CHAPTER 9

# PAPAYA SEEDS: TREASURE OF NUTRIENTS

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## Introduction

Papaya fruit is commonly consumed fresh as a dessert or juice. Papaya seeds are black in color and embedded in the fruit pulp. In general, the seed from ripe papaya represents of about 16% of the fresh fruit weight and is considered as a by-product. The abundant availability throughout the year and less economic value of papaya seed has encouraged the nutritionists to exploit such by-product as a protein-rich feed ingredient as well as functional feedstuff for poultry.

The seeds account for about 16 % of the fresh fruit weight and each seed is made up of sarcotesta and endosperm Pawpaw seed extracts had been shown to have several medicinal as well as nutritional properties. Several Species of Caricaceae have been used as medication against a variety of diseases. All parts of a pawpaw plant, including the Seeds, roots, rinds, and fruits have positive effects on general health preventing diseases (Seigler. et al., 2002).

The important use of the papaya seed could prevent or possibly even treat food poisoning. The seeds of papaya are believed to have strong anti-bacterial and anti-inflammatory effect on our digestive system. Studies have

shown that an extract made from papaya seed is effective in killing E. coli, Salmonella, Staphylococcus and other dangerous bacterial infections. There are even reports of using papaya seeds to successfully treating viral infections such as Dengue fever.

Furthermore, papaya seed do not contain toxic compounds and gluten, thus making seeds a safe ingredient also for gluten free diets. Considering the nutritional deficiencies and health problems among people in India, the current study is designed to develop food products with incorporation of papaya seed for nutritional enhancement.

Papaya seed oil had a high oxidative stability, suggests that crude papaya seed oil may exhibit a desired shelf life. Moreover, lipids with high monounsaturated fatty acids content, such as papaya seed oil, are used in emollient skin care products, bath oils, hair conditioners, and makeup.

Papaya seed flour was better in protein, lipid, and the minerals calcium, iron, magnesium, and zinc content. Papaya seeds are rich in oil content, which mainly consists of monounsaturated fatty acids and nutraceuticals, such as phenolics, tocopherol and carotenoid. Furthermore, papaya seed oil was reported to be persistent towards oxidation.

Due to their rich lipid content, papaya seeds could be economically engaging for industrial utilization. The regular intake of high amounts of this particular type of oil could induce a reduction in the risk of coronary heart disease. The high content of unsaturated fatty acids would be enabling the oil as a plausible replacement for other highly unsaturated oils.

Papaya seed flour was characterized by having high content of protein and fiber, which can be considered an excellent source to nutritionally enhance the products in which it is added.

It also allows the improvement of the nutritional and technological quality of the products but can also effective to reduce the environmental impact caused by the improper disposal of industrial waste.

## Nutritional Composition

The proximate composition of pawpaw seed to have a Moisture content of 7.3% moisture, 30.1% oil, 28.1% protein, 8.2% ash, 25.6% Carbohydrate and 19.1% crude fibre and rich in proteins content (27.3-28.3%).The papaya seed flour was better in protein, lipids, and the minerals calcium, iron, magnesium, and zinc content.

The papaya seeds are rich in oil content (13.9–30.7%), which mainly consists of monounsaturated fatty acids and nutraceuticals, such as the phenolics tocopherol and carotenoid. Furthermore, papaya seed oil was reported to be persistent towards oxidation, which can be transformed into an unconventional kind of cooking oil consisting of exceptional health benefits in food applications ( Samaram S. et al., 2013).

The papaya seed kernel has superior protein, lipid, and fiber contents than any other fruits. Due to their rich lipid content, papaya seeds could be economically engaging for industrial utilization similar to other traditional oilseed producer plants such as corn and soybean.

The main fatty acids of the papaya seed oil were oleic (76.9%), palmitic (13.4%), stearic (4.6%), and linoleic (3.2%) acids. Besides, trace amounts of palmitoleic, myristic, margaric, arachidic, eicosenoic, lauric, and linolenic acids were also observed. The lower linoleic acid content in papaya seed oil exhibited stronger stability against oxidation than any other seed oils. The high content of unsaturated fatty acids would enable the oil as a plausible replacement for other highly unsaturated oils (Puangsri. T. et. al. 2004).

The papaya seed oil showed excellent strength against oxidation without any addition of artificial antioxidants. The regular intake of high amounts of

this particular type of oils could induce a reduction in the risk of coronary heart disease. Moreover, high-oleic oils possess satisfactory stability to be utilized in extremely demanding food processing such as frying. Other edible applications are in the field of spatter oils for snacks, crackers, cereals, and bakery products, where the oil is utilized to preserve product quality and enhanced palatableness.

## Health Benefits

### Fight infection

Papaya seeds can destroy certain types of fungi and parasites. Papaya seed extract was effective against three strains of fungi, including the specific pathogen responsible for causing yeast infections. Another small study found that drinking an elixir made from dried papaya seeds and honey was significantly more effective at killing intestinal parasites than a placebo. However, further large-scale studies are needed to determine how eating papaya seeds may affect fungal and parasitic infections in humans.

### Kidney function

The papaya seeds could protect and preserve the health and function of your kidneys. It prevents kidney damage. Papaya seeds are also rich in antioxidants, which can block oxidative damage to your cells and protect kidney health.

### Digestive health

Papaya seeds are a good source of fiber. Fiber moves through your gastrointestinal tract undigested, adding bulk to your stools to promote regularity. The fiber intake increased stool frequency in people with constipation. Upping your fiber intake may improve several other aspects of digestive health as well.

### Antioxidant Property

The free radical causes many chronic health problems. Antioxidants can help us by preventing the formation of free radicals. A study conducted shows that carica papaya seeds water extract has a potent antioxidant activity in H2O2 oxidative stress-induced human skin Detroit 550 fibroblasts. The phytate had been reported to possessed antioxidant activity. The high phytin levels of the unripe seeds can be attributed to its use in preference for the ripe carica papaya seed in medicinal medicine for curing diseases (Elisa panzarini et al., 2014).

**Antimicrobial Property**

The seeds of papaya irrespective of its fruit maturity stages have bacteriostatic activity on gram positive and negative organisms which could be useful in treating chronic skin ulcer. Ethyl acetate extract of C. papaya seeds exhibit promising antimicrobial activities which are attributable to secondary metabolites present in the seeds. And proteus mirabilis and vanco mycin resistant enterococci were highly inhibited. Seeds of the plant can be used to treat health complications such as urinary tract infection and sepsis caused by Proteus mirabilis and vanco mycin resistant enterococci (Tao zhang. et. al., 2017).

**Anthelmintic Property**

The papaya extracts can serve as a source of chemical substance for use in the development of effective anthelmintic agents. The seeds of carica papaya has reasonable pharmaco therapeutic properties against intestinal nematodes of sheep hence it could serve as an anthelmintic agen (Ameen. et. al. 2012)

**Papaya Seed Products**

The gastro-free churan balls were prepared by incorporating papaya seed and papaya seed oil and were standardized as natural product with no added preservative, and would help to relieve constipation issues, has an acceptable organoleptic profile and benefit overall health and wellness. Based on the obtained results, it is seen that the product is nutritionally rich with diverse

sources of all nutrients. Thus, the product can be used in a defensive nutrition plan with no perceived harm even if consumed in excess (Jyoti. D. et. al. 2018).

The 'coffee' powder of papaya seeds for drinks; to test the organoleptic properties and the activity as a pancreatic lipase inhibitor. Inhibitor activity for pancreatic lipase was measured relative to anti-obesity drugs of Orlistat (Xenical), using titrimetric method. 1.42 grams of papaya seeds powder have an inhibitory activity equivalent to 1 tablet (120 mg) of Orlistat. Most of the respondents like with the texture, color, and flavor of the drinks (Subandhi et al., 2019).

The papaya seed flour was characterized by having a high content of protein and fiber, which can be considered an excellent source to nutritionally enhance the products in which it is added. The addition of papaya seed flour in the hamburger formulation not only allows the improvement of the nutritional and technological quality of this widely consumed product, but can also be effective to reduce the environmental impact caused by the improper disposal of industrial waste (Azevedo L. A. et al., 2014).

Papaya seed flour bread was made by baking, resulting minerals content such as magnesium (143.00-182.50 mg/100g), calcium (252.60-342.60 mg/100g), phosphorus (73.50-127.30 mg/100g), potassium, iron, sodium, increased as the level of pawpaw seed flour addition increased. There was an increased trend in the anti-nutritional contents of the bread samples with increased level of pawpaw seed flour addition.

According to studies conducted using papaya seeds flours as value addition in preparing functional papaya seed flour cookies, contained higher amount of protein content and high in the crude fiber than the control wheat cookies and was acceptable, and enhanced nutritional properties, physicochemical characteristics and organoleptic attributes (Syed, H. M. et al., 2012).

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