POTENTIAL MEDICINAL PROPERTIES OF CARICA PAPAYA LINN. - A MINI REVIEW

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ABSTRACT

Carica papaya Linn. is commonly called as paw-paw and it belongs to the family Caricaceae. Papaya possess excellent medicinal properties for treatment of different ailments. The different parts of the Carica papaya plant including leaves, seeds, latex and fruit exhibited to have medicinal value. The stem, leaf and fruit of papaya contain plenty of latex. The latex from unripe papaya fruit contain enzymes papain and chymopapain; other components include a mixture of cysteine endopeptidases, chitinases and an inhibitor of serine protease. Phytochemical analysis of C. papaya leaf extract revealed the presence of alkaloids, glycosides, flavanoids, saponins, tannins, phenols and steroids. This review focuses on different properties of papaya such as antioxidant and free radical scavenging activity, anticancer activity, anti-inflammatory activity, treatment for dengue fever, antidiabetic activity, wound healing activity and antifertility effects. Thus C. papaya acts as a multi faceted plant. It is also imperative to identify the mechanism of the plant compounds and studying the active principle of the extract. Thus, we should include the papaya in our diet as fruit salads, fruit juice, leaf extract, decoction prepared through papaya leaves, etc. However, including papaya seeds in any of the form should be avoided for young men and pregnant women, since it possess antifertility effects that was demonstrated well in animal models.

Keywords: Carica papaya, Papaya, Medicinal properties of papaya, Phytochemical analysis, Importance of papaya, Effects of papaya.

INTRODUCTION

Natural compounds isolated from various parts of the plant such as leaves, fruits, stem, roots, seeds have been shown to possess excellent medicinal value. Thousands of plant varieties used in folklore medicine have been studied for treatment of cancer, diabetes, arthritis, infectious diseases, etc. However, still it remains an area of research interest for unveiling the medicinal value of several plant species that is not studied thoroughly. Carica papaya Linn. is one such a plant with potential medicinal value and it is commonly called as paw-paw. Carica papaya belongs to the family Caricaceae and it has been cultivated in most of the tropical countries.

The edible part of papaya is widely used all over the world. The unripe fruit of papaya is used as mild laxative and abortifacient agent and leaves are used for treatment of pyrexis, diabetes, gonorrhea, syphilis, inflammation and as a dressing component for wounds[1]. This review focuses on potential medicinal properties of Carica papaya and its activity.

METHODS USED FOR LITERATURE COLLECTION

Literature survey was done in pubmed using key words Carica papaya; medicinal properties of carica papaya; phytochemicals in Carica papaya; antioxidants in Carica papaya; anticancer activity/antidiabetic activity/anti-inflammatory activity/wound healing activity/anti fertility effects of Carica papaya. The articles published only in pubmed indexed journals were primarily considered for writing this review.

Medicinal properties of Carica papaya plant

The different parts of the Carica papaya plant proved to have medicinal value including leaves, seeds, latex and fruit. C. Papaya has a wide variety of medicinal properties including anticancer, antiviral, anti-inflammatory, antimicrobial, antidiabetic, antihypertensive, wound healing activity, free radical scavenging activity and increase in thrombocyte count, etc. The phytochemical constituents of Carica papaya and its medicinal properties are presented as follows.

Phytochemical Compounds and antioxidants present in Carica papaya

Phytochemical analysis of C. papaya leaf extracts revealed the presence of alkaloids, glycosides, flavanoids, saponins, tannins, phenols and steroids[1,2]. The stems, leaves and fruits of papaya contain plenty of latex. The latex of Carica papaya is a rich source of four cysteine endopeptidases namely papain, chymopapain, glyceryl endopeptidase and caricain – a papaya endopeptidase II [3]. As the fruit ripens, papain and chymopapain get degraded and not present in the ripen fruit[4]. Other components include a mixture of cystine endopeptidases such as endopeptidase IV, omega endopeptidase, class-II & class-III chitinase and an inhibitor of serine protease[5,6,7]. Aqueous extract of unripe C. papaya administered orally in Wistar albino rats demonstrated no adverse effect on the histology of liver, kidney, heart and small intestine[8].

Antioxidants and free radical scavenging activity

The leaves, seeds and juice of papaya shows free radical scavenging and antioxidants activity. The antioxidant activity of various fractions (ethanol, petroleum ether, ethyl acetate, n-butanol and aqueous extract) from seeds of C. papaya was evaluated and showed that ethyl acetate and n-butanol fractions demonstrated antioxidant and free radical scavenging activity than other fractions[9]. Papaya juice is an efficient scavenger of highly reactive hydroxyl radicals (OH) [10], which significantly decreased the lipid peroxidation levels and increased the antioxidant activity in rats[11]. The leaf extract of C. papaya evidenced significant antioxidant and free radical scavenging potential [12]. The peroxidase is present in the unripe fruit of C. papaya but it is gradually decreased after fruit ripening.

Fig. 1: Medicinal properties of carica papaya
The aqueous extract of *Carica papaya* leaves significantly reduced plasma blood glucose level and serum lipid profile in diabetic rats [29,30]. The ethanolic extract of *Carica papaya* leaves demonstrated significant reduction in blood glucose level and regeneration of the beta cells of pancreas in diabetic mice [3]. Aqueous extract of unripe papaya fruit significantly inhibited the key enzymes α-amylase and α-glucosidase involved in type 2 diabetes and also inhibited the lipid peroxidation in rat pancreatic cells studied *in vitro* [32].

**Wound healing activity**

Aqueous extract of *Carica papaya* significantly enhance the wound healing that make it an ideal dressing component for treatment of wounds [33]. Fruits and seeds of *Carica papaya* were evaluated for wound healing activity using wound excision model in diabetic rats showed significant reduction in the wound area compared to untreated diabetic control. It also showed increased granulation, elevated hydroxyproline content and deposition of collagen in the wound area [34,35].

**Antifertility effects of *Carica papaya***

The papaya seeds were shown to have antifertility properties in male albino rats. Papaya seed extract treated in male albino rats reduced the cauda epidymal and testicular sperms [38]. Male Wistar rats treated orally with papaya seed extract (200mg/kg) demonstrated hypertrophy of pituitary gonadotrophs and gradual degeneration of germ cells, sertoli cells and leydig cells of testis thereby drastically affects the male reproductive functions [39]. The aqueous extract of papaya seed administered to male Sprague-Dawley rats suppressed the steroidogenic enzymes in the testis and reversible changes occurred when the extract was withdrawn after 30-45 days of treatment [40]. So that the papaya seed extract can be used as an effective male contraceptive [41].

**CONCLUSION**

Thus *Carapa* acts as a multi faceted plant. It is also imperative to identify the mechanism of the plant compounds and studying the active principle of the extract. *Carapa* possesses rich source of vitamins, antioxidants, flavonoids, polyphenols, etc. and hence, regular intake of papaya will improve our health by quenching the free radicals generated in the body and enhance our immune system to fight against the foreign pathogens.

Thus, intake of papaya as fruit salads, fruit juice, leaf extract, decoction prepared through papaya leaves, etc. should be a part of our diet. However, including papaya seeds in any of the form should be avoided for young men and pregnant women since, it possess antifertility effects that was demonstrated well in animal models.

**Conflict of Interest**

The authors do not have any conflict of interest to declare.

**REFERENCES**


