

CHAPTER 9

HEALTH BENEFITS OF FICUS CARICA

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INTRODUCTION

Fruits are truly among nature's great gifts because they provide many nutrients that are essential for the health and maintenance of our bodies. Medicinal plants and their constituents have been extensively used as health promoting effect. Epidemiological studies have proven that natural product has disease cure potentiality through modulation of physiological and biological activities. Medicinal plants and its constituents have confirmed their role in diseases prevention and treatment. In this vista, *Ficus carica* and its ingredients have confirmed disease preventive ability.

Ficus carica, commonly known as fig, is one of the nutritious fruits which is rich in fibre, potassium, calcium and iron. It is eaten both dry and fresh, however it is most consumed as dry in our locality. Most of the people are unaware of the of including this nutritious raw fruit in their diet. *Ficus* is one of the largest genera of angiosperms from the mulberry family with more than 800 species of trees, shrubs, hemi epiphytes, climbers and creepers in the tropical and subtropical region all over the world. The most significant species of *Ficus* found in India, are *F. bengalensis*, *F. carica*, *F. racemosa* and *F. elastica*. *Ficus carica* belongs to Moraceae family and is commonly known as "Fig" (Anjir in Hindi) in India. Fig trees are commonly cultivated in warm and dry climates.

F. carica has been cultivated for a long time in various places worldwide for its edible fruit. It is supposed to originate from Western Asia and spread to the Mediterranean by humans. It is also an imperative world crop today. Turkey, Egypt, Morocco, Spain, Greece, California, Italy, Brazil, and other places with typically mild winters and hot dry summers are the major producers of edible figs. Fruits can be eaten raw, dried, canned, or in other preserved forms.

Fig fruit is a well-known nutritious and delicious fruit of the Indian subcontinent. Its cultivation is restricted and done locally, which makes it an underutilized fruit crop. Fig fruit is attractive, energy dense and rich in nutritive value. Daily consumption of figs can provide almost 20 per cent of the recommended dietary fibre per serving. It also helps to regulate blood pressure and blood cholesterol due to the presence of potassium, omega 6 and omega 3 fatty acids. High medicinal value of figs is attributed to presence of different phytochemicals.

FICUS CARICA

Ficus (Moraceae) comprises one of the largest genera of angiosperms with more than 800 species of trees, shrubs, hemi epiphytes, climbers, and creepers in the tropics and subtropics worldwide. This genus is an important genetic resource due to its high economic and nutritional values and also an important part of the biodiversity in the rainforest ecosystem. It is also a good source of food for fruit-eating animals in tropical areas. The genus is divided into six subgenera based on preliminary morphology. The monoecious subgenus *Urostigma* is the largest with about 280 species all inclusive, and most of them display distinctive hemiepiphytic habits. *Ficus* includes 23 species of hemiepiphytes and lithophytes which produce aerial and creeping root systems (N. Ronsted et al.,2008).

Ficus carica is usually a 15–20 ft tall deciduous tree, with numerous spreading branches and trunk rarely more than 7 ft in diameter. The edible seeds are numerous and generally hollow, unless pollinated. Pollinated seeds provide the characteristic nutty taste of dried figs. The interior portion is a white, inner ring containing a seed mass bound with jelly-like flesh. The latex of the plant is milky white and mainly contains ficin, i.e., protein hydrolytic enzyme (Badgular, 2011).



PHYTOCHEMISTRY

Phytochemical studies on *F. carica* revealed the presence of numerous bioactive compounds such as phenolic compounds, phytosterols, organic acids, anthocyanin composition, triterpenoids, coumarins, and volatile compounds such as hydrocarbons, Aliphatic alcohols, and few other classes of secondary metabolites from different parts of *F. carica*. Most species of *F. carica* contain phenolic compounds, organic acids, and volatile compounds (A.P. Oliveira et al.,2009).

Organic Acids

Organic acid profile of fig leaves is composed by six organic acids: oxalic, citric, malic, quinic, shikimic, and fumaric acids (Oliveira et al., 2009).

Amino Acid

The amino acid profile of *Ficus carica* latex was identified by High-Performance Liquid Chromatography coupled to ultraviolet–visible spectroscopy (HPLC/UV-vis). There are 13 amino acid compounds present in Ficus, comprising five essential amino acids (leucine, tryptophan, phenylalanine, lysine, and histidine) and eight non-essential amino acids (asparagine, alanine, glutamine, serine, glycine, ornithine, tyrosine, and cysteine). Tryptophan, cysteine, and tyrosine are found in higher quantities relative to the other amino acids (Oliveira et al., 2010).

Fatty Acids

The fatty acid profile of *Ficus carica* latex was determined by gas chromatography ion trap mass spectrometry (GC-ITMS). It revealed the presence of 14 major detectable fatty acids. These acids are identified as myristic, pentadecylic, palmitic, margaric, *cis*-10-heptadecenoic, stearic, oleic, elaidic, linoleic, arachidic, heneicosylic, behenic, tricosylic, and lignoceric (Oliveira et al., 2010).

Flavonoids

The main free flavonoid (non-glycosylated) in *Ficus carica* was found to be luteolin, which was also discovered to be the main free flavonoid in *Pistacia lentiscus* Linn (Anacardiaceae) locally named as Mastic tree. Luteolin (5,7,3'4'-tetrahydroxy-flavone) turned out to be the major flavonoid in the *Ficus* leaf, with a slightly higher flavonoid content than quercetin.

Another flavonoid identified in the *Ficus* is 5,7-dihydroxy-4'-methoxy-isoflavone, present mainly as a free aglycone (Vaya & Mahmood, 2006).

Phenolic Compounds

Phenolic compounds are ubiquitously distributed in fruits, where they exert specific functions and are very important for sensory properties, i.e., flavor and color. Moreover, phenolic compounds have become popular among scientists and consumers for their health-promoting properties, mainly for their antioxidant property (Caro & Piga, 2008). The phenolic profile of fig leaves is composed by seven phenolic compounds, namely 3-CQA [3-*O*-caffeoylquinic acid], 5-CQA [5-*O*-caffeoylquinic acid], Q-3-Glu [quercetin 3-*O*-glucoside], Q-3-rut [quercetin 3-*O*-rutinoside], ferulic acid, psoralen, and bergapten (Oliveira et al., 2009).

BIOLOGICAL PROPERTIES

Antioxidant Activity

F. carica contains many phenolic compounds that play many physiological roles in plants. Some of them are also favorable to human health, since they are able to act as an antioxidant by different ways: reducing agents, hydrogen donors, free radical scavengers, singlet oxygen quenchers, and so forth. Fruits contained the highest levels of polyphenols, flavonoids, and anthocyanins and exhibited the highest antioxidant capacity.

Anticancer Activity

A mixture of 6-*O*-acyl- β -*D*-glucosyl- β -sitosterols has been isolated as an effective cytotoxic agent from fig (*F. carica*) latex that showed *in vitro* inhibitory effects on proliferation of various cancer cell lines (S.D Yanjeva et al., 2005).

Hepatoprotective Activity

The petroleum ether extract from leaves of *F. carica* was evaluated for hepatoprotective activity on rats treated with 50 mg/kg of rifampicin orally, and significant reversal of biochemical, histological, and functional changes induced by rifampicin on rats indicated potential hepatoprotective activity (N.Y. Gond et al., 2008).

Antihelmintic

As per WHO, only a few drugs are frequently used in the treatment of helminths in human beings. Anthelmintics from the natural sources may play a key role in the treatment of parasite infections. Antihelmintic activity of aqueous, petroleum ether, chloroform, and methanol extract of leaves of *Ficus carica* was investigated against *Pheritima posthuma* in comparison with mebendazole as a standard drug (Patil et al., 2010).

Anticonstipation Effect

Constipation is one of the most common gastrointestinal complaints worldwide. This study examined the effects of fig paste for the treatment of loperamide-induced constipation in a rat model. For this purpose, animals were divided into one normal control group and four experimental groups (0, 1, 6, and 30 g/kg). Loperamide (2 mg/kg, twice per day) was injected intraperitoneally to induce constipation in the four experimental groups. Fig paste was administered for 4 weeks to assess its anticonstipation effects. In progress, fecal pellet number, weight, and water content were increased in the fig-treated groups as compared with the control group. Reductions in body weight and increased intestinal transit length were observed in the fig-treated groups. Fecal pellet number was reduced in the distal colons of the fig-treated rats. Exercise and ileum tension increased in the experimental groups as compared with the control group. Constipation was decreased when the fig fruit was fed to rats (Lee et al., [2012](#))

Antipyretic

Commonly used antipyretic drugs are toxic to liver cells and cause complications. Antipyretic effect of ethanol extract of leaves was evaluated and extract at doses of 100, 200, and 300 mg/kg body wt. showed significant dose-dependent reduction in normal body temperature and yeast-provoked elevated temperature.

Anti-inflammatory

Petroleum ether (PEE), chloroform (CE), and ethanol (EE) extracts of *Ficus carica* leaves are reported for anti-inflammatory activity against carrageenan-induced rat paw

edema. The EE exhibits greater anti-inflammatory effect than PEE and CE of *Ficus carica* as compared with the standard drug, indomethacin (Patil & Patil, 2011).

Antispasmodic and Antiplatelet

The aqueous ethanol extract (AEE) of *Ficus carica* fruit was studied for antispasmodic effect on rabbit jejunum preparations and for antiplatelet effect using *ex vivo* model of human platelets. When AEE is tested in isolated rabbit jejunum, it produced relaxation in a spontaneous way. AEE also inhibits the adenosine 5'-diphosphate and adrenaline-induced human platelet aggregation. This study exhibits the remarkable spasmolytic property in the ripe dried fruit of *Ficus carica* along with antiplatelet activity that provides sound pharmacological basis for its medicinal use in the gut motility and inflammatory disorders (Gilani et al., 2008).

Traditional and contemporary uses

Ficus carica has been extensively used in traditional medicine for a wide range of ailments. Its bark, fruit, leaves, roots, and latex are medicinally used in different forms. Also, it is used in combination with another medicinal plant. In addition, in Mediterranean countries, the fig is so widely used both fresh and dried that it is called "the poor man's food". In Unani medicine, *Ficus carica* is used as a mild laxative, expectorant, diuretic; also, in treatment of diseases of liver and spleen as deobstruent and anti-inflammatory agent. In ethnomedicine, fruits are used in leprosy and nose bleeding, and are used as antipyretic, aphrodisiac, lithotriptic, hair-nutritive, emollient, demulcent, laxative, and in the treatment of various inflammations, paralysis, liver diseases, chest pain, and piles. Roots are used as tonic in the treatment of leukoderma and ringworm infection (Manjula et al., 2011). Latex is used as expectorant, diuretic, anthelmintic and anemia. Leaves are used as antidiabetic, vermifuge, and contact dermatitis in humans, phototoxicity in animals. Seeds are used as edible oil and lubricant.

F. carica has been traditionally used for its medicinal benefits as metabolic, cardiovascular, respiratory, antispasmodic, and anti-inflammatory remedy. It is commonly referred to as "Fig". Leaves, fruits, and roots of *F. carica* are used in native medicinal system in different disorders such as gastrointestinal (colic, indigestion, loss of appetite, and

diarrhoea), respiratory (sore throats, cough, and bronchial problems), inflammatory, and cardiovascular disorders. Fruits of *F. carica* can be eaten fresh or dried or used as jam. Figs are used as an excellent source of minerals, vitamins, carbohydrates, and dietary fibre because it is fat and cholesterol free and contain high number of amino acids. It is also reported that figs have been conventionally used for their therapeutic benefits as laxative, cardiovascular, respiratory, antispasmodic, and anti-inflammatory remedies.

CONCLUSION

Ficus carica has emerged as a good source of traditional medicine for the treatment of various ailments such as anemia, cancer, diabetes, leprosy, liver diseases, paralysis, skin diseases, and ulcers and also have important nutritional value. It is a promising candidate in pharmaceutical biology for the development/ formulation of new drugs and future clinical uses.

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