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## Ficus Carica: A Boon in Indian Traditional Medicine

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### Abstract:

The Ficus genus, part of the Moraceae family, comprises around 850 species, many of which serve as a nutritional source for humans. Various parts of Ficus plants, including roots, stems, leaves, and fruits, are medicinally significant due to their rich content of bioactive phytochemicals. These compounds include polyphenols, phenolic acids, triterpenoids, flavonoids, and vitamins, which exhibit strong antioxidant properties.

The antioxidant potential of Ficus phytochemicals enables them to neutralize free radicals, chelate metals, and reduce oxidative stress in biological systems. This, in turn, contributes to the plants' various biological activities, including antimicrobial, antidiabetic, anti-obesity, and anticancer effects. Ficus plants have been found to possess hepatoprotective, cardioprotective, and renal-protective properties, making them effective in treating a range of conditions, such as diabetes, stomach issues, skin diseases, inflammation, and cancer.

The diverse phytochemical composition of Ficus plants underscores their medicinal value and potential for therapeutic applications. By leveraging the antioxidant and biological activities of these plants, it's possible to develop new treatments and prevention strategies for various diseases. Overall, Ficus plants offer a rich source of bioactive compounds with significant potential for improving human health and well-being. Their long history of use in traditional medicine is supported by scientific evidence highlighting their efficacy and potential benefits.

**Keywords:** Moraceae, Ficus, Chelate metals, Oxidative stress, Antidiabetic, Anticancer

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### Introduction

In India, fig farming is primarily concentrated in a few states, including Maharashtra, Gujarat, Uttar Pradesh, Karnataka, and Tamil Nadu. In the northern regions, its cultivation extends to parts of Uttar Pradesh, Uttarakhand, Punjab, and Himachal Pradesh [1]. Despite its potential, fig fruit is considered an underutilized crop, particularly suited for growth on wastelands in the Indian subcontinent. Currently, fig cultivation

covers approximately 5600 hectares, yielding a production of 19,000 metric tons and a productivity rate of 12.32 tons per hectare. With its adaptability and nutritional value, fig farming presents an opportunity for agricultural development and economic growth in regions with suitable climates. By leveraging wastelands and expanding cultivation, India can tap into the potential of fig farming, enhancing food security and

rural livelihoods. This underutilized fruit crop holds promise for sustainable agriculture and economic benefits [2].

More than 600 fig cultivars have been identified, but only a few are commercially produced. Some prominent commercial varieties include Calimyrna, Adriatic, Mission, Brown Turkey, Dessert Fig, Celeste, and Kadota. In India, Poona and Dinkar are widely accepted and popular varieties of fig. Additionally, other commercial varieties cultivated in India include Conadria, Deanna, Excel, Celeste, Brown Turkey, and Brunswick (Magnolia). These varieties are chosen for their desirable traits, such as flavor, texture, and yield, making them suitable for fresh consumption or processing. The selection of suitable cultivars is crucial for successful fig cultivation, as it directly impacts the quality and quantity of the produce. By focusing on these commercial varieties, farmers and producers can optimize their fig production and meet the demands of the market. The diversity of fig cultivars offers opportunities for growers to choose varieties that best suit their local climate, soil conditions, and market preferences [3].

Figs of high economic value are categorized into the Smyrna type, predominantly grown in regions such as Iran. Notable varieties include Seyah, Sabz, Paynes, Mitali, Shah, Anjeer, and Karhi. Figs are also classified into three groups based on their color: White, Red, and Black. The White variety is characterized by a white, yellowish, or green skin, as seen in the Kadota variety. Another variety, Dotato, features yellowish-green skin with purple-colored flesh. White figs can be either seeded or seedless, with colored varieties being particularly prized.

The Red variety is distinguished by its bluish-brown hue, while the Black variety encompasses figs with skin colors ranging from dark red to completely black. This group includes popular varieties like Brown

Turkey, Celeste, and Sari Cob. These color-based classifications highlight the diversity within fig varieties, each with unique characteristics that cater to different tastes and preferences. The distinct features of each variety, such as skin color, flesh color, and seed presence, contribute to their economic value and appeal in various markets. Understanding these classifications can help in selecting the most suitable varieties for cultivation and consumption [4].

**Plant Monograph:** *Ficus carica* L. (Family: Moraceae) [5]

**Botanical Synonyms:** [6]

1. *Ficus carica* var. *afghanica* Popov.,
2. *Ficus carica* var. *domestica* Czern.&Ra v.,
3. *Ficus carica* var. *globosa* Hausskn.,
4. *Ficus carica* var. *johannis* (Boiss.)Hauss kn.,
5. *Ficus carica* var. *longipes* Bornm. ex Parsa,
6. *Ficus carica* var. *riparium* Hausskn.,
7. *Ficus carica* var. *rupestris* Hausskn.,
8. *Ficus carica* subsp. *rupestris* (Hausskn.) Browicz.

**Common Names:** [7]

1. English: Common fig tree, Fig
2. Hindi: Anjeer, Anjir, Tin
3. Bengali: Dumar
4. Urdu: Poast, Darakht Anjir, Anjir Zard
5. Kannada: Anjura,
6. Sanskrit: Angira, Anjeer, Anjir, Anjira, Phalgu, Rajodumbara, Udumvaracommon
7. Tamil: Simayatti
8. Telegu: Athi Pallu

**Origin and Habitat:**

The fig has a rich history dating back to 5000 BC, with evidence of its cultivation and use found in Neolithic sites. Referred to as the "Fruit of Heaven," the fig is the fruit of a flowering plant in the mulberry

family. Its origins are believed to be in Western Asia, specifically Turkey, from where its cultivation spread to other parts of the world through the Mediterranean countries. This ancient fruit has been cherished for its unique flavor, texture, and nutritional value, making it a staple in many cultures. The fig's journey from its origins to global cultivation is a testament to its enduring appeal and significance. With its sweet and versatile flavor, the fig has become an integral part of various cuisines, from savory dishes to sweet desserts. Its historical and cultural significance, combined with its nutritional benefits, make the fig a fruit of enduring importance [4].

In India, fig trees can thrive at elevations of up to 5000 feet above sea level, while in tropical regions, they prefer altitudes ranging from 2600 to 5900 feet. Fig trees are relatively resilient and can tolerate frost in favorable locations. For optimal growth, fig trees require a mostly dry climate with light spring rains. Excessive rainfall during the fruit's development and ripening stages can be detrimental, leading to fruit splitting. On the other hand, extreme hot and dry spells can cause fruit drop, making regular irrigation essential for the tree's health and productivity.

Fig trees are adaptable to various environments, but careful management of weather conditions is crucial for successful cultivation. By understanding the specific needs of fig trees, farmers and gardeners can take steps to mitigate potential challenges and promote healthy growth. This includes providing supplemental irrigation during hot and dry periods, while also protecting the trees from excessive rainfall that can damage the fruit. With proper care and attention, fig trees can thrive in a variety of settings, producing

high-quality fruit for years to come. By optimizing growing conditions and managing environmental factors, growers can unlock the full potential of their fig trees and enjoy a bountiful harvest.

Fig trees are adaptable to a wide range of soils, from light sand to rich loam, heavy clay, or limestone. However, the ideal soil should have sufficient depth and good drainage. Sandy soils with a medium dry texture and adequate lime content are often preferred, as lime is essential for the tree's overall growth and fruit development. Soils with high acidity are not suitable, and a pH range of 6-6.5 is considered optimal. Fig trees can also tolerate fairly saline soils, making them a good option for areas with high salt levels. Additionally, fig trees are known for their salt and drought tolerance, allowing them to withstand high levels of sulphate and chloride salts. This adaptability makes fig trees a viable crop for diverse environments. By selecting the right soil conditions and understanding the tree's tolerance, growers can optimize fig tree growth and fruit production. With proper soil management, fig trees can thrive and produce high-quality fruit [8].

### **Morphology:**

Fig trees grow on small, bushy trees that typically reach 10-12 meters in height. These trees have numerous spreading branches, smooth grey or white dull bark, and a trunk that is usually no more than 7 inches in diameter as shown in Fig. no.1. This distinctive growth habit allows fig trees to thrive in a variety of environments, making them a popular choice for cultivation. The tree's compact size and spreading branches also facilitate easy harvesting and maintenance. With its unique characteristics, the fig tree is a notable species in many landscapes [9].



**Fig. No. 1** Fig trees



**Fig. No. 2 (a)** Upper



**Fig. No. 2 (b)** Lower

**Fig. No. 2** *Ficus carica*: Leaves



**Fig. No. 3** Flower



Fig. No. 4 Fruit



Fig. No.5 Seeds

The plant consists the following parts:

1. **Root:** The fig tree has an aggressive spreading and shallow root system that provides support even in challenging environments. Its roots can cover a vast area, spreading up to 50 feet wide, and descend to depths of around 20 feet. This extensive root system enables the tree to absorb nutrients and water from a broad area, allowing it to thrive in diverse conditions. The fig tree's robust root system is a key factor in its ability to adapt to different environments and withstand stressors like drought and poor soil quality [10].
2. **Leaves:** The fig tree has deciduous leaves that are palmate and deeply divided into 3-7 main lobes. These fragrant leaves are 12-25 cm long and 10-18 cm wide, with a fairly thick texture as shown in Fig. no. 2. The upper surface of the leaves is rough as shown in Fig. no. 2 (a), while the underside is soft and hairy as shown in Fig. no.2 (b). When broken, the leaves and stems of the fig tree exude a copious amount of milky latex, a white, sticky substance. This characteristic latex is a notable feature of the fig tree, and its leaves' unique texture and fragrances add to the tree's distinctiveness [11].
3. **Flower:** The fig tree's deciduous flowers are either staminate (male) or pistillate (female) and are enclosed within an inflorescence structure. The long-styled female flowers are characteristic of garden and edible fig trees, producing the fruit that is commonly consumed. In contrast, short-styled female flowers produce inedible fruits as shown in Fig. no.3. This distinction in flower type and style length plays a crucial role in determining the edibility and quality of the fig fruit, making it an important consideration for fig tree cultivation and fruit production [12].
4. **Fruit:** The fig fruit varies in shape, ranging from obovoid to turbinate or pear-shaped, and can be 1-4 inches (2.5-10 cm) in length. Its color changes with ripening, transitioning from yellowish-green to coppery, bronze, or dark purple. The skin is thin and tender, while the fleshy interior can be whitish, pale-yellow, amber, pinkish, rose-red, or purple, depending on the ripeness as shown in Fig. no.4.

The fig fruit is technically an inverted flower, known as a syconium, where both male and female flower parts are enclosed within the stem tissue. This unique structure is hollow and fleshy, lined with

numerous small, unisexual flowers. The interior surface of the fig fruit features tiny, single-seeded fruits (achenes). When ripe, the juice of the fig is sweet, but when unripe, it contains a gummy latex. This distinctive composition and development contribute to the fig's unique taste and texture. Fruit can contain a closed or an open ostiole or eye located at the fruit apex [13].

5. **Seeds:** At peak maturity, the fig fruit's interior contains remnants of the flower structure, including the gritty, seed-like structures that are actually unfertilized ovaries. These "seeds" vary in size from small to medium to large, with a single fruit containing anywhere from 30 to 1600 of them as shown in Fig. no.5. The seeds contribute a resin-like flavor to the fruit, which is associated with the ovaries. This unique characteristic adds to the fig's distinct taste and texture. The presence of these seeds can also provide a subtle crunch and added depth to the fruit's flavor profile [14]. The fig's complex internal structure and composition play a significant role in its culinary and gastronomic appeal [15].

#### **Types of Figs:** [16]

The genus *Ficus* comprises around 700 species, divided into six subgenera with distinct reproductive systems. Figs originated in the Middle East, particularly southern Arabia, where wild and caprifig trees still thrive. These variations highlight the diversity within the fig family and underscore the importance of understanding their unique reproductive and pollination needs. This knowledge is crucial for cultivating and managing fig trees effectively, whether for food production or ornamental purposes. Each type has its own specific requirements and characteristics. There are four pomologically different types of figs, classified based on their bloom

characteristics and pollination methods, as follows:

1. Capri fig
2. Smyrna fig
3. San Pedro fig
4. Common fig or Adriatic fig

**1. Capri fig:** The original Capri fig produces fruit that is not edible, containing only pollen. However, it plays a crucial role in hosting specific wasps that are necessary for pollinating Smyrna and San Pedro figs. These wasps rely on the Capri fig's inedible fruit to complete their life cycle, allowing them to pollinate other fig varieties that produce edible fruit, highlighting the importance of Capri figs in fig cultivation.

**2. Smyrna fig:** Smyrna figs rely solely on Capri figs for pollination. Notable Smyrna fig varieties include Calimyrnas, Marabouts, and Zidis. These figs are often cultivated for drying, resulting in a product with large, crunchy seeds. The distinctive texture and flavor of Smyrna figs make them prized for their quality. They require specific pollination conditions to thrive, highlighting the importance of Capri figs in their cultivation.

**3. San Pedro fig:** San Pedro figs produce two yearly crops: one that requires pollination by Capri figs and another that doesn't. Varieties of San Pedro figs include King, Lampiera, and San Pedro. This unique characteristic allows San Pedro figs to be more adaptable and easier to cultivate than some other types of figs.

**4. Common fig or Adriatic fig:** The self-pollinating common fig family includes many popular edible fig varieties. Celestes, Brown Turkeys, Missions, Brunswick, and Adriatic figs are among the most well-known types. These figs are notable for their ability to produce fruit without the need for Capri fig pollination, making them convenient for cultivation and widely adaptable to different growing conditions.

They offer flexibility for growers and gardeners.

### Nutritional Composition:

Fresh figs are renowned for their delicious taste and impressive nutritional profile. They're a rich source of proteins, amino acids, carbohydrates, minerals, vitamins, and fibers. Figs are also high in calories and carbohydrates, as well as lipids, phenolics, and enzymes. This unique combination of nutrients makes figs an excellent addition to a healthy diet, providing a boost of energy and supporting overall well-being. Their nutritional composition contributes to their popularity

as a nutritious and versatile fruit. Figs can be enjoyed fresh or used in various culinary applications [17].

Figs have a nutritive index of 11, making them a nutrient-rich food. Dried figs, in particular, are a concentrated source of various nutrients, earning them the nickname "Poor Man's Diet" in Mediterranean countries. This nickname reflects their historical role as a staple food, providing essential nutrients and

sustenance as shown in Table no. 1 for people of all economic backgrounds as follows [16]:

**Table No. 1 Composition in 100 g fig**

S. No.	Constituents	Nutritional value per 100 grams (Fresh fruit)	Nutritional value per 100 grams (Dried and Edible fruit)
1	Moisture	88.10%	23.00%
2	Protein	1.3g	4.3g
3	Fat	0.20%	1.30%
4	Minerals	0.60%	2.40%
5	Fibre	2.20%	5.60%
6	Carbohydrate	7.60%	69.00%
7	Calcium	35mg	200 mg
8	Phosphorus	22mg	77 mg
9	Iron	0.6mg	4 mg
10	Vitamin A	80 IU	100 IU
11	Vitamin C	2 mg	2 mg
12	Calorific value	80	30600.00%
13	Thiamine	0.1 mg	0.1 mg

### 1. Carbohydrates:

Figs are a high-carbohydrate fruit rich in dietary fiber. Fresh figs contain 19.2g of carbohydrates per 100g, with 92% consisting of sugars [3]. The mainly sugars are present in fig fruit are glucose, fructose, and sucrose. The total sugar content is approximately 16.3g/100g. Figs also contain about 5g/100g of dietary fiber, including insoluble cellulose in the skin and soluble components. Notably, some fig varieties contain  $\beta$ -D glucans, which have

shown substantial antimicrobial activity, adding to the fruit's nutritional and health benefits. This composition makes figs a nutritious and healthy choice [8].

### 2. Proteins:

Figs have a relatively low protein content of 0.8g/100g compared to other edible fruits. However, they contain a remarkable number of amino acids in comparison to all other fruits [18]. It contains amino acids like leucine, tryptophan, phenylalanine,

lysine, and histidine as shown in Table no.2. Figs are also a valuable source of various enzymes, such as diastase, esterase, lipase, and catalase, which are extracted for commercial use. The latex of the fig fruit is

particularly rich in enzymes like ficin, proteases, and amylase, making it a significant source for industrial applications [19].

**Table No. 2 Composition of Amino acid in Fig fruit**

S. No.	Amino acid	Nutritional value in mg per100 gm
1	Alanine	45
2	Arginine	17
3	Aspartic acid	176
4	Cysteine	12
5	Glutamic acid	72
6	Glycine	25
7	Histidine	11
8	Isoleucine	23
9	Leucine	33
10	Lysine	30
11	Phenylalanine	18
12	Proline	49
13	Serine	37
14	Threonine	24
15	Tryptophan	6
16	Tyrosine	32
17	Valine	28

### 3. Fat:

Despite their low fat content, figs contain a variety of lipid compounds, including triacylglycerols, sterols, galactosyl diglycerides, ceramides, glycosides, cerebrosides, and phosphatidyl glycerols. These diverse lipids are extracted from the fruit, highlighting figs' complex biochemical composition beyond their low overall fat content which is a negligible amount of fat content reported 0.3g/100g [20]. This diverse range of fatty acids and sterols contributes to the fruit's nutritional and biochemical profile. Figs contain various fatty acids, including myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, and linolenic acid. Additionally, figs are a good source of sterols, particularly sitosterol [21].

### 4. Phytochemicals:

Figs are an excellent source of phytochemicals, with over 100 bioactive compounds identified. These compounds include arabinose,  $\beta$ -amyrins,  $\beta$ -carotenes, glycosides,  $\beta$ -sitosterol, and xanthotoxol. The diverse range of bioactive compounds in figs contributes to their potential health benefits and nutritional value, making them a valuable part of a healthy diet [22].

Figs are rich in various compounds, including phenolics, phytosterols, organic acids, anthocyanins, terpenoids, coumarins, and volatile compounds like hydrocarbons and aliphatic alcohols. Although figs have a diverse phenolic composition, their overall phenolic content is considered intermediate. This complex mix of compounds contributes to the fruit's nutritional and biochemical profile [23]. The most prominent phenolic compound in figs is

rutin, followed by other notable compounds such as quercetin rutinoside, catechin, chlorogenic acid, epicatechin, gallic acid, syringic acid, and ferulic acid. These phenolic compounds contribute to the fruit's potential health benefits and biochemical properties [24]. The red variety of figs contains higher levels of anthocyanins, with around 15 different anthocyanin pigments identified. Figs also contain a rare sulfur-containing protein called Metallothionein, which plays a role in normal brain function. This protein is produced in small amounts in the brains of humans and animals, highlighting figs' unique nutritional composition [25].

#### 5. Minerals:

Figs are believed to have a higher calcium content than milk and resembles that of human milk. They're also rich in iron, with some varieties containing almost half the iron content of beef liver. Iron is the most predominant mineral in figs, highlighting their potential as a nutritious and mineral-rich food [26]. Figs are rich in calcium and potassium, with notably high levels of

these minerals compared to other commonly consumed fruits. They also have high iron content. Additionally, figs are low in sodium and cholesterol, making them a nutritious and healthy choice.

#### 6. Vitamins:

The Figs are an exceptionally rich source of vitamins, particularly vitamin A and B vitamins, including thiamine, riboflavin, B5, and B6. Some fig varieties also contain vitamin C and E. Additionally, dried figs have been found to contain vitamin K, making them a nutrient-dense food option [8].

#### 7. Organic acids:

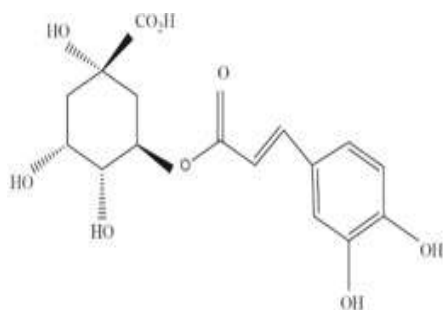
Like other fruits, figs' taste and character are influenced by their sugar and organic acid composition. Figs are relatively low in acids, with key organic acids including oxalic, citric, malic, quinic, shikimic, and fumaric acids as shown in Table no. 3 and Fig. no. 6. This balance of sugars and acids contributes to the fruit's unique flavor profile [8].

**Table No. 3 Chemical composition of fresh Fig**

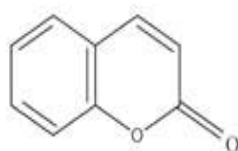
S. No.	Constituents	Nutritional value per 100 grams
1	Water	79.1 g
2	Energy	310 kJ
3	Carbohydrates	19.2 g
4	Sugars	16.3 g
5	Starch	–
6	Dietary fiber	2.9 g
7	Total Fat	0.3 g
8	Saturated fat	0.1 g

S. No.	Constituents	Nutritional value per 100 grams
9	Monounsaturated fat	0.1 g
10	Polyunsaturated fat	0.1 g
11	Protein	0.7 g
12	Vitamin A equiv.	142 IU
13	Thiamine (B1)	0.1 mg
14	Riboflavin (B2)	0.1 mg
15	Niacin (B3)	0.4 mg

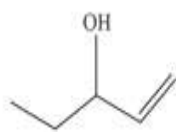
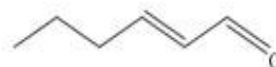
16	<b>Pantothenic acid (B5)</b>	0.3 mg
17	<b>Vitamin B6</b>	0.1 mg
18	<b>Folate (B9)</b>	6mcg
19	<b>Vitamin C</b>	2 mg
20	<b>Vitamin E</b>	0.1 mg
21	<b>Vitamin K</b>	4.7mcg
22	<b>Calcium</b>	35 mg
23	<b>Iron</b>	0.4 mg
24	<b>Magnesium</b>	17 mg
25	<b>Manganese</b>	0.1 mg
26	<b>Phosphorus</b>	14 mg
27	<b>Potassium</b>	232 mg
28	<b>Sodium</b>	1 mg
29	<b>Zinc</b>	0.2 mg



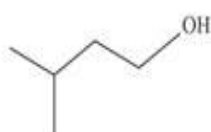
3-O-caffeoylquinic



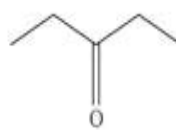
Coumarin



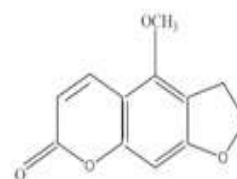
1-Penten-3-ol



3-Methyl butanol



3-Pentanone



Bergapten

Fig. No. 6 Chemical constituents in fig [8].

### Traditional Uses:

*Ficus carica*, a versatile plant, has been extensively utilized in traditional medicine for centuries, offering a broad spectrum of health benefits. Various parts of the plant, including its bark, fruit, leaves, roots, and latex, are employed in diverse medicinal

forms. In Mediterranean regions, *Ficus carica* is affectionately known as "the poor man's food" due to its widespread consumption, both fresh and dried. Ethnomedicinal applications of the plant are numerous as given as:

1. **Fruits:** Treat leprosy, nosebleeds, fever,

and various inflammations. They also serve as antipyretic, aphrodisiac, lithontriptic, hair-nutritive, emollient, demulcent, laxative agents, and address paralysis, liver diseases, chest pain, and piles.

2. **Roots:** Function as tonics in treating leucoderma and ringworm infections

3. **Latex:** Exhibits expectorant, diuretic, anthelmintic, and anti-anemic properties.

4. **Leaves:** Demonstrate antidiabetic, vermifuge, and anti-dermatitis effects in humans, as well as phototoxicity in animals.

5. **Seeds:** Yield edible oil and lubricants.

### **Pharmacological activities:**

In addition, the juice of the fruit is used to treat haemorrhage [18]. In Unani system, fig fruit is used as mild laxative, expectorant and diuretic [8]. In addition to its nutritional benefits, *F. carica* (fig) has various ethnopharmacological effects, including:

#### **1. Chemo-preventive effect:**

Extracts from fig leaves, fruit, and natural latex have demonstrated potential anti-tumor effects against various cancer cells, including human colon, breast, cervical, and liver cancer cells, in laboratory studies [9]. Figs' fiber content may help reduce colon cancer risk by facilitating quick waste elimination from the body, potentially lowering the risk of colon cancer development [27]. Fig seeds are rich in mucin, which helps collect and remove waste from the body, potentially preventing colon tumor formation by promoting regular bowel movements and reducing toxin exposure in the colon [28]. Fig's bioactive compounds, including a mixture of acyl moieties (palmitoyl, linoleyl, stearyl, and oleyl) in its mucin and 6-O-acyl- $\beta$ -D-glucosyl- $\beta$ -sitosterols, exhibit potent anti-cancer effects. These compounds have been shown to inhibit the proliferation of various cancer cell lines, including breast cancer and

glioblastoma multiforme cells, by inducing cytotoxicity and cell death. The fruit's fiber and other compounds are also believed to contribute to its chemopreventive activity [29]. Compounds like benzaldehyde and coumarins found in figs have been reported to have chemopreventive effects against prostate cancer cells. Specifically, benzaldehyde can induce keratinization in cancer cells, potentially transforming them into normal squamous cells [30].

#### **2. Antibacterial activity:**

Research has demonstrated the antimicrobial properties of fig extracts through both in-vitro and in-vivo tests. The aqueous extract from figs has been shown to reduce damage caused by bacterial pathogens, decreasing both disease incidence and severity. In laboratory settings, the extract exhibited antimicrobial activity against a range of bacterial strains at varying concentrations. Further investigation through in-vivo tests confirmed the extract's effectiveness against specific bacterial strains, including *Pseudomonas*. These findings suggest that fig extracts possess potent antimicrobial properties, making them a potential natural solution for combating bacterial infections. The ability of fig extracts to target and inhibit bacterial growth highlights their therapeutic potential and supports their traditional use in medicine. Overall, the study's results underscore the value of fig extracts as a natural antimicrobial agent, warranting further exploration and development [31].

#### **3. Antifungal activity:**

Figs have been recognized for their antifungal properties, making them a valuable resource in the fight against fungal infections. A study isolated a low-molecular-weight protein from the latex of fresh figs, which demonstrated notable antifungal activity. This discovery highlights the potential of fig-derived compounds in

developing new antifungal treatments. The antifungal protein found in fig latex shows promise in inhibiting the growth of fungal pathogens, which can cause a range of diseases in humans, plants, and animals. By understanding the mechanisms behind the protein's antifungal activity, researchers can explore new avenues for creating effective treatments.

The study's findings underscore the importance of natural compounds like those found in figs, which have been used in traditional medicine for centuries. The identification of specific antifungal agents in figs can lead to the development of novel therapeutic approaches, providing alternative solutions to existing antifungal treatments. Further research into the properties and applications of fig-derived antifungal compounds can unlock new opportunities for improving human health and plant disease management. By harnessing the potential of these natural compounds, scientists can develop more effective and sustainable solutions to combat fungal infections [32].

#### **4. Antiviral activity:**

Research on fig leaf extract has demonstrated promising antiviral properties, particularly against the Newcastle disease virus (NDV) and herpes simplex virus type 1 (HSV-1). Studies conducted on human cell lines showed that the extract exhibited significant inhibitory activity against NDV, with a minimum toxic concentration (MTC) value of 0.5 mg/mL. The fig leaf extract's antiviral effects make it a potential candidate for developing new medications. Its ability to directly kill viruses and low toxicity profile further enhance its therapeutic potential. Specifically, the water extract of fig leaves has been shown to possess distinct anti-HSV-1 effects, highlighting its promise in treating viral infections.

These findings suggest that fig leaf extract could have applications in medicine, food,

and pharmaceuticals. With its antiviral properties and low toxicity, fig leaf extract may be used to develop new treatments for viral diseases. Further research is needed to fully explore its potential and unlock its applications in various fields. Overall, the study's results underscore the potential of fig leaf extract as a valuable resource for developing new antiviral therapies [33].

#### **5. Hypoglycemic effect:**

Hyperglycemia is a condition marked by excessive urine secretion, with diabetes mellitus being the most common form. Diabetes mellitus is a chronic and progressive disease characterized by impaired carbohydrate metabolism, leading to increased morbidity and mortality rates. If left unmanaged, it can cause long-term complications such as retinopathy, nephropathy, neuropathy, and angiopathy [34]. Figs have been found to have a remarkable ability to regulate blood glucose levels. Consuming figs can lower total cholesterol levels and improve the total cholesterol to HDL ratio, ultimately contributing to reduced hyperglycemia [35]. In a 3-week study, fig extracts were given to both normal and diabetic rats, resulting in decreased plasma glucose levels in diabetic rats and reduced insulin levels in normal rats [36].

#### **6. Maintain Blood Pressure and Improves Heart Health:**

Figs can help regulate blood pressure due to their potassium content, which reduces tension in blood vessel walls. Additionally, fig consumption lowers triglyceride levels, improving heart health by preventing blockages in blood vessels that can lead to heart disease. The presence of phenols and omega fatty acids in figs further contributes to reducing the risk of heart diseases [37].

#### **7. Cholesterol lowering activity:**

A study investigated the effects of fig extract on cholesterol levels using HepG2 cells. The results showed that the extract reduced

cholesterol secretion and content in both basal and glucose-stimulated conditions. When glucose was added to the cells, cholesterol secretion increased significantly, but co-incubation with fig extract reduced this effect. The study found that the fig extract had a positive impact on cholesterol levels, particularly in glucose-stimulated conditions. The extract's ability to modulate cholesterol secretion and content makes it a potential intervention for managing postprandial hyperlipidemia, a condition characterized by high levels of lipids in the blood after meals.

The findings suggest that the hydro-extracts of fig leaves could be a safe and effective way to regulate cholesterol levels. By reducing cholesterol secretion and content, fig extract may help mitigate the risks associated with high cholesterol, such as cardiovascular disease. Further research is needed to fully explore the potential benefits of fig extract in managing lipid-related disorders. Overall, the study highlights the potential of fig leaf extract as a natural and safe intervention for promoting cardiovascular health [38].

#### **8. Anti-oxidant potential:**

Figs contain various phenolic compounds with potential antioxidant activity. These compounds play roles in plant metabolism and also offer health benefits to humans through multiple mechanisms, including acting as reducing agents, hydrogen donors, free radical scavengers, and singlet oxygen quenchers. This antioxidant activity can help protect against cell damage and promote overall well-being [39]. Fig extract has shown antioxidant effects in protecting against ischemia/reperfusion injuries in rats [9]. Research has identified cyanidin-3-rhamnoglucoside (C3R) as the primary compound responsible for fig's antioxidant potential, contributing around 90% of its total antioxidant activity. C3R effectively scavenges free radicals, including

superoxide, hydroxyl, and singlet anion radicals, in a dose-dependent manner. Its antioxidant activity is particularly notable in fibroblast cells, specifically against NH3T3 fibroblast cells. C3R is thought to counteract the production of reactive oxygen species (ROS) induced by buthionine sulfoximine and enhance the redox ratio, further highlighting its antioxidant properties [40]. C3R helps maintain the redox balance in fibroblast cells by modulating glutathione production and increasing the GSH/GSSG ratio. Additionally, it exhibits strong iron-chelating properties, binding to Fe<sup>3+</sup> ions, which may contribute to its ability to reduce oxidative stress, highlighting another potential mechanism behind fig's antioxidant benefits [9]. The polysaccharides exhibit antioxidant activity by scavenging free radicals. In studies with normal mice, administering polysaccharides significantly enhanced the clearance rate of carbon particles and increased serum hemolysin levels, indicating immune system support [41].

#### **9. Anti-inflammatory effect:**

Fig paste has been traditionally used to relieve pain and reduce inflammation when applied topically to swellings and tumors. Its therapeutic effects are thought to be due to its ability to relax muscle contractions, inhibit platelet aggregation, and exhibit spasmolytic activity, potentially mediated through the activation of potassium channels [42]. Figs are thought to have anti-inflammatory properties due to their ability to scavenge superoxide radicals, which is attributed to the presence of flavonoids. These compounds help mitigate oxidative stress and inflammation in the body [12].

#### **10. GI effect:**

Figs are rich in potassium, which helps regulate blood sugar levels. The high potassium content in figs keeps blood sugar in check, supporting overall glucose management in the body [37]. Figs may help

manage diabetes due to their high potassium content. Potassium influences pancreatic beta cells, which regulate insulin secretion. Low potassium levels can lead to reduced insulin production, causing blood sugar spikes. The chlorogenic acid in figs has been found to have a lowering effect on blood sugar levels. It works by inhibiting key metabolic pathways, specifically glucose release from the liver, thereby reducing blood glucose concentration [43].

#### **11. Hepatoprotective activity:**

In vitro tests have demonstrated the potential hepatoprotective activity of fig extract. When applied to cells, the extract induced several beneficial changes, suggesting its ability to protect the liver from damage. These findings indicate that fig extract may have therapeutic applications in supporting liver health and preventing liver-related disorders. The extract's hepatoprotective properties make it a promising natural remedy for promoting liver function and overall well-being. Further research is needed to fully understand the mechanisms behind its effects and to explore its potential uses in medicine. The study's results highlight the potential benefits of fig extract in supporting liver health and protecting against liver damage. With its promising hepatoprotective activity, fig extract may offer a natural solution for promoting liver well-being [44].

#### **12. Irritant Potential:**

Researchers isolated triterpenoids from fig leaves and tested their irritant activity. In vivo studies revealed that calotropenyl acetate, methyl maslinate, and lupeol acetate were the most potent irritants. While less irritating than euphorbium, these compounds showed similar effects to psoralen. These findings highlight the bioactive properties of fig leaf triterpenoids and their potential impact on skin or tissue. The study's results provide insight into the biological activities of these compounds, which may have

implications for their use in medicine or other applications. Further research is needed to fully understand their effects [8].

#### **Conclusion:**

Ficus plants are rich in phytochemical compounds, giving them significant antioxidant potential. These compounds play a vital role in human nutrition and medicine due to their diverse biological activities. Key phytochemicals present in Ficus species include polyphenols, phenolic acids, flavonoids, anthocyanins, glycosides, carotenoids, and water-soluble vitamins.

The presence of these bioactive compounds makes Ficus a valuable medicinal plant, particularly for its antioxidant properties. Ficus plants can help manage oxidative stress and treat various diseases due to their high antioxidant potential. All parts of the plant can be utilized for their medicinal benefits.

The antioxidant activity of Ficus phytochemicals makes them a promising natural resource for promoting health and preventing diseases. With their rich composition of bioactive compounds, Ficus plants offer a valuable opportunity for developing new therapeutic approaches. By harnessing the medicinal potential of Ficus, it's possible to create new treatments and prevention strategies for various diseases. Overall, Ficus plants are a rich source of antioxidants and phytochemicals with significant potential for improving human health.

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