



Pharmacological activity of carica papaya linn.

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➤ Abstract:-

Carica papaya L., a plant native to Southern America and introduced to India in the 16th century, exhibits a range of medicinal properties attributed to its bioactive compounds. Various parts of the plant, such as seeds, leaves, and latex, contain phytochemicals with anti-inflammatory, antioxidant, anti-cancer, anti-helminthic, wound-healing, and anti-malarial properties. The papain enzyme, present in the latex, is instrumental in wound healing by breaking down dead tissue and aiding the formation of healthy cells. Papaya seeds demonstrate strong anti-helminthic activity due to benzyl isothiocyanate, effectively expelling intestinal parasites. The fruit and leaves of the plant have shown promising anti-cancer effects by inhibiting the proliferation of cancer cells, particularly in breast, prostate, and colon cancers. Papaya's anti-inflammatory and antioxidant properties make it useful for managing arthritis and protecting cells from free radical damage.

➤ **Keywords:-**Carica papaya ,phytochemicals, papain enzyme ,lycopene, carotenoids.

➤ Introduction:

Carica Papaya Linn which is renowned known as (Papita, Papaya, Pawpaw). It is a well-known tropical fruit part of a Caricaceae Family. The Papaya Fruit is in green colour when it is unripe and turn yellowish or orange when it is ripe. The different part of Papaya Plant like root, latex, seed, peel have their own nutritional and medicinal properties. It is a less calorie nutrient fruit. There are many benefits of Papaya as it is highly contain Vitamins such as A, B, & C. Papain a proteolytic enzyme present in Papaya. This enzyme adequately treats Allergies & Injuries. *Carica Papaya* L. Is an essential plant which has their own different medicinal characteristics that has been noted from other species. The plant is said to be originated from southern America and addressed in India in 16th century. The plant part contain phytochemicals were these compounds are co-ordinated to properties such as Anti-Inflammatory, Antioxidant, Anticancer, Anti-Helminthic, Woundhealing, Anti-malarial, Anti-bacterial activity. Papaya plant fastly grows which makes it in demand in various countries. Papaya minimises higher cholesterol levels as it rich in fibre source. It also include bioactive compounds. Papaya plant could facilitate to enlarge the platelet levels in patients. Papaya is said to be powerhouse of the nutrients which is accessible in each and every part of region through the year. Papaya is also used as a food such as powdered papaya seed used as pepper.

➤ Pharmacological Activity:-

Wound Healing activity:

The wound healing properties arises from papain content present in Papaya, which has ulcer protective effect. Papain have potential to break down the dead tissue without causing harm to living cell. Chymopapain helps in recovering & developing healthy tissue. The Papaya leaves ability to wound healing has been studied in experimental studies. The ethanolic papaya seed extract was performed on Sprague-Dawley Rats, as it has wound healing properties in it. *Carica papaya* 's aqueous extract of roots also showed wound healing properties in albino rats. Papain, a cysteine proteinase, helps move healthy cells from the edge of the wound into the wound cavity by absorbing the necrotic tissue through the liquefying eschar.⁽¹⁾ The latex of unripe papaya pulp of isolated papain can be use in chronic skin ulcer and wound caring. Papain minimises bacterial load, enlarge granulation tissue formation and reduces exudates.⁽²⁾ As Papaya contain fibrin an essential factor in blood clotting useful in recovering the wounds. Papain is known for preventing the infection & anti-microbial & anti-oxidant properties which is co-ordinated to iron chelating properties.^(3,4)

Anti – Helmintic Activity :

Carica Papaya seed has shown Anti-Helminthic activity. The Benzyl isothiocyanate which is present in seeds of Papaya shows Anti-Helminthic properties. Papaya seed in dried form is used in combination of elixir and Honey results in remarkable effect on human Intestinal parasite without

any side effects.^(5,7,8) The part of Papaya fruit like seed, leaves and latex have Anti-Helminthic alkaloid such as carpaine in it help to clear parasite worms from the body.⁽⁹⁾ But the carpaine can be risky in higher doses. As papaya is rich in proteolytic enzymes which usually grasp nematode cuticles, having minimum toxicity has been used against gastrointestinal nematodes.⁽¹⁰⁾ The aqueous extract of C.papaya seed and latex of papaya shown strong Anti -Helminthic and Anti -amoebic properties. A paste of papaya leaves with normal salt and opium useful in relieving symptoms & also remove the worms from the body within 3 days.⁽¹¹⁾

Anti- Cancer Activity:-

In vitro investigation of Papaya it is recommended as it has anti -cancer properties. The leaf extract of papaya helps in preventing the development of cancerous cells. The enzyme papain plays an important role in cancer treatment. Isothiocyanate present in C.Papaya defends the different cancers of lungs, prostate, leukemia, breast & Colon.⁽¹²⁾ It has been studied that the Papaya fruit contains a pure lycopene which has anti - proliferative activity in Human breast and liver cancer. Breast cancer is most common form of cancer, Carica Papaya leaves extract has been showed anti -breast cancer activity.^(13,14) The juice of papaya leaf shows anti – proliferative effect on prostate cancer cells. Fibre present in Papaya fruit work as a synergistic shield for protecting the colon cells from free radical damage. Lycopene enzyme reactive towards oxygen and free radicals. In mouse cervical cancer, ethanol leaf extract of papaya reduces cancer cell proliferation and promotes cancer cell death. Lycopene helps in preventing growth of cancer cells. Cigarette smoke contains carcinogen cause vitamin A deficiency. Eating Vitamin A rich source food like Papaya help in preventing the vitamin A deficiency cause by Benzo(a) pyrene in cigarettes.⁽¹⁵⁾

Anti- Inflammatory Activity:-

C.Papaya is said to be having natural pain relieving capacity in it. The enzyme such as papain and Chymopapain has been studied to help in reducing the inflammation and healing of burns. The vitamins found in Papaya like C,E or beta carotene and some Anti-oxidant nutrients helps in minimising the inflammation. Due to its anti -inflammatory properties of papaya relieves the inflexibility of arthritis like rheumatoid, osteoarthritis. Enzyme papain has found to be effective in chronic inflammatory and related disease.⁽¹⁶⁾ Papaya seeds shows anti-inflammatory properties are described in clinical study.⁽¹⁷⁾ Papaya has wide range of secondary metabolites such as tannins, saponins, alkaloid, flavonoid which significantly effected on chronic inflammation.⁽¹⁸⁾

Anti -Oxidant activity :-

Papaya is a rich source of anti – oxidants due to presence compounds like vitamin A , flavonoid or carotenoids. Anti -oxidant are radical scavengers which protect against free radical causing pathological conditions such as inflammation, arthritis or ischemia . According to the study ,C.Papaya male flower has better anti-oxidant properties The antioxidant present in Papaya such as vitamin C gives skin protection from UV -induced damage .Anti -oxidant present in Papaya is useful in preventing the oxidation of low density lipo- protein cholesterol.^(19’20’21’22)

Anti Microbial Activity :-

The Carica Papaya leaves and root’s aqueous extract at concentration (25,50,100,200mg/ml) results in anti-microbial activity .In opposition to human pathogenic bacteria with the help of agar diffusion method.⁽²³⁾The seed of Carica Papaya can be helpful as an antibacterial agents for Eschericia Coli , staphylococcus aureus. The papaya chitinase has been studied to have antibacterial activities.⁽²⁴⁾The fresh and dried c.papaya leaves extract their antibacterial activity is tried out by researchers using disc diffusion method . Organic extract are more effective than aqueous extract.^(25’26)

Anti -Malarial Activity:

C.papaya extract(aqueous and organic) species are performed on malaria strain Plasmodium Falciparum in vitro.The performed results showed that petroleum ether extract of skin of raw Carica papaya fruit reveal remarkable anti-malarial activity. ⁽²⁷⁾Papaya (Carica papaya) has antimalarial properties, mainly due to compounds like carpaine alkaloids, flavonoids, and phenolics found in its leaves. These active components inhibit malaria parasite growth by disrupting the lifecycle of Plasmodium falciparum within red blood cells. They also reduce oxidative stress associated with malaria providing relief from symptoms. Additionally, papaya’s immune-boosting properties support the body’s response to infection, potentially enhancing the effectiveness of conventional malaria treatments. Papaya leaf extracts are used in teas or supplements for this purpose, though proper dosing is important to avoid side effects like gastrointestinal issues.⁽²⁸⁾

Anti-Immunomodulatory Activity:

Carica papaya seed extract is currently being promoted as a nutritional supplement with the alleged ability “to rejuvenate the body condition and to increase energy.” The product promises to improve immunity against common infections and overall body functioning.^(29’30)Mojica-Henshaw analyzes the chemical constituents of the Carica seed extract and determine the potential immunomodulatory properties of the different bioactive fractions. The immunomodulatory characteristics of crude Carica

seed extract and its bioactive fractions were studied in vitro using lymphocyte proliferation assays and complement-mediated haemolysis tests.^(31,32)

➤ Conclusion:

Carica Papaya Linn, commonly known as papaya, is a tropical fruit with numerous nutritional and medicinal properties. Its various parts, including roots, latex, seeds, and peel, possess anti-inflammatory, antioxidant, anti-cancer, anti-Helminthic, wound healing, and antimicrobial activities. The presence of proteolytic enzymes like papain, chymopapain, and other bioactive compounds makes papaya a valuable resource for healthcare and pharmaceutical applications. Overall, papaya is a powerhouse of nutrients and bioactive compounds, making it a valuable addition to a healthy diet and a potential natural remedy for various health ailments.

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