

## A REVIEW ON TRADITIONAL, PHARMACOLOGICAL, PHARMACOGNOSTIC PROPERTIES OF *FICUS CARICA* (ANJIR)

Alam Imran\*, Jat R.K, Srivastava Varnika

Department Of Pharmacy, Suresh Gyan Vihar University, Rajasthan, India

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\*E-mail: [imranalam006@gmail.com](mailto:imranalam006@gmail.com)

### ABSTRACT

*Ficus carica* (Moraceae) is a deciduous tree, which grows in tropical and subtropical region of India, commonly known as fig tree. Dried figs are nutritionally rich fruits. Figs are one of the highest source of calcium, copper, magnesium, vit.k. The seeds are real fruit in figs. In traditional medicine the roots are used in the treatment of leucoderma and ringworms. Fruits have antipyretic aphrodisiac property. A 40gm portion of dried figs (2 medium size figs) produces significant increase in plasma antioxidant capacity. Many biologically active compounds were isolated from figs. The barks, leaves are used in the treatment of diabetes, skin, diarrhea, and ulcer. Sushrusa included the fruits for use in fever, consumption, asthma, epilepsy and insanity. The present review in therefore, and effort to give a detailed survey of literature on its pharmacognostic, traditional and pharmacological uses.

**KEYWORDS** *Ficus carica*, Pharmacognostic, Traditional, Antioxidant, Antipyretic

### INTRODUCTION

In the history of foods the fig is one of the earliest fruits to be desiccated and stored by men. Sumerian civilization, Phoenicians, ancient Greek and old Chinese promoted fig culture and gave it sky scraping fame. The fruits were dried and stored for letter consumption. Legend has it that the Greek goddess Demeter first revealed to mortals the fruits of autumn, which they called the figs<sup>[1]</sup>. *Ficus* constituted one of the largest genera of medicinal plants with about 750 species of woody plants, trees and shrubs primarily occurring in subtropical and tropical regions throughout the world. There are four principal varieties of cultivated figs: the amber colored calimyra, the dark, purplish mission; the small but high-in-sugar Adriatic; and the unicly white to translucent amber kadota.

Since these are found all over the world, these are known many common names in different part of the world such as anjir (India), fig (English), higo (Spanish), figue (French), fige (German).

Figs are richest in mineral like copper, manganese, magnesium, potassium, calcium, vitamin k. they are good source of flavanoids and polyphenols including galic acid, chlorogenic acid, syringic acid, (+)- catechin, (-)- epicatechin and rutin<sup>[2,3]</sup>. The fruits of most other species are also edible though they are useally of only local economic importance or eaten as bush food. However, they are extremely important food resources for wildlife. In India, the most important species of *Ficus* are *Ficus Bengalensis*, *Ficus carica*, *Ficus racemosa* and *Ficus elastica*.

Figs have a laxative effect and contain many antioxidants. It is also used in various disorders such as gastrointestinal, respiratory, inflammatory, cardiovascular disorder, ulcerative diseases and cancers<sup>[4-7]</sup>. In traditional medicine the roots are used in the treatment of leucoderma and ringworms and its fruits which are sweet have antipyretic, purgative, aphrodisiac properties<sup>[8,9]</sup>. For the long time it has been used to treat warts. Moles and blisters. Eating figs prevent cracking of lips and premature wrinkles. The milky juice of green fig has necrotic property. This study was aimed to present an overview of traditional, phytochemical and pharmacological investigations of bioactive compounds present in these plants.

#### ***Ficus carica* (Fig/Angir)**

*Ficus carica* Linn, the plants of genus *Ficus* belonging to family moraceae are very important for their traditional use andtherapeutic potentials. *Ficus carica* known as fig in English and anjir in Hindi is an deciduous tree<sup>[10]</sup>. Cultural aspects of fig is in the book Genesis in the bible, Adam and Eve clad themselves with fig leaves (Genesis

3.7) after eating the “forbidden fruits” from the Tree of knowledge of Good and Evil. Among the more famous species are the sacred fig tree (pipal, bodhi) and the banyan fig (*Ficus bengalensis*). The fig tree was sacred in ancient Cyprus were it was a symbol of fertility<sup>[11,12]</sup>.

### ORIGIN AND DISTRIBUTION

The fig grows well in Mediterranean and dryer warm temperate climate. The fig is a deciduous tree, to 50ft tall but more typically to height of 10-30ft, chiefly cultivated in Mediterranean region, from Turkey in the east to Spain and Portugal in west, to a small extent in India, Arabia, China, and Japan.

### PHARMACOGNOSTIC PROPERTIES

#### **Macroscopy**

##### **Bark**

The bark is a smooth and silvery gray.

##### **Leaves**

Fig leaves are bright green, single, alternate upto 1ft length. They are more or less deeply lobed with 1-5 sinuses, rough hairy on the upper surface and soft hairy on the under side.

##### **Flower**

The tiny flowers of the fig are out of site, clustered inside the green fruits.

##### **Fruits**

The matured “fruit” has a tough peel (pure green, green suffused with brown or purple), often cracking upon ripeness and exposing the pulp beneath.

##### **Seeds**

Seeds may be large, medium, small or minute and range in no.from 30-1600 per fruits<sup>[13,14]</sup>.

##### **Microscopy**

**Microscopical:** The transverse section of the leaf reveals.

##### **Lamina**

Single layer of upper and lower epidermis, covered with a thin cuticle. The lower epidermis showed stomata and it was of anomocytic type. Below the upper epidermis double layer of palisade cells was found. Palisade cells are rectangular and compact. Below the palisade cell layer spongy parenchymatous cells were present in 5-6 layers. Covering, unicellular trichomes were present in large number.

##### **Midrib**

The upper and lower epidermal layers of lamina are continuous over the midrib. Two layers of collenchyma were observed above the lower epidermis. The rest of the midrib is occupied by spongy

parenchyma with the vascular bundle which is of collateral type. The vascular bundle is surrounded by pericyclic fibres. The unicellular trichomes were also present.

#### **Powder**

The behavior of leaf powder upon treatment with different chemical reagents was also observed. Fluorescence studies of various powders with various reagents revealed the presence of green and orange fluorescence with Conc. sulphuric acid and sodium hydroxide respectively under UV light at 254 and 366 nm<sup>[15]</sup>.

#### **Nutritional Information**

One large fruit contain (64gm) the following nutritional information according to the USDA<sup>[16-17]</sup>.

- Calories : 47
- Fat : 0.19
- Carbohydrates : 12.28
- Fibers : 1.9
- Protein : 0.48

#### **Traditional Uses Of *Ficus carica* Linn (Anjir)**

Fig is one of the earliest fruit cultivated by primitive man. Figs are having a definite laxative effect on a high alkalinity of ash. The laxative effect is probably due to the bulk of seeds and fiber combined with some specific solvent present in the juice.

The juice of the fruit with honey was prescribed by checking haemorrhage (Vrinda Maadhava). In Unani medicine, anjir is used as a laxative, expectorant, diuretic, also in the disease of liver and spleen as a deobstruent and anti-inflammatory agent<sup>[18]</sup>. The fruits emollient pulp helps relieve pain and inflammation and has been used to treat tumours, swelling and gum abscesses although, the fruit is often roasted before application.

Traditional Arabian medicine used figs as being strengthening to the body, building stamina and vigor<sup>[19]</sup>. Dry figs and flowers of genus senna combined to make a medicine to stimulate evacuation of the Bowles. In alternative medicine figs ensure treatment of headach, arthritis, and stomach disorder. It is used in various disorders such as gastrointestinal, cardiovascular disorder, ulcerative diseases and used in the treatment of leucoderma and ring warms.

#### **Pharmacological Properties**

##### **Hepatoprotective Activity**

Shade dried leaves of *Ficus carica* were extracted using petroleum ether (60-80<sup>0</sup>) and tested for antihepatotoxic activity on rats treated with 50mg/kg of rifampicin orally. The parameter assessed were serum levels of glutamic oxalo acetate transaminase, glutamic pyruvic transaminase, billirubin and histological changes in liver. Liver weights and pantobarbitone sleeping time as a functional parameter were also monitored. There was significant reversal of biochemical histological and functional changes induced by rifampicin treatment in rats by petroleum ether extract treatment, indicating promising hepatoprotective activity<sup>[20]</sup>.

##### **Hypoglycemic Activity**

The leaf extract induced a significant hypoglycemic effect in oral or intraperitoneal administration in streptozotocin-diabetic rats. Weight loss was prevented in treated diabetic rats and the survival index was significantly altered by the plasma insulin levels. Result shows the *Ficus carica* aqueous extract has a clear hypoglycemic activity<sup>[21]</sup>.

##### **Anticancer Activity**

Bioactive compounds like 6-o-acyl-β-d-glucosyl-β-sitosterols. The acyl moiety being primarily palmitoyl and linoleyl with minor amount of stearyl and oleyl has been isolated as a potent cytotoxic agent from fig latex. Both the natural and synthetic compounds showed invitro inhibitory effects on proliferation of various cancer cell lines<sup>[22]</sup>.

##### **Hypolipedemic Activity**

Livers from 8 week old roosters (n=24) with high abdominal fat pad ratios were extracted, sliced and cultivated with increasing concentration of leaf extracts, insulin both of them. While insulin significantly increased TG secretion (0.190±0.013mmol/l), TG contents (0.523±0.093mmol/l), and TC secretion (1.727±0.412mmol/l) and above the basal level (P<0.001), when leaf extract was added these effects were drastically reduced to the basal level in a concentration dependent manner (P<0.001). These results suggest that *ficus carica* leaf extract could be a beneficial supplement to modulate TG and TC secretion in poultry liver<sup>[23]</sup>.

##### **Antipyretic Activity**

Study was carried out to evaluate the antipyretic effect of an ethanolic extract of leaves of *Ficus carica* linn belonging to the family of moraceae, at normal body temperature and yeast induced pyrexia, in albino rats. The ethanol extract of *Ficus carica*, at the doses of 100, 200 and 300mg/kg showed the significant dose dependent reduction in normal body temperature and yeast provoked elevated temperature. The effect extended upto 5 hours after drug administration when compared to that of paracetamol (150mg/kg), standard antipyretic agent. This shows the antipyretic effect of ethanolic extract of the leaves of *Ficus carica*<sup>[24]</sup>.

##### **Antioxidant Activity**

The potential health-promoting constituents of fig fruits were studied with six commercial fig varieties differing in color (black, red, yellow and green) were analyzed for total polyphenols, total flavanoids, antioxidant capacity and profile of anthocyanins. In dark coloured mission and the red- brown-Turkey varieties, the anthocyanins fraction contributed 36 and 28% of the total antioxidant capacity, C3R (cyaniding-3-o-rutinoside), contributed 92% of total antioxidant capacity of the anthocyanon fraction. Fruits of the mission variety contained the highest levels of polyphenols, flavanoids, and anthocyanins exhibited the highest antioxidant capacity<sup>[25-26]</sup>.

##### **Anti Fungal Activity**

A low molecular weight protein with antifungal activity was isolated from the freshly collected latex of the anjir tree (*Ficus carica*) by successing affinity chromatography over chitin, cataion exchange chromatography over SP-sephadexC-50 and RP-HPLC. The molecular weight of 6481 and the partial n-terminus sequence of the protein were determined<sup>[27]</sup>.

##### **Anti-HSV**

To study the anti-HSV effect of the extract from the leaves of *Ficus carica*. The effective ingredient was extracted from the leaves of *Ficus carica* and ativirus effect was observed on Hep-2, BHK21 and PRK cells. The water extract from the leaves of *Ficus carica* possessed distinct antiHSV-1 effect. The MTC was 0.5mg/ml, TDO was 15mg/ml and TI was 30.0. It possess low toxicity and directlily killing virus effect on HSV-1. The leaves of *Ficus carica* possess anti-HSV-1 effect and their application on the area of medicine, food and drugs have expansive back ground<sup>[28]</sup>.

##### **Antibacterial Activity**

The methanol activity of (MIC<sub>s</sub>, 0.156 to 5mg/ml; MBC, 0.313 to 5mg/ml) showed a strong antibacterial activity against oral bacteria. The combination effect of methanol extract with ampicillin or gentamicin was synergistic against oral bacteria. It is proved that figs could act as a natural antibacterial agent<sup>[29]</sup>.

##### **Antispasmodic Activity**

To rationalize the medicinal use of Fig (*Ficus carica*) in gastrointestinal and inflammatory disorders. The aqueous-ethanolic extract of *Ficus carica* (Fc.Cr) was studied for antispasmodic effect on the isolated rabbit jejunum preparations and for antiplatelet effect using exvivo model of human platelets.

*Ficus carica* tested positive for alkaloids, flavonoids, coumarins, saponins, sterols and terpenes. When tested in isolated rabbit jejunum, Fc.Cr (0.1-3.0 mg mL<sup>-1</sup>) produced relaxation of spontaneous and low K<sup>+</sup> (25 mM)-induced contractions with negligible effect on high K<sup>+</sup> (80 mM) similar to that caused by cromakalim. Pretreatment of the tissue with glibenclamide caused rightward shift in the curves of low K<sup>+</sup>-induced contractions. Similarly, cromakalim inhibited the contractions induced by low K<sup>+</sup>, but not of high K<sup>+</sup>, while verapamil equally inhibited the contractions of K<sup>+</sup> at both concentrations. *Ficus carica* (0.6 and 0.12 mg mL<sup>-1</sup>) inhibited the adenosine 5-diphosphate and adrenaline-induced human platelet aggregation. This study showed the presence of spasmolytic activity in the ripe dried fruit of *Ficus carica* possibly mediated through the activation of K<sup>+</sup> ATP channels along with antiplatelet activity which provides sound pharmacological basis for its medicinal use in the gut motility and inflammatory disorders<sup>[30]</sup>.

#### Help Lower High Blood Pressure

Figs are a good source of potassium, a mineral that helps to control blood pressure. Since many people not only do not eat enough fruits and vegetables, but do consume high amounts of sodium as salt is frequently added to processed foods, they may be deficient in potassium. Low intake of potassium-rich foods, especially when coupled with a high intake of sodium, can lead to hypertension. In the Dietary Approaches to Stop Hypertension (DASH) study, one group ate servings of fruits and vegetables in place of snacks and sweets, and also ate low-fat dairy food. This diet delivered more potassium, magnesium and calcium. Another group ate a "usual" diet low in fruits and vegetables with a fat content like that found in the average American Diet. After eight weeks, the group that ate the enhanced diet lowered their blood pressure by an average of 5.5 points (systolic) over 3.0 points (diastolic)<sup>[31]</sup>.

#### Bone Density Promoter

Figs are a fruit source of calcium (79 milligrams in an 8 oz-wt serving), a mineral that has many functions including promoting bone density. Additionally, figs potassium may also counteract the increased urinary calcium loss caused by the high-salt diets typical of most Americans, thus helping to further prevent bones from thinning out at a fast rate<sup>[32]</sup>.

#### Protection Against Macular Degeneration

Your mother may have told you carrots would keep your eyes bright as a child, but as an adult, it looks like fruit is even more important for keeping your sight. Data reported in a study published in the Archives of Ophthalmology indicates that eating 3 or more servings of fruit per day may lower your risk of age-related macular degeneration (ARMD), the primary cause of vision loss in older adults, by 36%, compared to persons who consume less than 1.5 servings of fruit daily.

In this study, which involved over 100,00 women and men, researchers evaluated the effect of study participants' consumption of fruits; vegetables; the antioxidant vitamins A, C, and E; and carotenoids on the development of early ARMD or neovascular ARMD, a more severe form of the illness associated with vision loss. Food intake information was collected periodically for up to 18 years for women and 12 years for men<sup>[33]</sup>.

While, surprisingly, intakes of vegetables, antioxidant vitamins and carotenoids were not strongly related to incidence of either form of ARMD, fruit intake was definitely protective against the severe form of this vision-destroying disease. Three servings of fruit may sound like a lot to eat each day, but by simply tossing a banana into your morning smoothie or slicing it over your cereal, topping off a cup of yogurt or green salad with a couple of diced figs, and snacking on an apple, plum, nectarine or pear, you've reached this goal.

#### CONCLUSION

The present study shows the pharmacognostic and phytochemical properties of various bioactive compounds present in this plant. In traditional use the fruits emollient pulp helps in relieving pain and inflammation. Shade dried leaves of ficus extract with petroleum show antihepatotoxic activity. The ethanol extract also showed significant dose dependent reduction in normal body temperature when compared to that of standard antipyretic agent. Further more clinical and pathological studies should be conducted to isolate the characterize the bioactive components present in this plant.

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