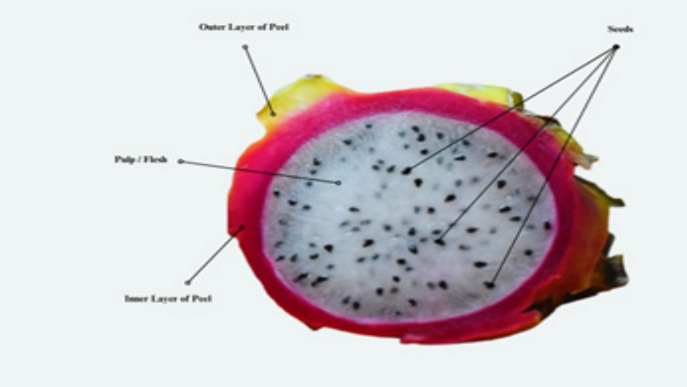


Figure 4: Fruit seeds.

dragon fruit has a lot of iron to increase the amount of hemoglobin and erythrocytes. The primary impact of red dragon fruit juice on hemoglobin and erythrocyte levels in pregnant women is its significant potential to provide supplementary therapeutic support for managing anemia during pregnancy.[6,7,61,62]

Peel

Pectin

Dragon fruit is also known to be pectin rich. According to a report approximately 14.96 to 20.14% of the dried peels (as shown in Figure 3) have recorded yields of pectin derived from dragon fruit.[63] It may be used for corporate purposes. 7.5% of the microwave-assisted extraction process removed pectin, a study stated that in fruit processing, dragon fruit can be a major source of pectin.[64,51] In food items such as low viscous food and drinks, A report suggested the use of dragon fruit peel pectin as a thickening agent.[65]

Betalains

Dragon fruit is recognized for its potential to serve as a natural food dye or coloring agent in culinary applications. Food coloring agents are important to make up for lack of color during processing. Real food dyes are valued by health-conscious customers over synthetic dyes. Dragon fruit is high in betalain pigments composed of betacyanins and betaxanthins. In research conducted not only extracted these pigments, but also confirmed that these pigments are very tolerant of the factors that cause color loss during production.[7,37,50,66-71]

Table 5: As per the following table, 100 g of dragon fruit pulp contains nutrients such as.

Nutrients	Amount
Protein	1.1 g
Water	87 g
Fat	0.4 g
Fibre	3.0 g
Carbohydrates	11.0 g
Ascorbic acid (Vitamin C)	20.5 mg
Thiamine (Vitamin B1)	0.04 mg
Riboflavin (Vitamin B2)	0.05 mg
Niacin (Vitamin B3)	0.16 mg
Iron (Fe)	1.9 mg
Calcium (Ca)	1.9 mg
Phosphorus (P)	22.5 mg

Source: http://www.healwithfood.org/nutrition-facts/dragon-fruit-nutritional-health-benefits.php#ixzz4wk4LZcyC

Seed

The dragon fruit is made up of small, black seeds that are encased in white or pink flesh (as shown in Figure 4). Among the fatty acids present in the seeds are Linolenic acid, Linoleic acid, Palmitoleic acid, Cis-vaccenic acid, Stearic acid, Oleic acid, Myristic acid, and Palmitic acid. To ascertain the structure of the oil derived from these dragon fruit seeds, research has been done. Curiously, it was discovered that the oil extract of these seeds was high in 50% of the necessary fatty acid's linoleic acid and linolenic acid, which are needed for human metabolism and cannot be produced by the body from other food components. The flesh of dragon fruit is also rich in polysaccharides and mixed oligosaccharides, which have been proven to encourage the growth of Lactobacilli and Bifidobacteria. Bifidobacteria and lactobacilli, which are gram-positive lactic acid-producing bacteria, make up a sizable portion of the microflora in the human intestinal tract. This gastrointestinal microflora, known as probiotics, aids in preventing the growth of gastrointestinal infections.[72-74]

Leaf

Dragon fruit leaves are rich and can be used with antibacterial properties in the treatment of infectious diseases including meningitis. Examination has revealed that extracts from red dragon fruit leaves and white dragon fruit leaves possess the capability to impede the proliferation of bacteria associated with bacterial meningitis, including *Neisseria meningitidis*, *Streptococcus pneumoniae*, and *Listeria monocytogenes*.[75,76]

The anti-microbial efficacy of the red dragon fruit leaf extract and white dragon fruit leaf extract escalates proportionally with their concentration. This research underscores the dose-dependent antibacterial attributes present in both extracts. Notably, flavonoids are recognized for their antimicrobial potential through their interaction with bacterial cell walls, potentially disrupting membrane integrity in the phospholipid segment. Phenolic compounds contribute to significant alterations in phospholipid membrane composition, resulting in cell denaturation.[23] The antibacterial mechanism of saponins involves the induction of protein and enzyme leakage within cells. Additionally, tannins play a role in the denaturation of bacterial cell proteins, ultimately hindering bacterial growth.[14]

Stem

The stem of a dragon fruit plant is thought to offer therapeutic benefits. According to some studies, eating the immature dragon fruit stem, which contains more ascorbic acid than the fruit's meat, may have helped people avoid some disease risk factors.[7,14]

FUTURE PERSPECTIVES OF DRAGON FRUIT

Dragon fruit cultivation is very important worldwide, and from a nutritional and bromatological consistency perspective, the fruit and its parts need to be more analyzed in order to be better used by the pharmaceutical and food industry. Given its ability to yield swift economic returns, with development commencing within the inaugural year post-plantation, and its capacity to thrive amidst challenging metabolic conditions, particularly in regions marked by limited water availability, dragon fruit cultivation emerges as a viable recommendation for areas unsuitable for nurturing other fruit varieties that demand more favorable climatic conditions and sufficient water resources for irrigation.

Every component of the plant, encompassing cladodes, flowers, and fruits, holds significant quantities of functional compounds with established therapeutic attributes. These include the ability to alleviate hypertension, a characteristic that has piqued the interest of the pharmaceutical sector in extracting these valuable compounds.

Numerous investigations propose that the fruit's functional attributes contribute to diminishing the susceptibility to chronic ailments. The elevated concentration of bioactive compounds exhibiting antioxidant properties within the pitaya bark accentuates its appeal from both pharmacological and nutritional standpoints due to its enhanced antioxidant functionality.

Nonetheless, the pitaya boasts advantageous characteristics that position it within the tropical fruit category, yet its recognition remains limited despite harboring substantial potential for both domestic and global markets. Regrettably, products associated with Pitaya remain scarce within the market, highlighting the necessity for comprehensive research aimed at enhancing their commercial viability.[7,12]

Due to its relatively low nitrogen requirements compared to many other fruit crops, the possibility of organic cultivation using locally sourced organic manures and composts becomes feasible for this crop. Consequently, given its current under exploitation, Dragon fruit holds the potential to emerge as a pivotal fruit crop in the coming times.[42]

CONCLUSION

The nutritional value and health benefits of dragon fruit have contributed to its growing popularity in India. This fruit is consumed with the assertion that it offers remarkable nutritional content and potential remedies for diverse health concerns. After evaluating multiple research studies, it can be firmly concluded that dragon fruit holds substantial nutritional and medicinal worth. It is enriched with essential nutrients such as vitamin C, B1, B2, B3, a notable fiber content, as well as vital minerals including calcium, iron, and phosphorus. Notably low in carbohydrates and devoid of fats, its seeds are a notable source of linoleic acid and linolenic acid, constituting 50% of these crucial fatty acids that are indispensable for human metabolism and cannot be synthesized from other dietary components. These attributes collectively contribute to its efficacy in addressing a range of ailments. Even the dragon fruit stem possesses therapeutic advantages. The premature stem, abundant in ascorbic acid, exhibits the potential to mitigate risk factors associated with specific diseases. Furthermore, the presence of pectins and betalains in both fresh and dried dragon fruit establishes it as a natural enhancer for food thickness and coloring.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

TSS: Total soluble solid; **DPPH:** 2,2-Diphenyl-1-picrylhydrazyl; **FRAP:** Index, Ferric reducing antioxidant power; **PUFA:** Polyunsaturated fatty acid; **SFA:** Saturated fatty acid; **MUFA:** Monounsaturated fatty acid; **UFA:** Unsaturated fatty acid; **TSP:** Total soluble phenolics; **TAA:** Total ascorbic acid; **TDF:** Total dietary fiber.

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