

Review article

***FICUS CARICA* L.: A PANACEA OF NUTRITIONAL AND MEDICINAL BENEFITS**

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ABSTRACT

Since times immemorial, people have been dependant on plants for the various nutritional and pharamacological properties. Folk and traditional medicine recognizes thousands of plant species having miraculous benefits. Fig (*Ficus carica* Linn.) has been part of folk-lore since centuries. *Ficus carica* Linn. (Moraceae) is a huge deciduous tree, with more than 800 species. Different parts of *Ficus carica* like bark, root, leaves, fruit and latex have their own valuable importance and are frequently used for the treatment of various illnesses. Fruit of *Ficus carica* is commonly called as fig (*anjeer*) has various medicinal properties used in Unani, Ayurvedic and Chinese traditional system of medicines. Fig fruit is mostly used in gastro intestinal and respiratory disorders. In Unani medicine, fig is used as a diuretic, mild laxative and expectorant. Phytochemical studies on the leaves and fruits of the plant have shown that they are rich in Phenolics, Flavonoids, Vitamin C, Alkaloids, Saponins, Coumarins, tannins, organic acids, and volatile compounds due to which it is having great antioxidant property. Most interesting therapeutic effects include hypoglycemic, hepatoprotective, anticancer, antimicrobial and hypolipidemic activities.

Keywords: Flavonoids, anthocyanins, laxative, saponins, tannins.

INTRODUCTION

Fig (*Ficus carica* L.) is known to be one of the first plants cultivated and oldest known fruit tree by humans. By recent investigations it had been indicated that fig has been cultivated for over 11000 years conceivably exist before cereal grains. (Kislev, 2006; Borola, 2014). *Ficus carica* Linn. is having greatest commercial importance among all the species of fig and is known by the name of common fig (*Anjeer* in hindi). (Barolo, 2014) It is one of the largest genera of angiosperms, and a deciduous tree of mulberry family Moraceae with more than 800 species of epiphytes, trees, and shrubs in sub tropical and tropical regions throughout the world. This tree is a native of south western part of Asia minor, and progressively spread to Europe and around the world. (Mitrofanova, 2016) It is cultivated in many parts of Uttar Pradesh, western part of Maharashtra, Tamil Nadu, Gujarat and Karnataka (Knap, 2016; Gond, 2008). It has been regarded from pre historical times as an anthropogenic tree and has been widely cultivated from ancient times for its fruits having nutritional value and referred to as figs. Figs have significant importance in Indian mythology throughout the tropics, both as objects of worship and for their many everyday uses. *Ficus carica* have been indicated in the traditional systems of medicine such as Unani, Siddha, Ayurveda and Chinese medicine for its therapeutic efficacies. (Shamkant, 2014; Borola, 2014) In human culture *Ficus carica* is a

remarkable and ancient source of food and medicine (Borola, 2014; Nikhat, 2013).

Fruits of fig can be eaten raw, dried, canned, or in other preserved forms like in sweets and jam which can be eaten fresh or used in preparation of delicacies and cakes. As per USDA data, dried fig has the best nutrient score as it is an important source of vitamins and minerals among all dried fruits. Fig is rich in iron, proteins, calories, and highest fibre content. It is the richest source of calcium higher than milk. Fig has nutritive index of 11, as against 6, 8 and 9 for date, raisin, and apple (Gani, 2018).

BOTANICAL CLASSIFICATION (Shamkant, 2014)

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Urticales
Family: Moraceae
Genus: *Ficus*
Species: *carica*

VERNACULAR NAMES

Arabic: Teen
Chinese: Wuhuaguo
English: Common Fig, Fig
French: Carique, Figuier commun
German: Echte, Feige, Essfeige, Feigenbaum
India: Anjir; Italian, Fico
Korean: Muhwagwanamu
Portuguese: Figueira, Figo, Figueira-Comum, Figueira-Da-

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Europa, Figueira-Do-Reino
 Spanish: Higo, Higuera-común
 Swedish: Fikon, Getfikon. (Al-Snafi, 2017)

BOTANICAL DESCRIPTION

Ficus carica is usually a 15-30 ft high, large deciduous tree or a large shrub with several branches from a trunk. Bark of the tree is grey, smooth or dull white or delicately hairy. Leaves are broad ovate or nearly orbicular, more or less deeply lobed, blade 10-20, petiole 5-7.5 cm, rough above and pubescent below. Flowers are unisexual, minute, closely crowded on the inner surface of large, hollow, externally pear-shaped receptacle, supported at base by several broad, smooth, scaly bracts, and perforated at apex by an orifice closed by numerous small scales. Male flowers: are few, found on lower part of receptacles. Stamens: usually 1-5, generally 3, sepals: 4, filaments: longer than perianth. Female flower: are found on the upper part of receptacles, shortly stalked, pedicellate, sepals-4, perianth very delicate and transparent, deeply cut into 3-5 acute segments, ovary superior, hyaline, 1-celled with a single ovule. The fruit of *F. carica*, like those of other species of *Ficus*, is a syconium- a fleshy hollow receptacle of a pear shaped form, on the inner surface of which grows a multitude of minute fruits. The ripe and unripe fruit of fig is shown in figure 1 and figure 2. Depending upon the nature of flowers and the method of pollination, it is usual to distinguish pomologically in 4 distinct classes of figs, Common fig, Caprifig, Smyrna fig and San Pedro fig. Of these four types Smyrna fig is commercially important and is extensively grown in Europe and America. (Al-Snafi, 2017; Dymock, 2005; Shamkant, 2014)

PARTS USED (CSIR, 1956)

- Fruit -fresh and dried
- Bark
- Leaves
- Roots
- Latex

TEMPERAMENT

Temperament of fig is hot in first degree and moist in second degree. Hot1 and Moist2. (CCRUM, 1987; Ali, 2012; Kabiruddin, 1953)



Fig.1 FIG (Ripe Fruit)



Fig.2 FIG (Unripe Fruit)

ACTIONS (Kabiruddin, 1953; Ali, 2012; Khan, 2012).

- Jali* (Detergent)
- Mudir e Bol* (Diuretic)
- Mulayyin* (Laxative)
- Mushil* (Purgative)
- Mu'arriq* (Diaphoretic)
- Mugharri* (Agglutinant)
- Muqawwi e Jigar* (Liver tonic)
- Mulattif* (Demulcent)
- Mufatteh* (Deobstruent)
- Munzj* (Concoctive)
- Mohallil* (Anti inflammatory)
- Muqawwi e Dimagh* (Brain tonic)
- Mughazzi* (Nutrient)

Therapeutic uses (Kabiruddin, 1953)

It is the drug of choice for Chicken pox and measles.

Other Uses (Kabiruddin, 1953; Ali, 2012; Khan, 2012)

- Sara* (epilepsy)
- Junoon* (mania)
- Falij* (paralysis)
- Amraz e Sadar* (Respiratory disease)
 - Chronic dry cough
 - Chronic throat dryness
 - Chronic Chest pain
 - Breathlessness
 - Asthma
- Khafkhan* (palpitation)
- Sudda, salabat e tilli* (obstruction of spleen)
- Amraz e gurda wa masana* (Disease of uro-genital tract)
 - *Huzal e kulliya* (dystrophy of kidney)
 - *Usrul baul* (Dysuria)
 - *Sulas-al Baul* (Dribbling of urine) dry fig is very effective
 - *Salabat e Reham* (uterus hardening)
- Qabz* (Constipation)
- Qulanj* (Colitis)

Dard e Kamar (Backache)
Amraz e Jild (Skin disease)

- Khelan (Freckles)
- Judri (Chicken pox)
- Hasba (Measles)
- Thaleel (Moles)
- Bahaq (ptoriasis)
- Qooba (tinea)
- Kalf (melasma)
- Jarb (scabies)
- Pitti (urticaria)
- Taqasshur e jild (scaling of skin)

Local application in joint pain and gout.

Toxicity: Liver

Correctives: Sikanjbeen

Substitues: Mawiz munaqqah

Dose: 2-3 fruits per day

ACTIVE CONSTITUENTS

Several phytochemical studies describe the presence of numerous bioactive compounds like organic acids, phenolic compounds, volatile compounds and few other classes of secondary metabolites from different parts of *Ficus carica*. Fresh fruits of *Ficus carica* contains cyanidin-3-Orhamnoglucoside, Cyanidin-3-O-glucoside, insoluble sugars, protein, iron, sodium, vitamin C, vitamin A, calcium, cholesterol, and saturated fat. Various flavonoids, Alkaloids, saponins, coumarins and terpenes are found in ripe dried fruit. Dried fruit contained total higher amounts of phenolics than the pulp of fresh fruits. Leaves of *Ficus carica* contains many active ingredients such as Furano coumarins including xanthotoxin, psoralen, bergapten, triterpenes such as calotropenyl acetate, lupeol acetate, and Phenolic acids such as 3-O- and 5-O-caffeoylquinic acids, ferulic acid, quercetin-3-O-glucoside, quercetin-3-O-rutinoside. Dried seeds contain fixed oil including fatty acids. (Oguzhan, 2011; Rahmani, 2017) Triterpenoids have been isolated from latex (mainly as steryl derivatives) and roots, Acyl sterylglucosides were stated only from latex. (Rubnov, 2001; Barolo, 2014)

Table 1. Mineral composition in dried Fig fruit

| Analyte | Concentration (ppm) |
|----------------|---------------------|
| Strontium (Sr) | Saturated |
| Calcium (Ca) | 1545.46 |
| Magnesium (Mg) | 679.04 |
| Phosphorus (P) | 365.75 |
| Iron (Fe) | 29.49 |
| Zinc (Zn) | 9.87 |
| Copper (Cu) | 5.02 |
| Manganese (Mn) | 4.75 |
| Arsenic (As) | 1.669 |

| | |
|-----------------|--------|
| Chromium (Cr) | 1.47 |
| Nickel (Ni) | 1.178 |
| Thallium (Tl) | 1.5686 |
| Tin (Sn) | 1.329 |
| Antimony (Sb) | 0.298 |
| Cadmium (Cd) | 0.0034 |
| Cobalt (Co) | 0.032 |
| Lead (Pb) | 0.680 |
| Lithium (Li) | 0.245 |
| Molybdenum (Mo) | 0.026 |
| Selenium (Se) | 0.790 |
| Titanium (Ti) | 0.3727 |

PHARMACOLOGICAL PROPERTIES

- ❖ Anti-inflammatory activity
- ❖ Anti-oxidant activity
- ❖ Anti-bacterial activity
- ❖ Anti-acne activity
- ❖ Antipyretic activity
- ❖ Anti-hyperlipidemic activity
- ❖ Anti-cancerous activity
- ❖ Hepatoprotective activity
- ❖ Hypoglycemic activity
- ❖ Nephroprotective activity

I. Anti-inflammatory activity

- Ali *et. al.* stated in his study that the hydro-alcoholic extract of *F. carica* leaves showed significant anti-inflammatory effects in the carrageenan induced paw oedema in rats. The presence of steroids, which are described to be present in the drug, enhances the anti inflammatory activity. (Ali, 2012)

II. Anti-oxidant activity

- Neha Soni *et. al.* reported that the antioxidant potential of fig extract was determined by ABTS assay was found to be very good (19.8 mg/ml) in the extract. (Soni, 2014)
- B. Ali *et. al.* also stated that the hydroalcoholic extract was found to scavenge the superoxide generated by photo-reduction of riboflavin in a concentration dependent manner. The presence of flavonoids which are reported to be found in drug is responsible for its antioxidant property. (Ali, 2012).
- Souhila Mahmoudi *et. al.* stated that Flavonoids, carotenoids and triterpenes have antioxidant activity by scavenging reactive oxygen species which prevent potential damage to cellular components such as DNA, proteins and lipids. (Mahmoudi, 2016)

III. Antibacterial activity

- Antibacterial activity was also reported using the well diffusion method by measuring zone of inhibition by an antimicrobial susceptibility test. Three gram positive bacteria (*Staphylococcus epidermidis*, *Bacillus subtilis*, *Staphylococcus aureus*), and A gram negative bacterium *Proteus mirabilis* were used to evaluate the antibacterial activity of dried fig extract. The dried extract of fig was

found to have higher antibacterial activity against *Proteus mirabilis*. (Soni, 2014)

- Souhila Mahmoudi et. al. reported that the extracts of *Ficus carica* leaves showed bactericidal activity and moderate antifungal activity, and the minimal inhibitory concentrations and minimal lethal concentrations were determined on *Bacillus cereus* and *Staphylococcus aureus*. (Mahmoudi, 2016).

IV. Anti-acne activity

- Chandani M Vaghasiya et. al. reported that the distilled Water extract of fruits as well as leaves has the best anti-acne activity, almost comparable to that of Erythromycin in 1 mg/ml concentration. (Vaghasiya, 2015)

V. Antipyretic activity

- Patil Vikas V. et. al. stated that that the ethanolic extract of the leaves of *Ficus carica* possesses a significant antipyretic effect in the yeast-provoked elevation of body temperature in rats, and its effect is comparable to that of Paracetamol taken as standard drug. *Ficus carica* extract also significantly reduced the normal body temperature. (Bhangale, 2010)

VI. Anti-hyperlipidemic activity

- Lorenz Joerin et. al. confirmed the anti-hyperlipidemic effect of *F. carica* leaf extract on high-fat diet-induced Sprague-Dawley rats. (Joerin, 2014)

VII. Anti-cancerous activity

- Seyyed Abbas Hashemi et. al. reported that there was a significant change in anti-proliferative effect of fig tree latex in 10 mg/ml on esophageal cancer line. Latex of *Ficus carica* tree could be a potential agent for the inhibition of cancerous cells production and development.
- Ghadam Ali Khodarahmi et. al stated that all extracts from the fruits, leaves and the latex have moderate cytotoxicity against HeLa cell line. The cytotoxic effects present mostly in the resin of the latex of *Ficus* species. (Khodarahmi, 2011)

VIII. Hepatoprotective Activity

- N. Y. Gond et. al. mentioned in their preclinical study, that the petroleum ether extract of *Ficus carica* definitely possess liver protective activity. (Gond & Khadabadi, 2008; Joseph & Raj, 2011) In another pre-clinical study, Nasrin Aghel et. al revealed hepatoprotective action with *Ficus carica* leaf extract in dose of 200 mg/kg against CCl4 induced hepatic damage. (Aghel, 2011; Bhaargavi, 2014)
- S. Sivakrishnan et. al. stated that methanolic extract of *Ficus carica* shows the hepatoprotective activity against drugs induced hepatotoxicity. (Sivakrishnan, 2019)

IX. Hypoglycemic Activity

- El-Shobaki, F. A. et. al concluded that inclusion of *Ficus carica* Linn. or its leaves in food may help to correct the hyperglycemia due to diabetes in their preclinical study. (El-Shobaki, 2010)
- Santiago Stephen Irudayaraj et. al. stated in his study that the ethyl acetate extract of *F. carica* leaves have an anti-diabetic activity by stimulating the insulin production from the regenerated beta cells of the pancreas. Increased insulin

secretion after treatment with *F. carica* positively altered the deranged carbohydrate metabolism in the diabetic rats by decreasing gluconeogenesis and increasing glycolysis, ultimately decreasing hyperglycemia. (Irudayaraj, 2017; Fazil, 2019)

X. Nephroprotective activity

- A preclinical study concluded that Hydroalcoholic extract of *Ficus carica* is effective in reducing serum creatinine, urea and blood urea nitrogen level in gentamicin toxicity, indicating a nephroprotective effect. (Kore, 2011)

XI. Anti-viral activity

- Michele Camero et. al. reported in his in vitro study that *Ficus carica* latex reduces the viral titres, which is produced by CpHV-1-infected MDBK cells. The latex was able to interfere with the replication of CpHV-1. (Camero, 2014)
- Houda Lazreg Aref et. al proved in his study that hexanic extract and hexane-ethyl acetate extract, both possessed antiviral activity against HSV-1, ECV11 and ADV. Extract of *Ficus carica* are capable of deteriorating the integrity of the virus and to prevent it from carrying out its infection. This activity could be due to the presence of ferulic acid as the main phenolic compound. (Aref, 2011)

CONCLUSION

By extensive literature survey, it was revealed that *Ficus carica* is an important medicinal plant which was used from traditional Unani system of medicine. It has been cultivated for over 11,000 years, possibly preceding cereal grains. It is a good source of vitamins, minerals (calcium, sodium and potassium), essential amino acids and dietary fibres. Nutrient composition of dried figs indicates that it has the best nutrient score among the dried fruits. *Ficus carica* is a rich source of naturally occurring antioxidant like phenolic compounds, flavonoids, phytosterols, sterols, anthocyanins and volatile compounds. Phenolic compounds and flavonoids play a vital role in preventing the health disorder which is related to oxidative stress including cardiovascular diseases, neurodegenerative diseases and cancer.

F. carica fruit is used to treat constipation, worked as laxative, purgative, antipyretic and aphrodisiac, dysentery and enteritis, fig is useful in piles, gout, in liver and spleen disorders as mentioned in Unani literature. Roots are used in treatment of ringworm and leucoderma. Latex of fig has been used as vermifuge as mentioned in classical literature.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest..

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