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A Review On Medicinal Exotic Dragon Fruit

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Abstract

Dragon fruit is also known as pitaya which is colourful fruit originated in Central America. It is among the most nutritious and wonderful exotic fruits known to man. It features a mouth watering light sweet taste, an intense shape and colour, not forgetting its outstanding flowers. It has antioxidant properties and the dragon fruit is a bright hue but it is also a powerhouse of multiple nutrients. The amazing fruit is loaded with health benefits that can address various health conditions. If we consume it as a daily diet with other nutritious fruits and vegetables which can improve the health. It contains chemical constituents such as antioxidants like betalains, polyphenolic compounds and carotenoids. It has black seeds which contain fibers that are important for the health and also rich in omega 3 and omega 9 including health benefits and nutritional value for improving the health. This review highlights the beneficial effects of dragon fruit in prevention of the harmful effects with medicinal properties and also nutritional values of the fruit along with their formulation of product from extraction of dragon fruit.

Keywords: Dragon Fruit, Cactus, Pitaya, Antioxidants, Hylocereus.

INTRODUCTION

The dragon fruit belongs to the cactaceae family of plants which includes cacti that come from North, Central and South America. They live in many places from the coast to high mountains to tropical rainforests. It is a power of multiple nutrients. It is a low-calorie tropical fruit that grows on the Hylocereus cactus, a climbing cactus also known as the Hylocereus Queen. This fruit is native to central and South America and Mexico and the plant is exotic looking. The dragon fruit plant is commercially grown globally. It is rich in high fibers and antioxidants that help in digestion, weight loss, treat anemia, lower blood sugar levels and even improve skin health. Dragon fruit is recently introduced in India as a super fruit. The fruit has intense color with a mellow mouth liquefying pulp containing black seeds which are present in the pulp containing medicinal properties. The fruit is also known as strawberry pear, pitaya, a night-blooming cereus, Belle of the night Conderella plant and Jesus. The fruit given a name that

is pitaya the reason behind is it contains bracts or scales on the outer surface of fruit and therefore it indicates the scaly fruit. The fruit which is developed from the flower which is large and has the ornamental values because it has blooming effect at night and flower contain white or creamish white colour. Dragon fruit has economical value and it is helpful for treating various kind of diseases

HISTORY

Dragon fruit is an epiphytic cacti and found in the region of island at the Caribbean and is cultivated throughout the tropical regions. Early, over the hundred years ago the fruit was introduced by the French to the Vietnam that time it was known by the name Thanh Long. The reason behind the name is that the fruit having oval shaped with the bright pink or red skin and green scales present on the dragon's skin. In recent years it was known that Vietnam is the world's largest exporter of the dragon fruit, by making 55% of the country's fruit export over the different countries and it made a profitable crop for them. In Mexico the fruit known by the name Pitahaya, which belongs to various other species of cactus with a flowering fruit. In Central America and Northern South America it is known by Pitaya Roja. This is now cultivated worldwide in 20 subtropical and tropical countries such as Bahama, Phillipines, Myanmar, Indonesia, Bermuda, Colombia, Israel, North Australia, Mexico, Nicaragua, Malaysia, Japan, Shrilanka, Southern China, Southern Florida, Taiwan, Vietnam, Bangladesh, Thailand and West Indies. The main reason of crop success were it is commercially interested, not demanding any specific requirements for their growth that is higher drought tolerance, has easily adapted to intensity of light and increasing temperature, high tolerance towards varieties of soil salinities.

MORPHOLOGY



Fig.no :1 morphological structure of dragon fruit

The dragon fruit is an evergreen cactus and grows faster which rises upto the level of 1.5 to 2.5 meters in height with vine like branches. It is a terrestrial or epiphytic cactus with succulent three winged and green stems. The stem is green and fleshy and has vine like structure on the branches. Each branch has three wavy wings and. 1-3 spines or may be spineless. The plant absorbs water from aerial root and keeps the stem on vertical surface. Dragon flower is white or cream white in colour and fruit ranges between 25 to 30 cm long and wide range is between 15to 17 cm with ovel or Bell shaped. The fruit has excellent external view with bright red or bright pink

skin with green scale and white, red, purple pulp along with black seeds which are embedded in the pulp. The plant needs support to grow up the vine in upward direction.

Phytochemicals Of Hylocereus Species

The phytochemicals present in dragon fruit are phenols, sterols, flavonoids, fatty acid, and tocopherol. Out of various phytocompounds found in pulp and peel of the fruit, there is also the presence of ascorbic acid, thiamin, niacin, and riboflavin and minerals like calcium, magnesium, potassium, phosphorus, betacyanin, beta carotene, lycopene, coumaric acid, protocatechuic acid, vanillic acid, gallic acid, syringic acid and hydrobenzoic acid. The peel of fruit contains large huge level of betacyanin, an antioxidant properties along with antimicrobial properties and the presence of pigment indicates it's used in colouring or preservatives which are beneficial in curing diseases.

Varieties Of Dragon Fruits

1) *Hylocereus Undatus* :

Containing red skin with white flesh which is the most well known kind, but it's the least sweet.

2) *Hylocereus polyrhizus*:

Containing the pink skin with red or pink flesh. It is bigger and sweeter than white pulp dragon fruit .

3) *Hylocereus Costaricensis*:

Containing pink skin with purple flesh and it looks for the name "American Beauty"

4) *Hylocereus Megalanthus*:

Containing yellow skin with white flesh and it is hardest to find, but it is the sweetest one.



fig.2 varieties of dragon fruit

Medicinal Properties Of Dragon Fruit

1.Prevents Inflammation

If someone suffering from chronic pain because of rheumatoid arthritis then the physician suggests to eat dragon fruit because there is scientific studies suggest that dragon fruit has an anti-inflammatory properties that can gives relief from severe pain in the joints between the bones and muscles. The pulp and peel riches in *anthocyanin* which inhibits the synthesis of reactive oxygen and nitrogen atom, cyclooxygenase-2, lipooxygenase and acetylcholinestetas and indicates that fruit contains important and potential role in controlling and managing of inflammation through varies pathways that are prostaglandin, leukotriene, and cholinergic pathways.

2. In Lowering Blood Sugar

The dragon fruit has hypoglycemic properties that may normalize blood glucose level in the blood and it considered to reduce the malondialdehyde. Person having type 2 diabetes then they should advised by the doctor to prefer dragon fruit in their diet as it helps them to reduce the blood sugar to normal level. Dragon fruit can thus play a major role in managing the normal level of blood sugar. The intake of *H. Polyrrhizus* can lowers the risk of glycemia in humans and it has proved by showing the hypoglycemic action which was induced in dyslipidemic mice contributes to reduce the risk of insulin resistance and found that beneficially decreases the high blood sugar level which consume high calories daily. The fruit contains metformin which has significant role in decreasing the glycemc and Homeostasis Model Assessment Insulin Resistance in type -2 diabetic rats.

3.Boosts Immunity Power

Immune system is most important component of our body which keeps from getting sick and catching infection. Dragon fruit has abundant minerals and vitamins C, calcium, phosphorus, iron, protein and fibres with the combination of these and will be able to fight any infection and illness and improve the immune system which indirectly increases its ability to defence the body against the foreign antigens like viruses, bacteria and germs

4.Effective in Antihyperlipidemic Effect

Dragon fruit is very important factor to prevent the disease because this reason it is very popular fruit among the people. By consuming the fruit can reduces the risk of heart stroke and heart attack. The fruit contain the seed which is rich in omega3 and omega9 fatty acid plays an important role in the prevention of heart attack in cardiovascular disease because it prevents the blockages in arteries and allows the blood to flow towards and from the heart properly. Dragon fruit also maintains the cholesterol level which also a major cause of heart attack by consuming the dragon fruit it also reduces the low-density level cholesterol. Mostly the use of *H. Polyrrhizus* can develop the lipid profile which results into decrease the total level of cholesterol, LDL, and triglycerides, and increase the level of HDL. Intake of *H.Polyrizus* shows beneficial effect in lipid level in dyslipidemic mice, showing the normalizing cardiovascular diseases. The peel of this fruit could also improve the blood lipid level which further reduces the risk of atherosclerosis which leads to cause heart attack

5.Improves hair growth

The dragon is beneficial for hair because it contains high nutritional value and low calorie fruit can boost hair growth while making it shiny, soft, and thick. It contain iron which play an important role to carry oxygen to the root of the hair and can helps to improve the growth, thickness and volume of the hair with a regular intake of iron.

6. Good for Eyes

It has the pigment that is beta-carotene that is good source pigment which gives beautiful colours in the fruit. Beta-carotene contain beneficial properties in prevention of eye problems such as macular degeneration and cataracts. A single cup of dragon fruit slices each day can prevent numerous eye problems.

7. Improves Skin

Unhealthy diet, stress, pollution exposure and other factors leads to faster aging of the skin. To prevent the skin aging which helps in dry skin, acne, and sunburns which are the major effects to cause the aging of the skin. Dragon fruit contain vitamin C and antioxidants which can helps to cure skin damage and thus leading to brighten, glowing and healthy skin by preparing the juice of dragon fruit and drink it for the glowing and brighter skin which we always wants.

8. Improves Digestion.

The dragon fruit is prebiotic fruit which boost up the growth of probiotic lactobacillus and bifidobacteria which help to the healthy bacteria in the gut to improve their gut health and reduces the colon cancer risk. The dragon fruit enhances the growth of health gut bacteria. It may beneficial effect on the gut microbiome, the bacteria in the intestine.

9. Reduces the Risk of Cancer

By the digestion of fruit results in fermentation of pitaya oligosaccharide and results in the formation of lactic acid, acetic acid, propionic and butyric acid which inhibits the carcinogenicity of the cells and has potential to control and management of colon cancer. The varieties of *Hylocereus* Species has effective in treating the cancer one of these are *H. Undatus*. It has an anti-cancer effect against the liver cancer (HepG-2) cells. The red dragon fruit has an antiproliferative action on the melanoma cells(B16F10). It shows that peel has a strong inhibition action on the growth of cancer cells as compare to the pulp. The peel and pulp contain polyphenols and it is an excellent source of antioxidants and also has bioactive compound like phenolic acids, flavonoids and betacyanin which is reason for inhibition of growth of melanoma cells.



10. Produces Antimicrobial Activity

Extraction from peel and pulp of the fruit specially *H. polyrhizus* can also acts as antifungal effects against *Candida albicans*, *Botrytis cinerea*, *Rhizoctonia solani*. The *H. Undatus* seed inhibits the growth of gram positive and gram negative bacteria species that is *Staphylococcus aureus* and *Escherichia coli*.

Nutritional Values Of Dragon Fruit

In dragon fruit the nutritional value differs between their species, origin, and harvesting period. Composition of nutrition and phytoconstituents of red dragon fruit were different because of the influencing growing environmental conditions. Dragon fruit contains mineral like sodium, potassium, calcium, phosphorus, magnesium and vitamins. Dragon fruit rich in mineral, glucose, fructose, dietary fiber, vitamins and well known it is rich for vitamin C, phosphorus, calcium, and antioxidants. The fresh fruit consists of 82-83% moisture, 0.17-0.22% protein, 0.22-0.62% fat, 0.7-0.9% fiber. 100gm of fresh fruit pulp contain 6.4-8.6mg calcium, 30-36 mg phosphorus, 0.4-0.60 mg iron and 7-8 mg vitamin C. The red pulp rich in betalains, which meets in antioxidant product and natural food color. The red layer of fruit has an abundant vitamins includes B1, B2, B3, C. As compared to subtropical fruit it has large antioxidant property. It also has higher fiber content, mineral such as calcium, iron, phosphorus, has less amount of carbohydrates and zero fats. The seed contains 50% of essential fatty acids such as linoleic acid and linolenic acid. The amount of ascorbic acid is higher in the premature stem

in comparison to the flesh of dragon fruit, which is used for the prevention of the diseases such as anaemia, diabetes, cancer. Dragon fruit is substantially a source of pectin and were excellent for its high source of polyphenolic compounds an antioxidant activity.

Different Types of Product Formulated by Dragon Fruit

A single part of dragon fruit such as seed, peel, flower bud, dried flowers, and pulp has large content of nutritional value such as fibers, antioxidants, Vitamin C, minerals such as calcium, magnesium, and phosphorus. The fruit contain nutrition aspect, the researcher can processed the fruit into different products which increases the compliance value of the consumers. The peel of the fruit acts as an antimicrobial agent, natural colorant and antioxidants. Apart from ripe fruit, the stem and fresh flower bud were also edible and used as vegetable. The antioxidant rich tea prepare by using the dehydrated dragon fruit.

The minimal process has been followed for the formation of the product it preserve the essential sensory attributes. The internal flesh of dragon fruit is used to make juice, jellies, wine. Peel of the dragon fruit used for the extraction of colorant used in the product as well as it rich in pectin. The seeds of dragon fruit were used to extract the oil and it contains about 50% of essential fatty acids. The seeds are used as an important ingredient in many product of foods such as ice cream, syrups, candy, yogurt, pastries and cold drinks.

1.JUICE

The consumers likes the less viscous, less dense, clear and nutritional juice of fruit which contain vitamin C, polyphenols and antioxidant action. The phenolic and betacyanin compound were the main components accountable for the antioxidant property of dragon fruit. The fruit has the characteristics that it has high turbidity and viscosity with colloidal suspension. So, the clarification is done for achieving the commercial importance and acceptability. By the degradation of pectin and starch present in juice which are responsible for the haziness in juice and therefore it increases the juice stability, yield and clarity. By applying low heat results in retaining two third of betacyanin content in pitaya after pasteurization. High content of mucilage in pitaya creates problem in juice clarification by filtration method, so it requires high dose of enzymes but in the presence of mucilage provides by minimizing the degradation of the betacyanin during heating and storage. The storage stability of juice is $20 \pm 2^{\circ}\text{C}$ which can increase by adding 1% of acetic acid which reduces damage caused by light and provides to use clarified packaging material

For highest retention of betalains like betacyanins and betaxanthins , lower temperature enzyme liquefaction process which is effective to retained 80% betalain with decrease in viscosity while there is indirectly increases in the juice yield 26-40% to 47-59% .The clarification of fruit juice is done by using the Pectinex Ultra SP-L enzyme was performed by Nur Aliaa et al. and the condition were recommended such as 0.06% concentration of enzyme, 49°C maceration temperature and 40 min maceration time period to prepare 80.3% juice yield. Juice of dragon fruit is the most important product wider attraction. It includes the factor like nutrition, organoleptic properties, longer shelf life, better compliance and make the juice effective and valuable product for both the consumers and food industry.

2.JUICE POWDER

Dragon fruit is more convenient because of high shelf life, economically viable and as natural colorant in different products as functional food. For making powder from fruit juice along with the retention of nutritional value and active ingredients. The industrial method that is spray drying which is used to make the powder from the juice of dragon fruit. The method such as spray drying has problems like stickiness and flow are associated with fruit juice this problem can be overcome by using the carriers like gum, starch, tragacanth, lipid, and gelatin used as an excipients to feed the raw material during drying.

For preparing the soft and fine powder of dragon fruit by using spray drying method. The powder also prepared by using peeled of pitaya slices which is first dried in an oven which is followed by grinding in grinder to achieve the fine particle size ranges upto 300 µm. The maltodextrin is used as binding agent in concentration of 60% with the powder to make the tablet also. It was determine that below the specified spray dryer operating condition, free flowing natural powder was not form. The juice powder product is consumed by consumers to meet all the nutritional deficiencies whereas it also serves the targeted group with specific health problems.

3.WINE

The process such as fermentation is prefer for the formation of the product that is wine and it make by using the dragon fruit which not only improves the shelf life of the product but also increases the flavor of the product. The pasteurization is done for the fermentation of the fruit juice which shows positive action on the bioactive components showing high amount of acetic acid, betacyanin, phytosterole, flavonoids, phenolic content. Formation of wine by using juice including the ingredients such as saccharose and yeast by preparing special conditional storage like refrigeration and temperature maintenance.

CONCLUSION

The fruit is considered as potential fruit. Pitaya, owing to its medicinal and nutritional properties, which can be used in to treat diseases such as to reduce the risk of chronic diseases. Pitaya peel peel used to extracted the colorant which is a prepare from natural source. This review mainly focus on the medicinal properties of the pitaya such as beneficial effect on inflammation, beneficial effect on diabetes, beneficial effect on cancer, on aging skin, on eyes includes disease and various formulation of pitaya. It also includes the nutritional values containing minerals, vitamins, fats, carbohydrates, proteins, fatty acids and antioxidants.

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