

Medicinal Properties and Nutritional Value of Dragon Fruit

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Abstract:

The idea behind nutraceuticals originated with a survey conducted in Germany, the United Kingdom, and France. The poll found that consumers place a higher value on nutrition than on exercise or genetics when it comes to maintaining good health. Any material that may be consumed whole or in part as food that has therapeutic or health benefits, including the ability to treat or prevent disease, is considered a nutraceutical.¹ These products could be anything from herbal goods and genetically modified designer foods to isolated minerals, dietary supplements, and tailored diets. The revolution in nutraceuticals will usher in a new era of health and medicine, when the food sector will adopt a research-driven approach akin to that of the pharmaceutical business.² Antioxidant-rich dragon fruit can also fend against inflammatory illnesses like arthritis and gout. Pitaya fruits contain significant concentrations of vitamins C, A, B1, B12, and E. Dragon fruits have high levels of potassium, magnesium, zinc, and phosphorus among other minerals. It contains iron, copper, and calcium in minor levels. The rich nutritional value of this fruit comprises its high concentration of vitamins, minerals, glucose, fructose, and dietary fiber.³ The revolution in nutraceuticals will usher in a new era of health and medicine, when the food sector will adopt a research-driven approach akin to that of the pharmaceutical business. Antioxidant-rich dragon fruit can also fend against inflammatory illnesses like arthritis and gout.⁴ Pitaya fruits contain significant concentrations of vitamins C, A, B1, B12, and E. Dragon fruits have high levels of potassium, magnesium, zinc, and phosphorus among other minerals. It contains iron, copper, and calcium in minor levels. The rich nutritional value of this fruit comprises its high concentration of vitamins, minerals, glucose, fructose, and dietary fiber. Numerous phytochemical antioxidants, including carotenoids, polyphenolic compounds, and betalains, have been found to have chemo-protective qualities against oxidative stress in the body and to maintain the appropriate ratio of antioxidants to oxidants for the enhancement of human health.^{5,6} It strengthens the human body's immune system and is used to treat heart problems, diabetes, and cancer.⁷

Key Word: Medicinal Food, Functional Food, Dragon Fruit.

INTRODUCTION:

One super fruit that has just been brought to India is the dragon fruit, which is thought to be a lucrative and promising crop. Fruit is highly attractive, with a golden flesh that melts in your tongue and tasty black seeds imbedded in it.⁸ Its exceptional nutritional qualities also draw producers from all over India to plant this fruit crop, which is native to Mexico, Central America, and South America. It's a plant that grows for a long time and has a beautiful flower that blooms at night called "Noble Woman" or "Queen of the Night." Other names for the fruit include Strawberry Pear, Dragon Seed, Pithaya, Night Blooming Cereus, Belle of the Night, Cinderella Vine, and Jesus in the Cradle.⁹ Many different types of organic compounds are found in plants, most of which are not directly involved in the growth and development of the plant.¹⁰ These substances are known as secondary metabolites. Secondary metabolites from plants have been used to make flavorings, food additives, medications, and other synthetic items.¹¹



Fig : Dragon Fruit Tree

BOTANICAL DESCRIPTION:

Fruit:

The fruit is an oblong, fleshy berry that is roughly 4.5 inches (11 cm) thick, with peel or skin that is red or yellow, scaled, and may or may not have spines. Depending on the species, pulp might have a pink, white, red, or magenta color. Embedded in the pulp are tiny, abundant, black seeds.¹²



Fig: *Hylocereus undatus*, white-fleshed



Fig: Hylocereus polyrhizus, red-fleshed



Fig:Hylocereus megalanthus, Yellow pitahaya fruit

Flowers:

Some pitaya species and cultivars are self-incompatible, while others are hermaphrodite. The huge, fragrant, nocturnal, bell-shaped, white blossoms are edible and incredibly spectacular. They can reach up to 9 inches (23 cm) in width and inches (36 cm) in length. Cream colored stigmas and stamens are present.¹³ Normally, three to five spherical buttons appear on the stem border; in around thirteen days, two to three of those buttons may develop into flower buds. When anthesis occurs, the light green, cylindrical flower buds grow to a height of around 11 inches in 16–17 days.¹⁴

Phytochemistry :

Vitamin B1, B2, B3, C, flavonoids, thiamin, niacin, pyridoxine, kobalamin, glucose, phenolic, betacyanins, polyphenol, carotene, phosphorus, iron, and phytoalbumin are just a few of the nutrients and minerals that Hylocereus undatus is rich in. It has a lot of phytoalbumins, which are highly prized for their antioxidant qualities.¹⁵

MEDICATION-RELATED ACTIVITIES:

Activity of antioxidants:

Since the peel of *H. undatus* contains more flavonoids than the meat, it has been suggested that the ethanolic extract of the peel and flesh has differing antioxidant capabilities.¹⁶

anti-tumor action:

Hylocereus undatus's anticancer qualities have lately been investigated. Numerous studies have demonstrated that the anticancer properties of *Hylocereus undatus* are caused by the polyphenols, flavonoids, and betanins that are contained in the plant.¹⁷ The ethanol-water solvent combination used to extract the peel of *H. undatus* shown anti-proliferative action.¹⁸

antimicrobial efficacy:

The antibacterial properties of *H. undatus* peel extracts in ethanol, chloroform, and hexane were investigated. showed an inhibition zone of roughly 7 to 9 mm against both Grampositive and Gramnegative bacteria.¹⁹

Effect of Hypocholesterolemia:

It has been demonstrated that the polyphenols in *H. polyrhizus* flesh can lower the body's cholesterol levels.²⁰

Effect of Prebiotics:

The meat of *H. undatus* was found to have 85% or more mixed oligosaccharides in the ethanolic extract. Compared to inulin, these oligosaccharides exhibited greater resistance against the human salivary α -amylase.²¹ Instead of being broken down in the stomach, they serve as prebiotics, promoting the growth of lactobacilli and bifidobacteria, two types of good bacteria. These microbes will support healthy digestion and maintain a robust immune system.²²

Utilizing Dragon Fruit in Food:

It's clear that the increased demand for dragon fruit in recent years is a result of its beneficial properties and high nutritional content.²³ This fruit has become a major force in the culinary business, inspiring a wide range of creative processed foods. Juice from Dragon Fruit.²⁴

Dragon fruit juice:

is a highly nutrient-dense fruit juice that contains significant amounts of vitamin C as well as antioxidants including phenolic compounds and betacyanin. One well-known and significant processed product made from dragon fruit is dragon fruit juice.²⁵ Given that customers prefer nutrient-dense, low-viscosity fruit juice, clarifying is necessary to make increased turbidity and viscosity fruit juice economically relevant and palatable. Dragon fruit juice enhances its organoleptic qualities, extends its shelf life, and boosts its appeal and recognition, among other benefits that make it a more valued product for the food industry and consumers.²⁶

Dragon Fruit Powder Juice:

Dragon fruit is widely recognized for its nutritional benefits, but since it isn't always in season, fruit juice has been made to be available all year round. It can be added to various processed meals to serve as a functional food because of its extended shelf life and high economic worth.²⁷ Spray drying, the most widely used commercial method, is used to make it. Since the initial consistency of these juice powders is sticky, maltodextrin is employed to reduce the stickiness of fruit powders.²⁸

Dragon Fruit Wine:

Since ancient times, wine has been treasured as a timeless, traditional libation. Making wine from the pulp of dragon fruit is a novel method that has surfaced thanks to the utilization of modern technologies.²⁹ With a pH of 4.29 and a remarkable total soluble solids (TS) reading of 23.07°Brix, the dragon fruit wine is truly remarkable. This juice is extracted and then goes through a transforming fermentation process that is cleverly arranged inside a multi-layered ferment tank that is cleverly packed with sugar and fruits.³⁰ A careful eight-week fermentation period is observed, and then pasteurization and prudent storage come next after being refrigerated at or below 4 °C for four to six hours. Stabilizer is added and hammered again to incorporate the air. The last test examines the dragon fruit ice cream's sensory attributes. Research demonstrated that adding 12% dragon fruit pulp to ice cream increased consumer acceptance and satisfied consumer desire. In ice cream, dragon fruit has been substituted by fat derived from whole or skim milk. The dietary fiber, amino acid content, antioxidant capacity, and lipid content were all raised overall, improving the ice cream's texture and quantity.³¹

Ice Cream with Dragon Fruit:

To homogenize the dragon fruit, diced pulp is added. During this process, the fruit's physiochemical properties such as its meltability, texture, color, betacyanin concentration, antioxidant capacity, and flavor profile are assessed. Beat together the whipped cream, sugar, and milk to create a uniform liquid composition.³²

Dragon Fruit Yogurt:

Prebiotic fatty acids from dragon fruit can be effectively used as a coloring agent in dairy products like yoghurt and milk infused with the fruit. The nutritional value and antioxidant content of yogurt made from dragon fruit have been the subject of numerous studies. The findings demonstrated that the dragon fruit's flesh or pulp can speed up fermentation while lowering milk's pH. Yogurt with dragon fruit added more whey and had a higher ability to hold onto water. A thorough metabolic and prospective analysis was conducted on the reddish-purple dragon fruit. It was discovered that this fruit had minimal effect on smell or other senses. It had improved the color and aesthetic appeal, indicating that it might be applied as a naturally improving color quality for food items and the food sector.³³

Product made of wheat and dragon fruit:

All food products contain wheat, however baked items like breads, cookies, noodles, and pasta contain it more than other foods. When combined with water, the protein components of gluten, gliadin and glutenin, can cause wheat flour to become stretchy. The dragon fruit is utilized in traditional wheat-based foods because it contains nutritional fiber. Research has been done as a result of consumers' growing health consciousness. It also demonstrates how the natural red color of the dough may be enhanced by adding antioxidants and phenolic acids. You can add both white and red dragon fruits to the bread to enhance its texture. You can also toss the peel of dragon fruit into cookies and noodles. The customer's simple wheat noodles have less beta-lane and flavonoid content than powdered dragon fruit peel.³⁴

Advantages for Health and Potential Treatments Dragon fruit:

It can be creatively used as a natural food coloring ingredient in addition to being a thirst quencher due to its high water content compared to its nutritional composition per 100 g. Dragon fruit can also be consumed as jam, juice, or preserves, depending on the flavor that is preferred. Dragon fruit contains a lot of vitamin C, which, when frequently ingested, speeds up the healing of cuts and wounds in addition to relieving asthma and coughing. But dragon fruit's high vitamin C concentration is crucial for enhancing immunity and the body's built-in antioxidant defenses. Numerous flavonoids found in dragon fruit offer

cardiovascular disease prevention. It also aids in the treatment of vaginal bleeding and discharge dragon fruit aids in meal digestion due to its high fiber content. Due to its many health benefits, dragon fruit is especially high in the B vitamin family (B1, B2, and B3). Dragon fruit contains vitamin B2, which not only acts as a multivitamin but also helps to improve and lessen appetite loss. Vitamin B1 facilitates improved glucose metabolism and energy production. In addition, vitamin B3 from dragon fruit lowers dangerous cholesterol levels while also moisturizing and smoothing skin. It also reduces blood pressure and improves vision. Because the glucose in dragon fruit helps diabetics control their blood sugar levels, it is beneficial for decreasing blood sugar levels in those who have type 2 diabetes. High amounts of calcium and phosphorus found in dragon fruit contribute to the development of strong bones, teeth, and healthy tissue. COVID-19 is a highly contagious sickness that spreads from person to person. There are numerous other indirect routes of disease transmission. Even while anti-rheumatic drug hydroxychloroquine and antiviral medications like lopinavir and remdesivir have been used in clinical practice, research on their safety and efficacy is still underway, signaling the beginning of a new age in medical in

Since there is currently no treatment for COVID-19 infection, supportive care is required to boost immunity and fend against sickness. Functional foods may be able to influence the immune system and prevent viral infection. Dragon fruit, an innovative superfruit from India, is one such dish. Its appealing look and healthy composition have made it more well-liked. They are abundant in vitamins, minerals, and antioxidants as well as betalains, which shield the body against certain diseases linked to oxidative stress.

The dragon fruit's seeds are rich in polyphenols and a great source of linoleic acid. As a functional food, the fruit is unavoidable in this COVID-19 scenario and can be urged to be ingested. The need for these foods is rising because research indicates that individuals with co-morbid conditions are more vulnerable to illnesses linked to oxidative stress and are better able to combat viruses. An essential vitamin, vitamin A, strengthens immunity and combats disease in concert with other fat-soluble nutrients. These consist of beta carotene, retinoic acid, and retinol.³⁵

CONCLUSION:

The intriguing and adaptable dragon fruit (*Hylocereus* spp.) has a wide range of nutritional, botanical, and health benefits, which makes it a desirable ingredient for a variety of culinary preparations. We have examined its distinctive qualities in-depth in this review, emphasizing its eye-catching look, variety of species, and climate adaptation. Its nutritional composition, which is high in fiber, important vitamins, and antioxidants, highlights its potential as a diet supplement that promotes health. It was clear to us as we investigated its culinary uses that dragon fruit had the power to revolutionize the food industry. This fruit enhances the sensory experience of customers by providing a delicious flavor and a visual spectacle in smoothies, salads, jams, and desserts. Innovative chefs and home cooks alike are drawn to it because of its subtle sweetness and flawless blending capabilities. The health advantages of dragon fruit, such as its capacity to enhance digestive health, immune system support, and antioxidant defense, add even more allure. The fruit's chemical components include glucose, phenolic, betacyanins, polyphenol, carotene, phosphorus, iron, phytoalbumin, carbohydrate, crude fiber, flavonoids, thiamin, niacin, pyridoxine, and kobalamin. Additionally, it has a lot of phytoalbumins, which are prized for their potent antioxidant qualities. In addition, a great deal of study has been done on this fruit, demonstrating the plant's wide range of pharmacological properties.

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