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Reya Biswas

Assistant Professor,
Department of Education,
Life Science, Rishi Arabindo
College of Education,
West Bengal, India

Debasmita Sarkar

Ph.D. Scholar, Department of
Food and Nutrition, Swami
Vivekananda University,
Barrackpore, West Bengal,
India

Sakshi Mishra

Assistant Professor,
Department of Dairy
Technology, Charutar Vidya
Mandal University, Anand,
Gujarat, India

Sandip Das

Faculty, Department of
Nutrition and Dietetics,
Vidyasagar Institute of
Health, Rangamati, Paschim
Medinipur & Research Scholar,
Department of Centre for Life
Sciences, Vidyasagar
University, West Bengal, India

Correspondence

Sandip Das

Faculty, Department of
Nutrition and Dietetics,
Vidyasagar Institute of
Health, Rangamati, Paschim
Medinipur & Research Scholar,
Department of Centre for Life
Sciences, Vidyasagar
University, West Bengal, India

Dragon fruit: Nutritional composition and therapeutic value

Reya Biswas, Debasmita Sarkar, Sakshi Mishra and Sandip Das

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Abstract

This review explores the nutritional profile and therapeutic benefits of dragon fruit (*Hylocereus spp.*), also known as pitaya. Dragon fruit is rich in vitamins, minerals, fibre, and antioxidants, particularly betalains and polyphenols, which contribute to its health-promoting properties. Studies have highlighted dragon fruit's role in supporting cardiovascular health, regulating blood sugar levels, and enhancing immune function. This review synthesizes current research on the nutritional composition and potential health benefits of dragon fruit, discussing its therapeutic value for managing metabolic disorders, improving digestion, and preventing chronic diseases.

Keywords: Dragon fruits, human health, nutrition, therapeutic value, antioxidant, bioactive compounds

Introduction

Dragon fruit, primarily grown in tropical and subtropical regions, has gained popularity worldwide due to its vibrant color, unique taste, and potential health benefits. The fruit's nutritional composition and bioactive compounds are associated with a range of therapeutic effects, including antioxidant, anti-inflammatory, and hypoglycemic properties (Maheshwari *et al.*, 2020) [6]. This review examines the nutritional profile of dragon fruit, focusing on its functional and therapeutic potential, which makes it a valuable addition to a health-focused diet.

Nutritional Composition of Dragon Fruit

Macronutrients and Micronutrients

Dragon fruit is relatively low in calories and provides a balance of carbohydrates, fibre, and protein. It contains essential micronutrients such as vitamin C, vitamin B complex, iron, calcium, and phosphorus, making it a nutrient-dense food choice (Gunasena *et al.*, 2019) [5].

Bioactive Compounds

Dragon fruit is a rich source of antioxidants, including betalains, flavonoids, and phenolic compounds, which play a critical role in preventing oxidative stress and cellular damage (Esquivel *et al.*, 2021) [4]. The presence of betalains, specifically, gives dragon fruit its vibrant red and purple hues and is linked to its anti-inflammatory effects (Chen *et al.*, 2020) [2].

Dietary Fibre and Prebiotics

High in dietary fibre, dragon fruit promotes digestive health by acting as a prebiotic. It contains oligosaccharides that support the growth of beneficial gut bacteria, potentially improving gut health and reducing digestive disorders (Phebe *et al.*, 2018) [8].

Therapeutic value and health benefits

Antioxidant Properties

The high antioxidant content in dragon fruit, particularly from its betalains and flavonoids, helps reduce oxidative stress, protect cells from damage, and may lower the risk of chronic diseases like cancer and cardiovascular disease (Esquivel *et al.*, 2021; Tewari, 2019) [4, 11].

Table 1: Nutritional composition of dragon fruit from previous studies

Nutrient	Content per 100g	Health Benefits	Reference
Calories	50-60 kcal	Low-calorie; supports weight management	Ariffin AA, <i>et al.</i> (2018) [11]
Carbohydrates	11-13 g	Provides energy; dietary fiber aids digestion	Swain T, Mishra S, (2020) [9]
Dietary Fiber	3-5 g	Improves gut health; lowers cholesterol	Esquivel P, Stintzing FC, Carle R, (2021) [4]
Protein	1.1-1.4 g	Aids muscle repair and growth	Maheshwari S, <i>et al.</i> (2020) [6]
Fats	0.1-0.6 g	Minimal fat content; heart-friendly	Phebe D, <i>et al.</i> (2018) [8]
Vitamin C	3-25 mg	Boosts immune function; antioxidant	Gunasena H, Tharindumala KP, (2019) [5]
Calcium	6-10 mg	Supports bone health	Chen Y, <i>et al.</i> (2020) [2]
Iron	0.3-0.6 mg	Important for blood health	Patel S, Sanches MA, (2019) [7]
Magnesium	8-12 mg	Vital for muscle and nerve function	Swain, T., & Mishra, S. (2020) [9]
Betalains	Present, high in red/purple varieties	Antioxidant and anti-inflammatory properties	Esquivel P, <i>et al.</i> (2021) [4]
Flavonoids	Present, 0.1-0.3 mg	Protects against chronic diseases	Maheshwari S, <i>et al.</i> (2020) [6]

Anti-Diabetic and Blood Sugar Regulation

Dragon fruit has been shown to help regulate blood glucose levels due to its low glycemic index and high fibre content. Studies suggest it can improve insulin sensitivity and potentially reduce fasting blood glucose, making it beneficial for managing diabetes (Chen *et al.*, 2020) [2].

Cardiovascular health

The polyunsaturated fatty acids and fibre in dragon fruit may contribute to heart health by lowering LDL cholesterol levels and improving blood lipid profiles. Additionally, its antioxidants reduce oxidative stress, which can mitigate the risk of cardiovascular diseases (Gunasena *et al.*, 2019) [5].

Anti-Inflammatory and Immunomodulatory Effects

Dragon fruit’s betalains exhibit anti-inflammatory properties that support immune health. Research indicates that dragon fruit consumption can enhance immune response and decrease inflammation, potentially aiding in managing inflammatory conditions (Maheshwari *et al.*, 2020; Samanta *et al.*, 2022) [6, 12].

Comparison with Other Functional Fruits

While dragon fruit has notable nutritional and therapeutic benefits, comparing it with similar tropical fruits such as acai berries, goji berries, and kiwi helps underscore its unique bioactive composition. Compared to these fruits, dragon fruit is particularly high in betalains and dietary fibre, providing distinct advantages for antioxidant support and digestive health (Phebe *et al.*, 2018) [8].

Table 2: Therapeutic value and health benefits of dragon fruit from previous studies

Health Benefit	Bioactive Components	Therapeutic Effects	Reference
Antioxidant Properties	Betalains, flavonoids, polyphenols	Protects against oxidative stress, reduces cell damage	Esquivel P, Stintzing FC, Carle R, (2021) [4].
Anti-Diabetic Effects	Dietary fibre, low glycemic index	Helps regulate blood glucose, improves insulin sensitivity	Chen Y, Chen C, Chen P, (2020) [2].
Cardiovascular Health	Fibre, polyunsaturated fatty acids	Lowers LDL cholesterol, improves lipid profiles	Gunasena H, Tharindumala KP, (2019) [5].
Anti-Inflammatory Effects	Betalains, polyphenols	Reduces inflammation, supports immune response	Maheshwari S, Chauhan AK, Kumar V, (2020) [6].
Digestive Health	Dietary fibre, oligosaccharides	Acts as a prebiotic, promotes gut microbiota health	Phebe D, Rosliza R, Tien T, (2018) [8].
Immune System Support	Vitamin C, antioxidants	Enhances immune function, protects against infections	Rath B, (2017) [13]
Anti-Cancer Potential	Polyphenols, antioxidants	Inhibits tumor growth, potential to reduce risk of cancer	Patel S, Sanches MA, (2019) [7]

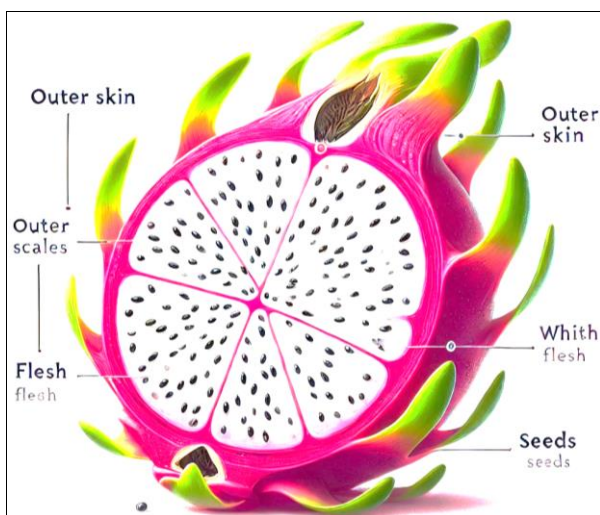


Fig 1: Structure of dragon fruits (Tarte *et al.*, 2023) [10]

Future Research and Applications

Further studies on dragon fruit’s bioactive compounds, mechanisms of action, and therapeutic dosages are needed to establish clearer health benefits. Research on incorporating dragon fruit into functional foods and dietary supplements could support its use in modern health practices and therapeutic diets.

Conclusion

Dragon fruit is a nutrient-rich tropical fruit with a unique composition of antioxidants, dietary fibre, and bioactive compounds that confer a range of health benefits. Regular consumption may promote cardiovascular health, support blood sugar regulation, and enhance immune function. As research progresses, dragon fruit's value as a functional food in promoting health and preventing chronic diseases will likely become even more prominent.

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