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Nutritional Composition of Papaya Peel and it's Benefits

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Abstract

Nowadays, there is a considerable interest in studying the feasibility of using by-products from food processing plants as raw materials for production of value added products since these wastes are inexpensive and highly abundant. The increasing of awareness among consumers is placing greater demand on products that offer maximum health benefits. Therefore a cheap, efficient and environmentally sound utilization of these wastes is needed.

There is a considerable emphasis on the recovery, recycling and upgrading of wastes. In the food industry these by-products can be recovered and often be upgraded to higher value and useful products. Fruits and vegetable processing industry generates substantial quantities of waste. The peels are a source of minerals, organic acids, dietary fibres and certain vitamins which have a wide range of action including antioxidant, anti-mutagenic, cardio-protective, antibacterial and antiviral activities. The by-products of papaya is approximately 20-25% of fruit weight.

Papaya owns second position to hydrogen peroxide and hydroxyl radical scavenging activity and the by-products accounts for approximately 20-25% of fruit weight. The fruit by products are good sources of bioactive compounds such as ß-carotene, lycopene, anthocyanins and flavonoids when compared to fruit pulps. The papaya peels were blanched, sun-dried and converted into powder. This papaya peel powder was further checked for it's nutritional content based on previous researches.

Keywords: Papaya peel powder, Food waste, ß-carotene, peel

Introduction

Papaya *(carica papaya L.)* is one of the important delicious fruit crop grown in the tropical and subtropical parts of the world. It originated in Mexico and spread to all tropical parts of the world. Papaya *(carica papaya L.)* belongs to the family of caricaceae and was introduced in India in 16th century by Portuguese. It is one of the few plants which produce fruit throughout the year. It is popular due to various simple reasons like, it requires less area per tree,

comes to fruiting within a year, easy to cultivate, provides per hectare income next only to banana and has a high nutritional and medicinal value. Regular consumption of papaya can ensure a good supply of vitamin A and C, which are essential micronutrients for good health. It is a cheap fruit available in all places, to all people.

Papaya ranks fourth in the food production in India and eighth among the food crops grown in India. In India productivity is 39.6 MT/ha (Indian Horticulture Database-2011). Global production of papaya is 11.2 million tonnes. Papaya is also grown in other countries like Brazil, Indonesia, Nigeria, Mexico and Ethiopia. In India, Andhra Pradesh is the leading producer of papaya.

Papaya is rich in enzyme papain which helps in the digestion of proteins, due to this reason it is used by pharmaceutical industries for preparing digestive medicines. Papain (alkaloid obtained from the milky latex of papaya) is an effective stimulant and diuretic. It is used to remove skin blemishes and scars. Papain is also beneficial for the treatment of stomach ulcers, diphtheria and even cancer. The ripe fruit and seeds have medicinal properties for the disorders of liver, spleen and digestive tract. Papain prepared from the dried latex of its immature fruits is used in meat tenderizing, manufacture of chewing gums, cosmetics, for degumming natural silk and to give shrink resistance to wool.

Everything in papaya plant such as roots, leaves, peel, latex, flower, fruit and seeds have their nutritional and medicinal significance. Papaya can be used as a food, a cooking aid, and in medicine. In general, the papaya promotes proper functioning of pancreas, alleviates indigestion, protects against infection, aids in diabetics and hepatitis patients. The consumption of ripe papaya is thought to help in the prevention of cancer in organs and glands with epithelial tissue. Papaya has rejuvenating properties that especially assist in controlling the early ageing process. Overall the papaya acts as a detoxifier, activates the metabolism, rejuvenates the body and maintain body homeostasis because it is rich in antioxidants, B vitamins, folate and pantothenic acid, the minerals potassium, magnesium and fibre. Papaya juice is a popular beverage and can assist in mitigating infections of the colon and breaking down the pus and mucus. It is believed that it can act as a useful tonic for the stomach and intestines, if consumed alone for at least 3 days. sometimes it is suggested to go for "Papaya Therapy" once a year i.e., to eat one or two papayas daily for 2 to 4 week to benefit from its healing properties.

The fruit is rich in phytochemical, especially carotenoids and polyphenols. Papaya is also known to be a thirst quencher by people living in tropical countries. Besides its juicy pulp, the peel and seeds of papaya are valuable too. In some of the poor countries in tropical region, papaya peel is used for cooking as one of the dishes. Although papaya peel and seeds have various uses, the phytochemicals especially phenolic compounds in these parts of papaya have anti-oxidative properties.

The red colour of papaya fruit is due to the accumulation of lycopene, whereas the yellow colour is the result of conversion of lycopene to ß-carotene and ß-cryptoxanthin (Hirschberg, 2001). As the fruit ripens, its colour changes, which is caused by the breakdown and disappearance of chlorophyll. The flesh colour of papaya fruit is considered a quality trait that correlates with its nutritional value and is linked to shelf life of the fruit. The full genomic sequences of both yellow and red fleshed papayas have been reported to be identical (Skelton *et al.,* 2006). No significant

compositional differences have been reported between the transgenic and non-transgenic papaya (Jiao *et al.,* 2010).

Fruit processing results in large amounts of waste such as peels and seeds. The disposal of these materials is usually a problem, which is compounded by legal restrictions. Thus, new aspects on the use of this waste as by-products, for a further utilization in the production of food additives or supplements with high nutritional value, have aroused great interest since they are high value products and their recovery may be economically attractive. It is known that by-products are important sources of sugars, minerals, organic acids, fibre, and phenolic compounds that have a wide range of pharmacological activities, which include antitumor, antiviral, antibacterial, cardio-protective, and anti-mutagenic activities (Djilas *et al.,* 2009). Making full use of food is a way to increase daily cooking by creating new recipes such as jellies, pies, juice, and pastries, in addition to nutritionally enriched diets, providing more fibre, vitamins, and minerals (Storck *et al.,* 2013).

Papaya peel has the antidandruff, skin soothing and moisturizing ability which is important in cosmetic industry. The ability of eliminating intestinal parasites, anti-helminthic and anti-amoebic properties of bioactive compounds found in seeds pave a promising path for new drug discoveries. Additionally, papaya peel waste is generated in many countries throughout the year and proper management of this waste product could gain commercial interest in various industries. Since the annual global average production of papaya is about 10.0 million metric tons, it is important to add value to the left over waste materials of papaya fruit which could in turn be commercially beneficial as well as be useful to the environment due to reduction of waste.

Procedure

Selection criteria of papaya fruit

Ripe papaya fruits with no visible external cuts or spoilage and universal peel colour were purchased from local markets of Uttam Nagar, Delhi.

Preparation of blanched papaya peel powder

- Ripe papaya was taken and washed thoroughly in running water twice to remove dirt and adhering extraneous matter.
- After cleaning papaya fruit was peeled and the peels were washed again.
- The washed peels were blanched at 100°C for 3-4 minutes
- Then the peels were immediately cooled in ice cold water for 2 minutes
- Blanched peels were sundried
- Then the dried peels were dried again in microwave to remove extra moisture
- After that the powder of the dried peels were made in a mixer grinder.
- Peel powder is stored in air tight and sanitized container
- The container is refrigerated for further use.

Result

The nutritional value of the papaya peel leaves is shown in table 1. It was observed that papaya peels powder contain 9.82% of moisture, 47.33% carbohydrate, 2.51% fat, 11.67% proteins. Mineral estimation shows that 18.61% of calcium, 516.33% of pottasium and 9.61% of magnesium is present. Along with this 15.46µg of ß-carotene per 100g weight is also present. L.B.S. SABINO, 2014 conducted a study which was aimed at performing

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the determination of bioactive compounds, antioxidant activity, and the identification of the minerals in the flours produced with the tropical fruit peels of mango, papaya, melon, and pineapple. The results showed that the papaya peel flour has the highest amount of ascorbic acid and lycopene when compared with the other studied flours. The mango peel flour has a high content of total extractable polyphenols and a high antioxidant activity. Regarding the mineral content, the by-product of melon stood out with 523.24±26.12 mg/100 g of potassium, 104.15±3.52 mg/100 g of calcium and 6.62±0.30 mg/100 g of iron. The flours prepared with mango, papaya, melon, and pineapple peels are potential sources of bioactive compounds and minerals, also presenting good antioxidant activity, being, therefore, recommended to be used in food products to improve the nutritional quality of the product._Mir N. Islam et al., 2017 researched on the Green papaya (Carica papaya L.) peels, obtained as a waste product in the processing of papaya pickles, which were dried and their proteolytic activity was compared with that of the enzyme in the papaya latex. The proteolytic activity of the enzyme in papaya peel was about 10 times lower than that in the latex. Taking into account the activity of the enzyme, spice batches were mixed with 30% and 45% papaya peels, in order to formulate meat tenderizers. According to the sensory evaluation of the cooked samples, the meat marinated with 30% of green papaya peel, for 2 h at room temperature had the highest level of acceptance for its soft texture and good flavour. In conclusion, green papaya peel, dried, ground, and mixed with various spices showed a great potential for use as a low-cost meat tenderizer. Furthermore, the process described allows the conversion of papaya peels with a negative value to an essential value added ingredient.

Table 1: Nutritional composition of papaya peel powder (per 100g fresh weight)

Nutrients	**Papaya peel powder (values/100gm)**
Moisture %	9.82
Carbohydrate%	47.33
Fat %	2.51
Proteins %	11.67
Minerals	
Calcium%	18.61
Pottasium%	516.33
Magnesium%	9.61
Vitamin	
ß-carotene	15.46µg

Summary and conclusion

The present paper gives information regarding nutrient composition of papaya peel powder. It was noted that papaya peel powder contain 9.82% of moisture, 47.33% carbohydrate, 2.51% fat, 11.67% proteins. Mineral estimation shows that 18.61% of calcium, 516.33% of pottasium and 9.61% of magnesium is present. Along with this 15.46µg of ß-carotene per 100g weight is also present. The result of the mineral analysis show that papaya peels are rich in pottasium and ß-carotene. It is also a good source of calcium.

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