

Benefits of Papaya Fruit and its leaves to Treat Malaria or Dengue and Various Other Uses for Human Health

Meesha Deshpande (Guide)¹, Prashant Singh Parihar², Shibani Brahma³, Aditi Shirole⁴,

Eesha Vahikar⁵, Harshita Agarwal⁶

¹⁻⁶Symbiosis Skill and Professional University (Kiwale), Pune.

Abstract: The tropical fruit Papaya is loaded with Vitamins A, B, C, D and E, fiber as well as healthy plant components. It also contains papain enzyme which is used to tenderize meat and which also aids the digestion process. The antioxidants present may help reduce the oxidative stress and thereby lower risks of other diseases. Adding to that, it may also help against sun damage and defend wrinkling of the skin. Papaya is delicious when eaten ripe, alone or it can also be easily combined with other foods. Papaya has several health benefits, previous studies have shown the plant extract effectiveness in the treatment of malaria and dengue. Not only the fruit is beneficial but also the extracted papaya leaf juice has antimalarial properties and is beneficial in increasing the platelets count, which can be done naturally rather than depending on any medications for the same. It has several properties such as anti-wrinkle, anti-inflammatory, anti-cancer, which help in maintaining optimum health. Furthermore, the papaya fruit is also highly effective for healthy skin with anti-wrinkle, anti-acne properties. Currently it is a popular remedy for treating Melasma. It has beneficial effects on the hair such as hair conditioning, hair growth and dandruff prevention for healthy scalp and hair. Papaya consumption during PMS or menstruation cycle should be restricted due to its thermogenic effect on the body, portion control is important to avoid any adverse effects. Consumption of green or unripe papaya should be highly avoided during pregnancy or breastfeeding as it may be harmful for the fetus or the infant. Moreover, in the recent future, papaya in the form of capsules may be used for therapeutic treatments or as an ingredient within the range of skin and hair care products.

Keywords: papain, leaf extract, meat tenderizer, acne control, allergy, chymopapain, antimalarial, dengue, platelets.

Introduction:

Papaya fruit is from the plant *Carica papaya*, originated in Central America and Southern Mexico but it is now grown in most of the other parts of the world.

When unripe the skin is green and orange when ripe with the flesh being yellow, orange or red. It also has many black seeds, edible but bitter.

This fruit contains papain enzyme which helps break down the tough chains of protein in the muscle meat and hence for thousands of years it has been used as a meat tenderizer.

The leaf extract has antimalarial properties and is highly effective in increasing the platelets count; observed to be beneficial in patients suffering from malaria and dengue respectively.

Not only internally, but externally as well it has shown effects on the skin making it radiant, clear, acne free and on the hair making them dandruff free.

A medium sized papaya (approximately 275g) contains

- Energy – 119 kcal
- Protein – 1.3 g
- Carbohydrates – 30g
- Fat – less than 1g

- Dietary fiber – 4.7g
- Sugar – 21.58 g

HOW PAPAYA LEAVES CAN EASE CAUSING MALARIA?

Malaria remains one of the life-threatening disease caused by protozoan *parasites* that are transmitted to human beings through the bites of infected female *Anopheles* mosquitoes. However, it is preventable and curable.

Much attention has been drawn to the biological activity of plant extract of *Carica Papaya* possibly due to the numerous compounds including the crucial compounds are *chymopapain*, *papain*, etc., exist in *C. papaya* and these compounds may mutually or solely contribute to produce larvicidal activity against *Anopheles stephensi*.

Previous studies have shown the effectiveness of plant extract against mosquito larvae and the plant extract essential oils against vector mosquito larvae.

Plant allelochemicals might be fairly useful in increasing the potency of biological control agents because plant products produce a large variety of compounds that increase their immunity against insect attack.

THERAPEUTIC TREATMENT FOR DENGUE FEVER BY USING PAPAYA LEAF EXTRACT:

Dengue fever, likely known as breakbone fever, is a mosquito-borne infection that can lead to a severe flu-like illness. It is caused by four different viruses (DENV-1, DENV-2, DENV-3 and DENV-4) and spread by *Aedes* mosquitoes.

Several studies have demonstrated that the juice of the leaves of the *Carica papaya* plant from the family *Caricaceae* may potentially help to escalate the platelet levels in patients suffering from dengue.

A medicinal property being explored to control the massive problem of dengue is the extraction of papaya leaves juice. There have been contrary reports on the efficiency of this extract in the intervention of dengue.

The papaya plant feasibly brings about its outcome in dengue by making better the thrombocytopenia correlated with this condition. Prior researches explain the "membrane stabilizing properties" of *C. papaya* L. leaf extracts in *in vitro* studies. This study shows that *C. papaya* L. leaf extracts forbid heat-induced and hypotonicity-induced hemolysis of erythrocytes acquired from healthy individuals as well as individuals with dengue infection; the aftermath was detected at the lower concentrations of the extracts.

Therefore, the extracts are expected to possess membrane-stabilizing properties and secure blood cells opposing stress-induced destruction. This remedy may be useful in patients going through dengue infection where the leaf extracts could likely obstruct platelet lysis.

The taste and savour of papaya leaves is bitter, however the health benefits are impressive. They are packed with calcium and vitamin A, B, C, D and E. The antioxidants filled in the leaves fight free radicals that go into the body.

Papaya leaf extraction is prepared by blending papaya leaves thoroughly. After washing tender papaya leaves, grind it to a fine paste by adding little water to it. Strain this juice with the help of an extractor. The juice will be thick and bitter, so it should be diluted with water to make it gentle for drinking. This is usually taken as an extract, tea, or juice and has been estimated to ease symptoms associated to dengue fever.

From the numerous reports proclaimed in scientific literature, it appears that *C. papaya* L. leaf extract does have beneficial properties to fight with dengue. This mechanism plays a vital role in increasing the platelet count. This can be likely associated to its membrane-stabilizing property.

The flavonoids and other phenols present in the papaya leaf have been encouraged to provide the beneficial properties. One of the analysis found that the leaves of papaya plant are rich in uncountable minerals. Many researches suggested that these minerals might bring equity in mineral deficiency caused by the virus and reinforce the immune cells against it.

Furthermore, to its consequence against the virus, the papaya plant seems to be effective against the aedes mosquito. Papaya extract beyond any question offers a cheap and possibly effective treatment for dengue.

ANTIINFLAMMATORY PROPERTIES OF CARICA PAPAYA:

Papaya leaf is loaded with impressive amount of nutrients and plant compounds with prospective anti-inflammatory benefits, namely *papain*, *flavonoids*, and vitamin E.

The anti-inflammatory remedies of papaya leaf extract can help reduce intractable inflammation.

Papain, which is mostly found in high concentration in papaya leaves, is predicted to reduce inflammation in the body by disintegrating damaged and oxidized proteins.

These damaged proteins is corelated with several autoimmune disorders that make the body much more prone to disease.

To get better from common cold, papaya leaf extract is the best choice. High concentrations of vitamin A. vitamin C in papaya leaves attempt to build up immune system and treat cold and coughs.

One of the study in the Journal of Ethnopharmacology also established that papaya leaf extract can increase Th1 type cytokines for boosting up the immune system.

These flagging molecules synchronize the immune system, papaya having with more immunotherapy benefits and deliver treatment and avoidance of certain diseases and allergic disorders.

Papaya Benefits for Skin And Health:

The foods which we consume sometimes play a really important role on our skin. A proper skin care regime helps in achieving radiant skin. Fruits are filled with many vital Nutrients that are proven beneficial for a healthy skin.

Carcia Papaya is the scientific name of the orange and green fruit commonly known as papaya.

Papaya is a fruit filled with many benefits skin and health wise both, it has a enzyme called as papain, which has overall health benefits for skin as well as health.

Papaya is rich in many Vitamins like A, C and Phyto-vitamin K. In addition to these vitamins it also has Micro-minerals like phosphorous, magnesium and beta-carotene. Papaya is also rich in chemical

Things to watch out for while eating Papaya:

It is really safe to consume, but people who have allergic reactions or cannot have too much sugar then they need to control the portion size or the amount that fitswith your specific health needs.

Benefits of Papaya on Skin

1. Wrinkle Reduction

Papaya is rich in Antioxidants like *Lycopene*, which helps defend the visible signs of aging.

According to a study, skin damage and wrinkles appear due to excessive free radical activity, Antioxidants help in fighting these free radicals damage and helps in keeping your skin smooth and clean.

Another study was done on rats, suggested that papaya helps your skin elasticity which would minimize the appearance of wrinkles.

Another study done on older women suggested that, the ones who consumed the mixture of antioxidants Vitamin C and Lycopene had a measurable reduction in skin wrinkles.

2. Acne Control

The enzyme *papain* in papaya can help decrease inflammation. The protein dissolving papain is found in many exfoliating products which help in many skin problems.

These exfoliating products help in reducing acne by removing dead skin cells that clog pores. Papain also removes damaged keratin that can build up on the skin and form small bumps another study suggested. Papaya is also rich in Vitamin A and it might play a role in the development or treatment of acne. Retinol is the topical form of Vitamin A, which can help treat or prevent inflammatory acne lesions.

3. Melasma Treatment

It is a popular remedy for treating Melasma.

Studies suggest that the enzymes like beta-carotene, Vitamins and phytochemicals in papaya have skin lightening properties.

Daily application of cold pressed papaya seed oil may help in lightening the skin and reduce dark spots.

Benefits of Papaya on Hair and dandruff control:

1) Hair conditioning

According to a study, Vitamin A in papaya can have positive effects on hair by helping the scalp by producing sebum which nourishes, strengthens, and protects your hair.

Here is an example on how to apply papaya

½ ripe papaya + ½ cup coconut oil + 1 tablespoon honey.

Apply the hair mask by applying the major solution to the scalp, keep it on for 30-40 minutes, then rinse off with water first and then apply the shampoo which you use on daily basis.

2) Hair Growth

A study suggests that the compounds present in papaya, along with Lycopene show a potent hair growth stimulating activity.

3) Dandruff Prevention

The main cause of dandruff is a yeast like fungus called as malassezia.

A study indicated that the antifungal properties of papaya seeds can assist in both controlling and preventing dandruff.

Benefits of papaya and it's Nutrition:

Nutrition

- **Relation of Papaya and Digestion**

Papayas contain an enzyme called papain that aids in digestion.

It is also used as a meat tenderizer. Papaya is high in fibre and has a good water content, both which help with constipation and promote regularity and a healthy digestive tract.

- **Relation of Papaya and Heart disease.** The fibre, vitamins and potassium content in papaya help in preventing heart disease. An increase in potassium and decrease in sodium will help in prevention of cardiovascular disorders.

- **Benefits of papaya for Menstrual Cycle:**

According to many studies, eating papaya has shown that it helps in the contraction of the uterine muscles. Papaya produces the required body heat as well as provides carotene.

This stimulates the hormone oestrogen which helps in inducing periods or menses more frequently.

How to eat a papaya:

When eating or let's start from buying the papaya, we have to look for fresh papaya's with reddish orange skin and which soft to touch. All parts are edible so we can scoop the flesh and eat it, remove the seeds we can dry them and then have them on daily basis.

Recipes:

- Make a tropical salad with fresh papaya, pineapple, and mangoes.
- Mix papaya with lemon mojito ingredients and soak overnight to make a papaya infused lemon mojito.
- Can be eaten in salsa form with tacos!

Adverse effects of Papaya:

"Every truth has two sides; it is as well to look at both before we commit ourselves to either." While papaya is an incredible tropical fruit, it has certain possible risk factors one should be conscious of before making any consumption decision. The risk factors depending on the usage of this fruit include:

Oral consumption:

Papaya fruit has bounteous health benefits when taken in amounts commonly found in foods. Its leaf extract is also safe when taken as a medicine for up to 5 days.

However, the consumption of unripened papaya is risky and possibly unsafe. The unripe papaya contains latex which is a mix of proteolytic enzymes including *papain*, *chymopapain A* and *B*, *endopeptidase papain III*, *endopeptidase papain IV* and *endopeptidase papain omega*. The risk is from papain enzyme that may damage the oesophagus when consumed in large amounts.

Consumption of papaya leaf extract in higher quantities (more than 2gm/kg of papaya leaf extract, as per most of the studies conducted) may cause the pulse rate to fall to dangerously low levels, potentially leading to the nervous system malfunction. This is due to an alkaloid compound called *carpaine* in the papaya leaves (this compound is also present in the seeds, bark and roots of the papaya tree). More research, though, is required to back this up.

Topical application:

Latex, a mix of the proteolytic enzymes present in the papaya fruit, varies in quantity depending on the ripeness of the fruit. Ripe papaya has a comparatively lower concentration of latex than unripe papaya. So, applying unripe papaya can cause skin irritation, blister formation or allergic reactions in some people.

Pregnancy:

Consumption of ripe papaya has been considered safe for pregnant women as it contains very little or negligible quantity of papaya latex. However, the unripe papaya has a significantly higher concentration of papaya latex which is studied to have a uterine-stimulating effect that may lead to miscarriage or premature labour. Not only this, but papaya latex also has oxytocin and prostaglandins like effect. These two hormones are widely studied to induce labour and cause contractions of the pregnant uterus. *Papain* and *chymopapain*, the main enzymes of papaya latex, have reported marked oedema and haemorrhagic placentas in fetuses. Hence, avoiding the consumption of unripe papaya during pregnancy is safer.

Breast Feeding:

Papaya fruit is presumed to have a stimulating effect on the breast milk flow in lactating women in countries like India, Melanesia and Angola. However, not many scientifically valid clinical trials support this lactation related use of papaya. Also, in many countries, it is said to harm the infant. Hence, it is better to either avoid or consult a doctor before consuming it in a period as sensitive as breastfeeding.

Blood Sugar levels:

Fermented Papaya Preparation (FPP) is starting to gain popularity for its hypoglycemic effect (i.e., blood sugar lowering effect). However, people who already have low blood sugar levels are likely to be at risk of blood sugar falling too low from the consumption of this form of papaya. Even overindulgence of fermented papaya preparation may lower the blood sugar level

beyond control. It is, thus, better to have a thorough knowledge of one's blood sugar levels before consuming FPP or before overindulging in the same.

Blood Thinning Medication:

According to various studies, papaya latex has proven anticoagulating or blood-thinning properties. Hence, if one is already on any blood-thinning or anticoagulating medications such as heparin, it is safer to check with a doctor before consuming papaya to avoid any cross interactions. Also, papaya fruit is to be avoided a few weeks before any surgery due to its anti-coagulating effect.

Hypothyroidism (Underactive Thyroid gland):

An individual suffering from Hypothyroidism may consider experimenting on different foods to improve the condition as it is very discomforting. However, consuming excess amounts of papaya for improvement is not a good choice as it can worsen the condition.

Latex Allergy:

If one has Latex Allergy, there is a good chance that they would be allergic to foods containing Latex too. Papaya is one such fruit that dominantly contains Latex. Such individuals should, hence, be careful and avoid papaya consumption.

Papain allergy:

Papain enzyme of the papaya fruit can cause allergic reactions in people exposed to it. People most exposed to papain are the ones who work in factories where papain containing products are manufactured or handled.

It is an allergen that can cause immediate and late asthma; or even various respiratory disorders such as, Wheezing, Obstructed breathing and continuous congestion of the nasal passages/ chest tightness. Apart from this, some individuals can also be sensitive to oral intake of papain.

Hence, individuals with papain sensitivity must avoid papaya consumption and also extensive protective measures should be taken in settings involving papain handling.

Dosing:

Carica papaya is, of course, a naturally occurring fruit used as a delight, a medicine, a rejuvenating agent, a digestive aid and a lot more. However, it is to be kept in mind that even a natural product is beneficial only if consumed in righteous form, manner and quantity.

The precise dosage of papaya that is to be given as a treatment for a specific condition depends on several factors such as the consumer's age, medical history, stage of the medical condition it is being used for, existing co-morbidities and many more. One should carefully follow the relevant directions on product labels and check with their health expert before using them.

Conclusions:

The papaya fruit has several benefits due to its nutrient content which is also filled with antioxidants that helps in reducing the oxidative stress by nullifying the free radicals. The plant leaf extract also has several properties such as anti-malarial, anti-inflammatory, anti-cancer which ultimately help towards optimum health. The leaf extract is helpful in increasing the platelets count in the body thereby helping the patients suffering from malaria and dengue.

The enzyme papain acts as a meat tenderizer, aids in the digestion process, furthermore it is also effective for healthy, radiant skin due to its anti-acne, anti-wrinkle properties. It is similarly helpful for healthy and strong hair with its benefits such as hair conditioning, hair growth and dandruff prevention.

Every coin has two sides and so does this fruit has adverse effects when consumed (especially unripe papaya) uncautiously during the specific time period like during pregnancy, breast feeding or with blood thinning medications. One also needs to be

careful about allergies. The most common allergies of this fruit are latex and papain allergies which can have hazardous effects causing unmanageable symptoms if been careless.

Everything in moderation is good for health, so a moderate dosage or consumption of this fruit is important.

Future Aspects: The benefits of papaya fruit and leaves is not only internal but also external. Hence, capsules for therapeutic treatments, products in the skin care and hair care range can be expected.

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Biographies.



Author: Prashant Singh Parihar.



Co.Author: Shibani Brahma.



Co.Author: Aditi Shirole.



Co.Author. Eesha Vahikar.



Co.Author. Harshita Agarwal.