

## To Review On the Dragon Fruit

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### Abstract.

Red dragon fruit (*Hylocereus polyrhizus*) is one of Indonesia's commodities widely consumed and developed nowadays. Dragon fruit or pitaya is a non-local fruit that is much favored by the public because it has efficacy, benefits, and high nutritional value. The most well-known efficacy of dragon fruit is its antioxidant content. This article aims to explain the characteristics and postharvest handling of dragon fruit. Dragon fruit can be consumed directly or processed into juice, jam, syrup, and other products. These preparations of processed dragon fruit have a by-product, namely dragon fruit peel, that has not been used optimally. Dragon fruit peel is 22% compared to whole fruit and contains the most polyphenols, a source of antioxidants. Furthermore, every 100 g of dragon fruit peel contains 150.46 mg of betacyanin pigment.

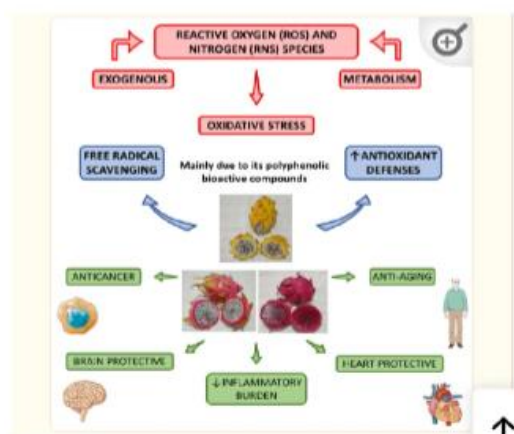
Dragon fruit peel also contains vitamins C, E, and A, alkaloids, terpenoids, flavonoids, thiamine, niacin, pyridoxine, cobalamin, phenolic, carotene, and Phyto albumin. Dragon fruit is a non-climacteric fruit, so it must be harvested at the right level of maturity. Dragon fruit is harvested 28 to 30 days after the flowers bloom. After harvesting, the dragon fruit is sorted by color and shape, followed by cleaning, grading, labeling, and distributing. Currently, several technologies can extend the shelf life of dragon fruit, such as coating it with wax or cassava starch and applying the Modified Atmosphere Packaging (MAP).

**Keywords:** Dragon Fruit · Dragon Fruit Peel · Modified Atmosphere Packaging (MAP)



### I. Introduction

The red dragon is one of the fruits widely consumed and developed in Indonesia today. Dragon fruit or pitaya is a tropical fruit under the cactus family and Cactaceae. It is native to Mexico, Central America, and South America. However, it is also cultivated in Asia, such as Taiwan, Vietnam, Philippines, Malaysia, and Indonesia. Dragon fruit is a non-local fruit much favored by the public because it has efficacy, benefits, and high nutritional value. Dragon fruit is consumed directly or processed into juice, jam, syrup, and other products. The preparations of processed dragon fruit produce a peel that has not been optimally utilized even though it takes 22% proportion compared to the whole fruit. Dragon fruit peel contains the most polyphenols, a source of antioxidants.



### Antimicrobial Effects

In a study to investigate the antimicrobial effect of red pitaya peels, Temak et al. found that the extract has efficient in vivo and in vitro effects against several microorganisms, such as *Escherichia coli* and *P. aeruginosa*.

Sushmitha et al. investigated the effects of *H. undatus* seeds in Gram-negative and Gram-positive bacterial species and found that the minimum inhibitory concentration is 50 µL for *Staphylococcus aureus* and *Escherichia coli*. Tenore

et al. [80] also found antimicrobial activity for hexane, chloroform, and ethanol extract of the skin of *H. undatus* and showed inhibition of the growth of Gram-negative and Gram-positive bacteria.

#### Anti-Cancer Effects

Some studies have shown the anti-cancer potential of dragon fruit. Divakaran et al. aimed to evaluate the ability of this fruit to produce nanoparticles and found they can significantly inhibit the growth of MCF-7 breast cancer cells.

Another study showed that the fecal fermentation of pitaya oligosaccharides augmented the populations of *Lactobacillus* and decreased the populations of *Bacteroides* and *Clostridium*, and resulted in the production of lactic acid, acetic acid, propionic and butyric acids that can inhibit Caco-2 cells and has a potential for risk reduction in colon cancer

#### Antioxidant activities.

Exploitation of natural antioxidant substrates in medicinal plants with pre-ventive influences on cellular damage caused by free radicals, which are involved in many diseases like cancer, has been increasing (Young and Woodside 2001). us, the popularity of many plants in disease prevention could be attributed to the antioxidant (radical-scavenging) properties of their constituent phenolic compounds (such as flavonoids, phenolic acids, stilbenes, lignans and tannins), alkaloids, and vitamin C (Pietta 2000; Nyama et al. 2016; Gan et al. 2017; Pehlivan 2017; San Miguel-Chávez 2017). Several studies link the scavenging activity of antioxidants

#### Anti-Diabetic Effects

Many studies have demonstrated that the consumption of red pitaya can reduce glycemia in humans. In a systematic review and meta-analysis, Poolsup et al. [8] found that dragon fruit can be used to prevent diabetes.

The study of Putri et al. showed that pitaya associated with metformin could significantly decrease glycemia and HOMA-IR (homeostasis model assessment-Insulin Resistance) in type 2 diabetic rats. The authors suggested that red dragon fruit could be used as an alternative to metformin due to its effectiveness in decreasing HOMA-IR (and thus, insulin resistance) and malondialdehyde levels. Moreover, the consumption of red pitaya promoted a hypoglycemic effect in dyslipidemic C57BL/6 mice, contributing to reducing the risk of insulin resistance [85]. Fadlilah and Sucipto found

that pitaya (*H. polyrhizus*) effectively reduces fasting blood sugar levels in students who consume high calories daily. Marietta et al. [86] investigated the effects of red pitaya skin extract on glycemia and lipid profile of diabetic and dyslipidemic male Wistar rats and found no significant reduction in glycemia.

#### Anti-anaemia activity

Pitaya contains essential nutrients, including precursors required for erythropoiesis, such as iron (Fe), vitamins C, E, B12, thiamine, and riboflavin (Tenoret et al. 2012). Rahmawati et al. (2019) conducted a study to evaluate the effect of dragon fruit on postpartum mothers, who are considered susceptible to anaemia. Postpartum mothers were supplied with 400cc of *H. polyrhizus* fruit juice (obtained from 500g of pitaya) for 14 days. Results showed that levels of hemoglobin, hematocrit, and erythrocytes increased significantly in the treatment group, compared to the control group. According to Rahmawati et al. (2019), the high content of vitamin C in the dragon fruit is responsible for its anti-anaemia activity, as it facilitates the absorption of iron needed in the production of blood and non-heme iron

#### Anti-Lipidemic Effects

The use of red pitaya can improve lipid profile, decrease total cholesterol, LDL-c, and triglycerides, and increase HDL-c levels in normocholesterolemic subjects, pre-diabetic, and type 2 diabetic patients. The consumption of red pitaya also showed benefits in lipid levels in dyslipidemic C57BL/6 mice, contributing to reducing cardiovascular diseases.

## II. Conclusion

Dragon fruit is a fruit that contains various benefits from the fruit and the peel of the fruit. Dragon fruit has a characteristic red color, has a soft, scaly peel, and has a considerable number of black seeds. The fruit peel that takes 22% of the whole fruit contains polyphenols as antioxidants and natural anthocyanin dyes which are pretty high. Dragon fruit has the potential for herbal tea beverage products containing high antioxidants and natural dyes. Using the human senses, sorting dragon fruit crops is based on color, size, and physical defects. Dragon fruit can last up to 10 days at room temperature. After two weeks of storage, dragon fruit is still in reasonably good condition at a temperature of 14 °C. The flesh on the skin of dragon fruit can be used in making herbal teas, jelly, syrup, and various

kinds of functional food products that are beneficial to the body. Authors' Contributions. The manuscript was written through contributions of all authors. All authors have given approval to the final version of the manuscript.

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