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A Review on Dragon Fruit

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ABSTRACT:
The two different species of what is known as dragon fruit are Hylocereus polyrhizus and Hylocereus undatus and both are members of the Cactaceae family. The many antioxidants found in dragon fruit, such as betalains, which are hydroxycinnamates, and flavonoids protect cells from unstable molecules known as free radicals, which are associated with aging and the risk of chronic disease. Dragon fruit also contains significant amounts of vitamin C and phytoalbumins, which are known for their antioxidant properties and can tighten and soften your skin while giving you a radiant, healthy complexion. Regular use of this prepared dragon fruit face cream can help slow down the aging process. In addition, burns and acne are treated with it.

KEY WORDS - acne, sunburn Dragon fruit, herbal cream, anti-ageing

INTRODUCTION

Dragon or dragon fruit is the fruit of several species of cacti native to the Americas. Hylocereus polyrhizus and Hylocereus undatus are two varieties commonly called dragon fruits, belonging to the Cactaceae family, and dragon fruits have gained popularity in many countries around the world. The fruit of various Native American cactus species is known as dragon or dragon fruit. Both Hylocereus polyrhizus and Hylocereus undatus, often known as dragon fruits, are members of the Cactaceae family and are becoming increasingly popular in many nations around the world. Dragon fruit can weigh up to one kilogram when its spines sprout. Depending on the species, the edible flesh of dragon fruit can be either red or white, while the color of the skin can range from yellow to dark red. It is characterized by a large number of tasty little black seeds. Naturally occurring flavonoids, mostly found in the skin of dragon fruit, are abundant in dragon fruit. In addition, dragon fruit is rich in phytoalbumins, which are valued for their powerful antioxidant properties. It supports our body's defense against free radicals. By reducing the amount of free radicals, it also helps delay the aging process. The result is skin that looks taut, supple and youthful. Large concentrations of vitamins C, B1, B2 and B3 can be found in dragon fruit. In addition, it is rich in some vital minerals including calcium, phosphorus and iron. Plus, it has a healthy amount of fiber, niacin, protein, and last but not least, it's 80% water. Therefore, it is reasonable to refer to it as a "super fruit" that improves nutrition and cures physical ailments. In addition, dragon fruit can play a significant role in your daily beauty routine. Unsaturated fats from dragon fruit seeds reduce harmful cholesterol.[1] It is a long-day plant with a beautiful night-blooming flower that is nicknamed the "Noble Woman" or "Queen of the Night". The fruit is also known as Strawberry Pear, Dragon Fruit, Pithaya, Night Blooming Cereus, Belle of the Night, Conderellaconderella and Jesus in the Cradle. The fruit is named pitaya because of the bracts or scales on the skin of the fruit and hence the name pitaya means "scaly fruit". It has an ornamental value due to the beauty of its large flowers (25 cm), which bloom at night; they are creamy white in color. It is considered as a fruit crop of the future (Gunasena and pushpakumara, 2006 and Gunasena et al., 2006)[2]. The biggest advantage of this crop is that it will grow for about 20 years after planting, and about 800 dragon fruits can fit in 1 hectare. It is grown commercially in Israel, Vietnam, Taiwan, Nicaragua, Australia and the United States of America (Merten, 2003)[3].

Nutritional Safety and Importance of Dragon Fruit:

The approximate nutritional values in g or mg per 100 g of the edible part of the white-fleshed dragon fruit are as follows: moisture (85.3%), protein (1.1), fat (0.57), crude fiber (1.34), energy (Kcal) (67.7), ash (0.56), carbohydrates (11.2), glucose (5.7), fructose (3.2), sucrose (not detected),

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sorbitol (0.33); vitamin C (3.0), vitamin A (0.01), niacin (2.8), Ca (10.2), Fe (3.37), Mg (38.9), P (27.75) , K (272.0), Na (8.9) and Zn (0.35) and in fruits with red flesh moisture (82.5-83.0), proteins (0.159-0.229), fat (0.21- 0.61), crude fiber (0.7-0.9) and ascorbic acid (8-9) (Jaafar et al., 2009)[4]

Botanical classification:

Dragon fruit belongs to the botanical family Cactaceae and genus Hylocereus. This genus is mainly characterized by climbing vine cacti with aerial roots that bare attractive berries with large scales, as reported by Fournet, (2002)[5]. Hylocereus spp. they are diploid (2n = 22) (De Dios, 2004 and Lichtenzveig, et al. 2000)[6,7]

There are many discrepancies regarding the botanical classification of Hylocereus (Mizrahi et al., 1997 and DaubresseBalayer, 1999), which are probably explained by similar morphological characteristics and/or environmental conditions. The classification of Britton and Rose (Britton and Rose., 1963) [6] was commonly followed, but the results of recent genetic analyzes were also taken into account (Tel-Zur et. al., 2004) [8].

Dragon fruit:

Dragon fruit (Hylocereuspolyrhizus), or pitaya, is grown on a large scale in areas with tropical climates such as Central and South America, as well as Malaysia, Vietnam and Thailand in Southeast Asia. Recently, dragon fruit has appeared as a new source of food ingredients, which has a natural red-purple color, which is a great source of dyes, yet it is rich in antioxidants, fiber. Vitamin C, minerals and phytoalbumins that have high nutraceutical properties.[9]

FIGURE: DRAGON FRUIT

TAXONOMY:

Kingdom:Plantae
Division: Spermatophyta
Class: Dicotyledonae
Ordo: Cactales
Family: Cactaceae

Health benefits of dragon fruit:

1. High in Nutrients. Share on Interest.
2. May Help Fight Chronic Disease.
3.Loaded With Fiber.
4. Promotes a Healthy Gut.
5. Strengthens Your Immune System.
6. May Boost Low Iron Levels.
7. Good Source of Magnesium.[9]

MEDICINAL PROPERTIES OF DRAGON FRUIT

Antidiabetic properties: Diabetes mellitus is one of the most common systemic diseases in the world, associated with hyperglycemia due to a malfunction of the pancreas in the production of insulin and/or insufficient sensitivity of cells to the action of insulin (American Diabetes Association 2009). neem (Azadirachta indica), ivy gourd (Coccinia indica), bitter gourd (Momordica charantia), jam (Syzygiumcumini), aloe vera (Aloe barbadensis Miller) and chicory (Cichorium intybus) (Ocvirk et al. 2013; Kooti et al. 2016; Adinortey et al. 2019). Medicinal plants generally exhibit antidiabetic effects through biochemical mechanisms such as restoration of pancreatic β-cell function, improvement of insulin receptor sensitivity, stimulation of insulin secretion, inhibition of hepatic gluconeogenesis, increased glucose absorption and inhibition of glucose-6-phosphatase, β-amylase activity and β -glucosidases (Adinortey et al. 2019).[10,11]

Antioxidant Activities: There is increasing use of natural antioxidant substrates in medicinal plants with a preventive effect on cell damage by free radicals, which are involved in many diseases such as cancer (Young and Woodside 2001). Thus, the popularity of many plants in disease prevention could be attributed to the antioxidant (radical scavenging) properties of their essential phenolic compounds (such as flavonoids, phenolic acids, stilbenes, lignans and tannins), alkaloids and vitamin C (Pietta 2000 Nyamai et al., 2017; Several studies have linked antioxidant scavenging activity to total phenolic compound content (Bertoncelj et al. 2007; Wu and Ng 2008).Phenolic compounds such as phenolic acid (e.g. gallic acid) and polyphenol (e.g. flavonoids) are highly correlated with antioxidant activity. (Nurliyana et al. 2010)

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and some of them have been shown in vitro to be more effective antioxidants than vitamin C and vitamin E (α-tocopherol)[12,13,14,15,16,17,18,19]

Antiviral and antimicrobial activity:

The physiological and biochemical basis of plant resistance to various pathogens (i.e. viruses, fungi or bacteria) is related to secondary metabolites synthesized by plants after microbial infection (García-Mateos and Pérez-Leal 2003; Montes-Belmont 2009; Hernández-Alvarado et al. . 2018; Mickymaray 2019) Various criteria can be used to classify secondary metabolites involved in plant immunity, i.e. core structure, common precursors and mechanisms of action. According to the mode of biosynthesis and accumulation of defensive phytochemicals, one of the most frequently used criteria is the defense metabolites produced and stored constitutively in plant tissue, phytoanticipins (e.g. de novo in response to infection are called phytoalexins (e.g. camalexin, phenylalanine-derived phytoalexins such as resveratrol, isoflavonoids such as glyceolines or terpenoids) (Müller and Börger 1940; Van Etten and Bateman 19281, Paton 1951; 25,26,27). The benefits of plant consumption against a wide range of pathogenic microorganisms are associated with various bioactive compounds, including secondary metabolites with higher antimicrobial properties, such as flavonoids (flavones, flavonols, flavanols, isoflavones, anthocyanidins), terpenoids (sesquiterpene lactones, diterpenes, triterpenes, polyterpenes), steroids, phenolic acids (hydroxybenzoic, hydroxycinnamic acids), stilbenes, lignans, quinones, tannins, coumarins (simple coumarins , furanocoumarins, pyranocoumarins), alkaloids, glycosides, saponins, lectins and polypeptides with great antimicrobial potential, (Iwu et al. 1999; Chanda et al. 2010; Naseer et al. 2012; Fadipe et al. 2013; Umer et al. 2013; Taher et al. 2014, Mickymaray 2019).[28,29,30,30,319,30,32,33]

Wound healing activity:

Wound healing is a complex process consisting of several phases aimed at restoring the integrity of damaged tissues and involving different cell populations, the extracellular matrix and the action of soluble mediators such as growth factors and cytokines. Wound healing is a daily challenge in clinical pathology and often fails without appropriate physiologic, endocrine, and nutritional support (Velnar et al. 2009).[34] Tsai et al. (2019) used ethanol-aqueous extracts of different parts of Hylocereus polyrhizus such as bark, stem and flower to conduct an in vitro test of their wound healing properties. The NIH-3T3 fibroblast cell line was used to test the ability of cell migration in the scratch, as it were called. The result showed that the pith and flower sink from the fruits in 95% aqueous ethanol at a concentration of 1000 μg ml–1 promoted the migration of fibroblasts after 24 hours, which play a vital role in the wound healing process. In this study, extracts of stem, peel and flower in 95% aqueous ethanol of dragon fruit had high activity in protecting against DNA damage. Among the powerful antioxidants present in dragon fruit extracts are the content of phenolics and flavooids, which are involved in DNA protection and wound healing, among others, properties with potential applications in the pharmaceutical, cosmetic and food industries.[35] Perez et al. . Cut and incision wounds were given on the back of each mouse and treated with different concentrations (0.05%, 0.1%, 0.2%, 0.4% and 0.5%) of aqueous extract (200 μL per wound). The cally hat is worn twice a day for seven days. Both snake species are monitored daily for claw and trail changes and evolution (including the number of days required for trail shedding). In addition, the tensile strength was measured on the tenth day after removing the sutures on the incision wound on the seventh day. The results showed that topical application of tape or extract significantly contributed to wound healing and H. undatus had no hypoglycemic activity. However, the curative activity is significant only for the water extract of flowers and leaves, while the pulp and bark extracts show wound curative activity and the bark extract has a weak cicatrizing effect. H. undatus flower extract has the most effective effect on the area in question. Perez et al. . the stage [36]

Anti-hyperlipidemic and anti-obesity measures:

Hernavati et al. (2018) showed that pitaya peel powder added to food will contribute to the prevention of hyperlipidemia due to the benefits of its composition: i) high amount of coarse fiber in the peel (69.30% of total dietary fiber, divided by 56.50% insoluble fiber) fiber . and 14.82% soluble dietary fiber), helps reduce energy expenditure because it neutralizes cholesterol and bile acid in the intestines, insulin can increase satiety and increase satiety; ii) Antioxidants, phenols and especially tocotrienols (vitamin E) reduce hepatic and plasma cholesterol levels and LDL-cholesterol concentrations. [37] Suastuti et al. (2018) showed anti-obesity and hypolipidaemic activity of

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methanol meat extract of H. costariscens in obese mice fed meat extract at a dose of 100 mg kg-1 BW in body weight, adiposity index Li, organ weight, visceral fat weight, total cholesterol, low -density lipoprotein, triglyceride, very low-density lipoprotein, and total cholesterol/high-density lipoprotein (HDL) ratio. In contrast, HDL-cholesterol, fecal fat, and cholesterol concentrations were increased in these mice. [38] Sudha et al. (2017) evaluated the antioxidant, antidiabetic and anti-lipase activity of white pitaya (H. undatus) juice extract in vitro. Dragon fruit phytochemical research revealed the existence of bioactive compounds with antioxidant, antidiabetic and antilipase activity, including triterpenoids, alkaloids, flavonoids and saponins. In summary, dragon fruit bioactive compounds, including coarse fiber, phenolics, polyphenols and flavonoids, contribute to reducing the serum lipid profile, because these antioxidants can prevent the absorption of intestinal cholesterol. release through emissions (Hernavati et al. 2018; Suastuti et al. 2018). [37]

Hepatoprotective activity:

A recent study by Par mara et al. (2019) evaluated the possible hepatoprotective properties of a methanol extract of dragon fruit against acetaminophen-induced liver damage in rats. Animals were treated for three days, 30 min before ingestion, with acetaminophen (3 g kg-1 day-1, p.o.), different doses of pitaya methanol extract (300 and 500 mg kg-1, p.o.) and silymarin (200 mg kg-1 1, p.o.), a standardized extract obtained from the seeds of Sily bum marianum widely used in the treatment of liver diseases of various origins, used in the study for comparative purposes. At the end of the last treatment, blood was collected and analyzed for various serum enzymes, and rats were sacrificed for histological studies. The results obtained by Parmar et al. (2019) supported the antioxidant and hepatoprotective potential of pitaya at the enzymatic and histological levels: levels of the enzymes alanine and aspartate aminotransferase, alkaline phosphatase, total and direct bilirubin, lactate dehydrogenase, gamma-glutamyltransferase and total protein, as well as oxidative stress parameters such as malondialdehyde levels, reduced glutathione and superoxide dismutase and catalase activity, were restored toward normal by dragon fruit extract comparable to silymarin.[39] Cauilan (2019) evaluated the protective effect of oral administration of crude and ethanolic extracts of H. polyrhizus fruits (2,500 mg kg–1 TH) compared to standard silymarin treatment in tetrachloromethane (CCl4)-challenged rats. liver damage. Hepatoprotective activity was detected by a significant decrease in serum glutamate-pyruvic transaminase levels and serum glutamate-oxo-aloacetic transaminase levels in rats administered H. polyrhizus extracts compared to the control group (without dragon fruit extract) and silymarin. treatment group. This study suggested that the hepatoprotective activity of pitaya could be related to its rich composition of antioxidants such as triterpenes, flavonoids, glycosides, tannins, saponins and alkaloids. Cardiovascular protective activity. Cardiovascular diseases are the leading cause of death for men and women in developed countries and account for up to a third of all deaths worldwide. Increased arterial stiffness is associated with an increased risk of cardiovascular events. Lifestyle changes and/or appropriate treatment can reverse the stiffness of the arteries associated with some medical conditions. The therapeutic and preventive potential of pitaya against diseases related to oxidative stress, mostly related to its bioactive compounds such as antioxidants, has attracted the interest of several studies.[40] Eldeen et al. (2020) investigated the anti-inflammatory properties of the pulp and peel of H. undatus and identified its main bioactive compounds. They found beta lines known to have high radical scavenging activity and reported for the first time the presence of squalene (a polyunsaturated hydrocarbon with the formula C30H50 and made up of six isoprene units) in meat. dominant fruit component (13.2%). According to their results, squalene exhibited inhibitory activity against three pro-inflammatory enzymes, i.e., 5-lipoxygenase, cyclooxygenase-2, and acetylcholinesterase, with EC50 values ranging from 46 to 47 μg ml–1. A study by Eldeen et al. (2020) demonstrated the potential of pitaya to manage neuronal and inflammatory conditions through various mechanisms including leukotrienes, prostaglandins, and cholinergic pathways.[41]

Anticancer activity:

The antiproliferative potential of dragon fruit is related to its content of powerful antioxidants such as polyphenol, anthocyanin, betalains, steroids and triterpenoids (Wu et al. 2006; Luo et al. 2014; Guimarães et al. 2017).[42,43] Among these compounds , in addition to antimicrobial and antiviral properties, betalains can also inhibit lipid peroxidation,

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cyclooxygenase enzymes (COX-1 and COX-2), and human tumor cell proliferation (Strack et al. 2003; Reddy et al. 2005 [44,45,46]

Antihyperlipidemic and anti-obesity effects:

In order to evaluate the effect of red dragon fruit peel powder (H. polyrhizus) on blood lipid levels, Hernawati et al. (2018) fed different groups of hyperlipidemic male Balb-C mice with different doses of pitaya bark powder ranging from 50 to 200 mg kg–1 body weight (BW) for 30 days. After treatment, blood samples from each group were analyzed for total cholesterol, triglycerides, and low-density lipoprotein cholesterol (LDL-c) levels, and the results showed that all of these parameters decreased with increasing doses of red dragon fruit peel powder. .Hernawati et al. (2018) pointed out that pitaya peel powder supplemented in food would contribute to the prevention of hyperlipidaemia due to the advantages associated with its composition: i) high crude fiber content in the peel (69.30% of total fiber, divided into 56.50% insoluble dietary fiber and 14.82% soluble dietary fiber) helps reduce energy intake as it traps cholesterol and bile acids in the small intestine, can increase insulin sensitivity and also increases satiety; ii) the high content of antioxidants, phenol and especially tocotrienol (vitamin E) reduces the level of cholesterol in the liver and plasma concentrations of total cholesterol and LDL-cholesterol.[37] A study by Suastuti et al. (2018) on the antiobesity and hypolipidemic activity of the methanol extract of H. costaricensis meat showed that obese rats fed the meat extract at a dose of 100 mg kg–1 BW significantly decreased their body weight, Lee obesity index, organ weight, visceral fat weight, total cholesterol, low-density lipoprotein, triglycerides, very-low-density lipoprotein, and total cholesterol/high-density lipoprotein (HDL) ratio. In contrast, HDL-cholesterol, fecal fat, and cholesterol concentrations increased in these rats.[38] In summary, bioactive compounds in dragon fruit extracts, including crude fiber, phenolic, polyphenolic and flavonoid content, contribute to the reduction of serum lipid profile, as these antioxidants are able to inhibit the absorption of cholesterol in the intestine, its excretion in the stool (Hernawati et al. 2018; Suastuti et al. 2018).[37,38]

EVALUATION OF THE PREPARATION:

Physical Assessment:

Physical parameters such as color, appearance and consistency were checked visually.

Washability:

Formulations were applied to the skin and then manually checked for ease and extent of washing with water.

pH:

The pH of a 1% aqueous solution of the formulation was measured using a calibrated digital pH meter at constant temperature.[48]

Spreadability:

Spreadability refers to the extent of the area over which the gel is easily spread when applied to the skin or affected area. The bioavailability efficiency of a gel formulation also depends on its dispersion value.[47] Spreadability is expressed as the time in seconds for two slides to slide off the gel placed between the slides under a certain load. Less time needed to separate the two slides, better spreadability. Two sets of glass slides standard dimensions were adopted. The herbal gel formulation was placed on one of them slides. The second slide was placed on top of the gel so that the gel was sandwiched between two slides in the area occupied by a distance of 6 cm along the slide. 100 gm the weight was placed on the upper slide so that the gel between the two slides was compressed evenly from a thin layer. The weights were removed and the excess gel adhered the slides were scrapped. The two slides were fixed so that they would stand without a single thing interference & in such a way that only the upper slide slides freely by the force of weight attached to it. A 20g weight was carefully tied to the upper slide. Time required for the top slide to travel a distance of 6 cm7 separated from the lower slide under the influence weight was recorded. The experiment was repeated three times, both formulated gels and marketed gel and mean time required to calc.[47,49]

Spreadability was calculated using the following formula:

$S=M\times L/T$

Where, S- Spreadability

M- Weight tied to the top slide (20gm).

L- Length of glasses (6.5 cm).

T- Time in sec.

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