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A review on nutritional importance and health benefits of papaya (*Carica papaya* L.)

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Abstract

Papaya fruit is famous for their abounded nutritional and medicinal values. It comes early in bearing, produces a fruit in a year and fruit production is quite high in per unit area. Papaya fruits offer tremendous dietary antioxidants. Apart from antioxidant properties, papaya fruit is the rich source of nutrients, vitamins and minerals. Papaya fresh fruit is commonly used as a carminative, stomachic, antiseptic and diuretic in many countries in the world. The nutrients and phyto-chemicals contained in papaya fruit helps in digestive systems, reduce inflammation, support the working of cardiovascular, immune and may also help in prevention of colon, lung and prostate cancers. Hence this review looks the nutritional and health benefits of papaya.

Keywords: Papaya, fruit, health, nutritional, medicinal etc.

Introduction

Papaya (*Carica papaya* L.) is a very important fruit crop of tropical and subtropical regions of the world belonging to the family caricaceae. Papaya is an ideal fruit for growing in kitchen gardens, backyards of homes as well as in orchards. Papaya is grown commercially in most of the states in India *i.e.* Kerala, Orissa, Andhra Pradesh, Tamil Nadu, Bihar, Maharashtra, Uttar Pradesh and Karnataka. Different parts of papaya plant such as fruit, latex, roots, leaves, peel, flower and seeds have their own nutritional and health benefits. Papaya fruit is rich source of antioxidant vitamin A, vitamin C, and vitamin E, minerals, magnesium and potassium. Papaya is one of the best natural sources of antioxidant such as β -carotene and vitamin C and fairly rich in minerals that prevent or even reverse serious diseases like cancer, diabetes, heart disease, stomach ulcers and helps in lowering the cholesterol levels (Sies and Stahl, 1995) ^[35].

Papaya Production in India and Chhattisgarh

In India, papaya is being cultivated an area of about 138.0 thousand hectares having annual production of 5989.88 thousand metric tonnes with productivity of 43.30 metric tonnes per hectare. Andhra Pradesh is leading state in papaya production followed by Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Chhattisgarh. Chhattisgarh comes under top ten fruit producing states and sixth position in case of papaya fruit production. Papaya is cultivated in an area of about 14.40 thousand hectares with production of 381.42 thousand metric tonnes and productivity is 26.48 mt/ha. In Chhattisgarh, top three major papaya producing districts are Durg, Mahasamund and Raipur.

Nutritional importance of papaya

The papaya can be considered as a highly nutritious fruit, as it provides many more nutrients on per calorie basis as compared to other fruits. Nutritive value per 100 g of papaya fruit pulp is as under (Table 1).

Fresh papaya fruit has low in calories (32.1 Kcal/ 100 g) therefore, if it consumed in an adequate amount suppresses the appetite for consuming high-calorie foods which can increase weight. Antioxidants can prevent or delay cell damage which caused by free radicals, unstable molecules in response to environmental and other stresses produced by the body.

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The papaya fibre content counteracts food in the small intestine and it prevents the absorption of excess fat preventing constipation by retaining water in the colon and softening the stool. Papayas are best fruit which immediately prevents or solves the problem of constipation. It has a good source of dietary fibre. It has very significant role for keeping the digestive track working smoothly.

Papaya is rich in carotene compound. Carotene has links to improvement of vision and the prevention of night blindness. Papaya is also great impact on hair health because it contains vitamin A, a nutrient necessary for sebum production, which moisturized hair. Vitamin A is also crucial for the growth of all bodily tissues, including skin and hair. Higher intake of it's to a lower risk of developing asthma in adults. Papaya contains carotenes, lycopene and zeaxanthin all three organic compounds which reduces the risk of developing asthma in adults. Papaya contains some unique protein digestive enzymes including papain and chymopapain. These enzymes helps improve healing from burns by lowering the inflammation. Papaya is also a good source of vitamin K and sufficient consumption of vitamin K play vital role for good health because, it improves calcium absorption and may reduce urinary excretion of calcium, means more calcium strengthen and rebuild bones in the body reported that due to nutritional quality rich properties (vitamin C and carotenoids) of papaya (*Carica papaya* L.) have excellent stability in commercial restaurants under the usual handling conditions. Red flesh papaya contains significant quantities (4.1 mg/100 g flesh) of lycopene (Nguyen and Schwartz, 1999)^[19].

Health benefits of papaya

Papaya is used in antacids preparation to prevent constipation and ulcer treatment. Extracts of unripe papaya have shown cytoprotective and antimotility properties, suggesting it's an anti-ulcer fruit (Ezike *et al.*, 2009)^[5].

Fruit, seeds, latex and leaves of papaya contain carpaine, it is an anthelmintic alkaloid that can remove the parasitic worms from the body. High doses of carpaine can be dangerous. Papaya latex as well as the aqueous extracts of papaya seeds have shown potent properties of anthelmintic and anti-amoebic (Satrija *et al.*, 1994 and 1995)^[27, 28].

The unique protein digesting enzymes (papain and chymopapain) of papaya have been reported to help in lowering the healing of burns and inflammation. It lowers inflammation in the body; lessen pain caused by sport injuries. The papaya antioxidant nutrients including vitamin C, vitamin E and beta-carotene can also help in lowering the inflammation. Due its anti-inflammatory properties can relieve the severity of rheumatoid arthritis, osteoarthritis and polyarthritis. It has been also reported that people who consumed the lowest amounts of vitamin C rich foods were three times more likely to develop arthritis than those who consumed the highest amounts (Pattison *et al.*, 2004)^[22]

The papaya fruit is used to treat the wounds in relevant ulcer dressing and for burn dressings. The possible mechanism of action may be antimicrobial activity and proteolytic enzymes chymopapain and papain (Hewitt *et al.*, 2002 and Starley *et al.*, 1999)^[8, 29].

Papaya is top ranked fruit in terms of its exceptional nutritional of carotenoids, flavonoids, fibre, vitamin A, Vitamin C, folate, niacin, thiamin, riboflavin, iron, calcium and fibre contents per serving (USDA, National Nutrient Database for Standard Reference, 2006, Luximon-Ramma *et*

al., 2003, and Lim *et al.*, 2007)^[15, 16]. Therefore consumption of papaya is recommended to evade the vitamin A deficiency, childhood blindness cause in many tropical and subtropical developing countries (Chandrika *et al.*, 2003 and Gouado *et al.*, 2007)^[2, 7].

Jian *et al.* (2007)^[1] reported that regular consumption of lycopene rich fruits (papaya, guava, apricots, pink grapefruit, tomatoes and watermelon) and drinking green tea may greatly lessen the risk of developing prostate cancer in men. They advised that the synergistic effect of regular consumption of both the green tea and lycopene rich fruits reduce stronger than the protection provided by either of them individually.

The papaya latex proteins are considering the antifungal action (Giordani *et al.*, 1996)^[6]. The papaya chitinase has been reported to have antibacterial and antifungal activities (Chen *et al.*, 2007)^[4]. Papaya may also be attributed to bacteriostatic activity due its free radical scavenging potential. Vitamin C and vitamin A are essential for the proper functioning of a healthy immune system. Papaya may be a healthy fruit choice due to rich source of vitamin C and provitamin A (beta-carotene) for preventing such illnesses as recurrent ear infections, colds and flu. It is also been shown to be helpful in the prevention of colon cancer. Rahmat *et al.* (2002)^[23] found that both papaya juice and extracted lycopene showed antiproliferative and anticancer properties on liver cell line (Hep G2) and the juice may be more effective than the extracted lycopene in inhibiting the cancer cell growth. A papaya is good source of fibre. Fibre is very important for smoothly working of digestive track. Eating of enough fibre based food helps to stop constipation (Chen *et al.*, 2007)^[4].

Table 1: Nutritive value of papaya fruit pulp (per 100 g)

Parameter	Papaya pulp (Per 100 g)	Reference
Energy	32.1 Kcal	Nwofia <i>et al.</i> , 2012 ^[21] ; Stephen <i>et al.</i> , 2013 ^[30] ; Bergonio and Perez, 2015 ^[1] ; Vij and Prashar, 2015 ^[34] ; Nam <i>et al.</i> , 2018 ^[20] ; Kumar <i>et al.</i> , 2019 ^[14] ; Santana <i>et al.</i> , 2019) ^[26] .
carbohydrate	7.2 g	
Fibre	0.8 g	
proteins	0.6 g	
Lipids	0.1 g	
Potassium	257 mg	
calcium	24 mg	
Phosphorus	5 mg	
Iron	0.1 mg	
Beta carotene	888 IU	
Vitamin B1 (Thiamine)	0.04 mg	
Vitamin B2 (riboflavin)	0.05 mg	
Vitamin B3 (Niacin)	0.34 mg	
Vitamin C (ascorbic acid)	61.8 mg	

Conclusion

This review surveyed the nutritional and health benefits of papaya because it is rich source of many vitamins, minerals and phyto-chemicals. Different part of the papaya plant possesses tremendous nutritional as well as healing properties for treatment of various diseases. Several studies have confirmed their role to help in curing of different diseases. Consumption of sufficient papaya fruit in daily life leads improvement in health and reduces susceptibility to non-communicable diseases such as constipation, diabetes, cancer etc. However, more wide studies are required to explore the role of papaya in the ailments of gastrointestinal system and prevention of different forms of cancers.

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