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REVIEW

Medicinal and Pharmacological Potentiality of the Plant At-Tîn-Common Fig (*Ficus carica* L.)

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At-Tin (*Ficus carica* L.) of family Moraceae is commonly known as edible fig. This plant has been mentioned in the Holy Qur'an (in Sura 'At-Tin') only once. Islamic scholars have different views regarding the interpretation of the plant At-Tin. Most of them have interpreted it in the meaning of common fig in their interpretation on the Holy Qur'an. According to some authorities the fig means Mosque of Syria or Mountain of Syria or Mosque of Nuh which was built upon the Mountain Al-Judi. Some commentators say that At-Tin signifies a mountain nearby to which 'Jerusalem' is situated and that is the place of birth of Hazrat Essa (Alaihi Salaam). The fruit of *Ficus carica* (Fig) has been widely used in traditional medicine as laxative, anthelmintic, demulcent, emollient, galactogogue, vermifuge, nutritive, stimulant for the brain, poultice for gumboils and for the treatment of anemia, dental abscesses, heart-disease, hemorrhoids, osteoporosis and tumors. Consequently, fig has been extensively studied for its biological activities and has been shown antibacterial, antifungal, antiviral, antiwart, anticancer, antidiabetic, antiinflammatory and antioxidant properties.

Key Words: *Ficus carica*, Qur'an, Pharmacological Potential.

INTRODUCTION

The Holy Qur'an is the last revealed book and the only complete divine guidance that exists in the world for mankind[1]. The Holy Quran from the very start has a claim that it covers every aspect of life and is full of wisdom[2]. Sura 'At-Tin' is only one surah from the Qura'n which has taken its name from its 1st verse indicating a specific plant, At-Tin, "The Fig."[3].

According to the Holy Qura'n (Surah 95. At-Tin, Verse 1-4): "By the fig and the olive, By mount Sinai, By this city of security (Makkah).Verily, We created man in the best stature (mould)"[4]. Our Holy Prophet (Sallallaho Alayhi Wassallam) used certain herbs and recommended various medicinal plants for cure of common diseases. He recommended fig for the treatment of piles and rheumatism[5]. Hazrat Abu Darda (Radiallaho Anho) narrates that Rasullullah (Sallallhu Alayhi Wasallam) said, "Eat fig, for it cures the piles and is useful for rheumatism"[6]. In another Hadith, Hazrat Abu Darda (Radiallaho Anho) narrates that someone presented to the Prophet a plate containing figs. He said, "eat figs! If I would say a certain type of fruit was sent down to us from the heavens I would say it's a fig because it has no seeds. It ends (cures) the piles and is useful for rheumatism."[7].

According to Ibn Sireen, a scholar in the science of dreams, figs, if seen in dreams, denote wealth and prosperity. The benefits I have restricted myself to mentioning here is an indication of the compassion, Allah feels for human beings[8].

Fig (*Ficus carica*) is one of the earliest fruits cultivated[9]. According to some commentators, when the man appeared on the earth, the fist tree planted for his benefits was the fig[10]. When Hazrat Adam (Alayhi Salam) and Hazrat Hawa (Alayha Salam) were expelled from the paradise and they knew that they were naked, they sewed fig leaves together and made themselves aprons[10,11].

The fig is the most mentioned fruit in the Bible. Ancient records indicate both King Urukagina of the Sumarian era (2900 B.C.) and the Assyrians (2000 B.C.) were familiar with fig[12]. They also mentioned in a Babylonian hymnbook dated about 2000 B.C. Every inhabitant of Athens was a "philosykos," literally translated, "a friend of the fig"[9].

The early Greeks so highly prized figs that it was considered an honor to bestow the foliage and fruit. In the original

olympic games, winning athletes were crowned with fig leaves and given fig fruits to eat[12].

Figs were one of the crops that became known in China during the T'ang dynasty which rose to power in the 700's BC[13]. By the end of the Roman Empire during 5th century, fig culture was well distributed throughout the Mediterranean and along the shores of the Atlantic[12].

Pliny the Elder (AD 23-79) records several stories about fig trees in Rome. He asserts that a sacred fig tree grows in the Roman Forum. Alluding to the myth that Rome was founded by the twins, Romulus and Remus, who suckled on a she-wolf, Pliny tells us that, "This tree is known as Ruminalis because the she-wolf was discovered beneath it giving her teats (*rumis* in Latin) to the infant boys"[13].

In the first half of the sixteenth century, the fig was brought to England by Cardinal Pole, a few years before Cortez introduced the tree to Mexico. Fig trees reached North America in about 1790[13]. Figs were first introduced into the New World by Spanish and Portuguese missionaries[12].

Interpretion of 'At-Tin' (Fig) by Islamic Scholars: There are different views of commentators about the interpretation of 'At-Tin' (fig) mentioned in the Holy Qur'an. Most of them have interpreted it in its actual meaning (*i.e.* common fig plant) and described its medicinal and nutritional qualities in their commentaries on the Holy Quran[14,15]. Some authorities are reported to have interpreted it as the Mosque of Syria or Mountain of Syria[16], Noah's mosque on Mount Judei (Ibn Abbas--), the earth of Damascus where Hazrat Essa (Alaihi Salaam) was born[17], the mosque of the sleepers in the cave[18], a mountain near Jerusalem[19]. According to some authorities the fig symbolizes the countries in which this tree predominates, *i.e.* Palestine and Syria[20], a mountain of the sacred earth or a mosque of Damascus or a famous city[21], the place where Hazrat Ibrahim (Alaihi Salaam) migrated[22,23].

Allah has sworn by this tree (At-Tin) due to its multitude of benefits that come from this tree and its fruit; additionally, to the fact that its overwhelming presence in the land of as-Sham [Sierra] is the same place where 'Esaa' (son of Mary) Alaihi Salaam was given the prophethood[24]. The various views of Islamic scholars have been summarized in Table-1.

Taxonomic aspect: Botanical name: *Ficus carica* L.; Family: Moraceae; English name: Common Fig; Local name: Anjeer; Arabic name: At-Tin; Habit & Habitat: A small tree cultivated in poor soil; Part used: Fruit, leaves, latex.

Description: A small deciduous tree, 5-6 m high; shoots densely pubescent. Leaves petiolate, petiole 1.8-3.5 cm long densely pubescent, lamina ovate to ovate-cordate, 4.3-12.8 × 5.4-12 cm, acute, serrate, scabrid on the upper side, wooly tomentose beneath, lateral veins 8-9 pairs. Hypanthodium (inflorescence) axillary. Male flowers with 3-5 perianth segments and 3-5 stamens. Female flowers with 5 perianth segments; ovary with lateral style, stigma 1-2. Fruit usually pyriform-obovoid, 2-3.8 × 1-2.8 cm, hispid, yellowish to brownish violet[25].

Distribution: Cultivated and sub spontaneous in India, Pakistan, Afghanistan; Russia, Iran, Middle East, N. Africa and Europe. Today the United States, Turkey, Greece and Spain are the primary producers of dried figs[9].

TABLE-1
VIEWS OF ISLAMIC SCHOLARS ABOUT THE INTERPRETATION OF FIG MENTIONED IN HOLY QURAN

S. No.	Name of the commentator	Views	Ref.
1	Abdullah bin Ahmad bin Mahmood An-Nasafi	Common Fig	63
2	Abdul Hameed Swati	Common Fig	64
3	Abdul Majid Daryabadi	Common Fig	15
4	Abdullah Yousaf Ali	Common Fig	65
5	Abu 'Abdullah Al-Qurtubi	Mosque of the sleepers in the cave	18
6	Abu ashaathaa Jabir bin Zaid Alazdy	Common Fig	66
7	Abul Kalam Azad	The earth of Damascus	17
8	Abu Muhammad Abdul Haq Haqqani	Mountain of Syria	67
9	Abu Tahir Muhammad Bin Yaqoob Al-Ferozabadi	Mosque of Syria or Mountain of Syria	16
10	Abi Muhammad Al-Hussain Bin Mas'ud Al-Baghvi	Mountain of Syria	68
11	Al-Hassan bin Yasaar Al-Basri	Common Fig	66
12	Allaud Din Ali Bin Muhammad Bin Ibrahim Al-Bughdadi Al-Khazin	Common Fig	69
13	Al-Qazi Naasir-ud-Din Abi Saeed Abdullah Bin Umar Al-Bayzawi	Common Fig	14
14	Al-Syed Mehmood Alusi Al-Bughdadi	Common Fig	70
15	Attaa bin Abi Ribah	Common Fig	66
16	Syed Hamid Hassan Balgrami	Common Fig	71
17	Fakhruddin Al-Razi	Common Fig	72
18	Ibrahim Nakh'i	Common Fig	66
19	Ikrama Maula ibn Abbas	Common Fig	66
20	Ismail ibn Kathir	Common Fig	18
21	Jarullah Mehmood bin Umar Al-Zemakhshari	Common Fig	73
22	Subhan-Ul-Hind Maulana Ahmad Saeed	Common Fig	74
23	Maulana Hussain Ali	Place where Hazrat Ibrahim (A S) migrated	22
24	Mufti Muhammad Shafi	The land of the tree (Palestine and Syria)	20
25	Muhammad Abdur Rashid No'mani,	Common Fig	21
26	Muhammad Afzal Khan	Place where Hazrat Ibrahim (A. S) migrated	23
27	Muhammad Ashraf Ali Thanawi	Common Fig	75
28	Muhammad ibn Jarir Al-Tabari	Common Fig	18
29	Mujahid bin Jabr	Common Fig	66
30	Muhammad Shah Abdul Qadir	A garden on a hill	76
31	Qazi Muhammad Sana Ullah Pani Patti	Common Fig	77
32	Shabir Ahmad Usmani, 1989	Common Fig	19
33	Shaykh 'Abdur Rahman as-Sa'di	Fig tree, Sierra	24

Medicinal uses: Fig has been extensively studied globally, which justifies its broad traditional therapeutic value. The fruit, root and leaves of *Ficus carica* are used in the native system of medicine in different disorders such as Gastro intestinal (colic, indigestion, loss of appetite and diarrhea), respiratory (sore throats, coughs and bronchial problems), inflammatory and cardiovascular disorders and as antispasmodic[26].

The fruits are used as a galactogogue and tonic and as a poultice in the treatment of gumboils, dental abscesses, tumors and other abnormal growths. Fresh and dried figs fruit and its

syrup have long been appreciated for their laxative action[27,28]. Figs are good for eye sight[29].

Recently, some beneficial effects of fig tree (*Ficus carica*) leaf extract has been argued[30,31] having therapeutic benefits in cases of hyperglycemia[32], cancer[33], helminth infection[34], hypercholesterolemia[35], hypertriglyceridemia[36] and bovine papillomatosis[37]. The latex is widely applied on warts, skin ulcers and sores and taken as a purgative and vermifuge, but with considerable risk[27]. Medicinal uses of *Ficus carica* have been summarized in the Table-2.

Scientific miracle of the holy Quran

Metallothionein (MT): Metallothionein is a Sulfur containing protein which can easily bind with zinc, iron and phosphorus. It is produced in small quantity in the brains of humans and animals. It is considered very important to human

TABLE-2
MEDICINAL USES OF COMMON FIG (*Ficus carica*)

Diseases	Part used	Treatment	Ref.
Anemia	Fruit	Figs contain iron which enriches the blood, and helps to produce it. Dried figs give about 3.0 mg of iron for every 100 g. They are ideal for women, girls and those suffering from Anemia.	40
Asthma	Fruit	Syrup made from methi seeds, figs and honey is very effective in bronchial asthma.	8
Blood pressure	Fruit	Figs are a good source of potassium. They lower Cholesterol and are useful for those with high blood pressure. People who eat potassium-rich foods tend to have lower blood pressure.	29
Bronchitis	Fruit	A quarter of a liter of boiled milk with 12 dry figs for ¼ of an hour. Drink the liquid once strained and sweetened.	80
Cancer	Fruit	Figs are used for the treatment of cancer in Japan. About twenty kinds of cancer has been treated with figs.	8
		In USA fresh fruit is used for the treatment of cancer.	80
		The fig compound angelicin, has been recommended currently for the treatment of skin cancer.	9
Chills	Fruit	Figs are also recommended in the treatment of chills.	8
Colics	Fruit	It is useful in colics and is a good diuretic.	8
Constipation	Fruit	Decoction of dry figs is useful. Boil 3 dry figs in water for ¼ an hour. Leave to rest and drink the liquid and eat the figs the following morning	85
Diabetes	Leaf	The leaf decoction is taken as a remedy for diabetes.	27
Digestion		To eat five figs is excellent in aiding digestion and improving the condition of the stomach and bowels.	29
Eye sight	Fruit	Figs are good for eye sight. Eating three or more servings of the fruit per day lowers the risk of age-related macular degeneration (ARMD).	29
Galactogogue	Fruit	The unripe green fruits are cooked with other foods as a galactogogue and tonic	28
Gumboils, Dental abscesses	Fruit	The roasted fruit is emollient and used as a poultice in the treatment of Gum boils, dental abscesses *etc*.	28
Hemorrhoids	Fruit	The Holy Prophet Muhammad PBUH is recorded to have said to make use of figs in order to curb Hemorrhoids.	6
Insects bites	Latex	In Turkey scorpion bite and bee sting are treated by applying externally the fresh latex of stem.	80
		The application of the latex of the leaves are also useful for scorpion &bee stings.	85
Insomnia		Figs contain a nutrient called tryptophan. This promotes good sleep and helps the brain use glucose properly, encouraging and stimulating good circulation	40
Intestinal obstruction	Fruit	It clears the intestinal obstruction, as if has laxative, anti-ulcer and antibacterial powers.	8
Kidney and urinary bladder stones	Fruit	It can dissolve and expel kidney and urinary bladder stones, and can help patients suffering from kidney failure and patients who has had a kidney transplant.	29
		It can clear the obstruction of liver and gall-bladder and relieves inflammations of kidney and urinary bladder	8
Mouth disorders		For the treatment of the mouth disorders (Inflamation, wounds *etc*.) decoction of dry figs is advantageous. Boil 3 dry figs in water for ¼ an hour. Leave to rest and drink the liquid and eat the figs the following morning.	85
		During fevers, if it is chewed, the patient feels relief from the dryness of mouth.	8
Osteoporosis	Fruit	Figs, rich in calcium, play a very important role in the development of bones. They are invaluable for those suffering from osteoporosis and brittle bones.	29
Skin ulcers	Latex	The latex is widely applied on externally.	27
Sores	Latex	The latex is widely applied on externally.	27
Stress	Fruit	There are many causes of physical and emotional stresses. Figs are extremely nutritious, and over-all an ideal fruit to overcome stresses and anxieties.	29
Sore throat	Fruit	In Latin America, figs are much employed as folk remedies. A decoction of the fruits is gargled to relieve sore throat.	27
Swollen gums	Fruit	In Latin America figs boiled in milk are repeatedly packed against swollen gums.	27
To lose weight	Fruit	Figs are ideal for those trying to lose weight. It contains the digestive enzymes for all the three components of diet: Proteins, carbohydrates and fat.	8
Toothache	Latex	The latex soaked cotton is placed in the cavity of the affected tooth for the treatment of toothache.	10
Tumor	Fruit	In Latin America the fruits are much used as poultices on tumors and other abnormal growths.	27
		According to Japanese tests, figs and the fig syrup (benzaldehyde) have helped shrink tumors.	8
Warts	Latex	In Italy and Turkey and Tunisia the latex is externally applied on the warts several times daily.	80
	Fruit	In France fresh fruit juice is externally applied on warts.	80

beings by playing vital role in reducing cholesterol, performing metabolism, strengthening the heart and controlling breath. Its production level decreases after the age of 35 years and stops at the age of 60 years. So it is not easy to obtain metallothionein from human. Scientists, therefore, targeted plants for this purpose. A team of Japanese scientists found this magical substance, metallothionein only in two plant species: fig and olive. They found that the use of metallothionein extracted from fig or olive alone did not give the expected beneficial result for human health. The useful results were achieved only when the mixture of metallothionein extracted from both the plants was used. The team tried to find the best mix ratio between fig and olive that provides the best influence. The best mix ratio was found to be 1:7 (1 fig to 7 olive).

In holy Quran the fig has been mentioned only once while the olive seven times (six times explicitly and one time implicitly). The information gathered from the holy Quran were sent to the team of Japanese scientists. After verifying that the discovered information were mentioned in the holy Qur'an 1427 years ago, the President of the Japanes Research team declared to accept Islam[38].

Phytochemistry

Phytochemical investigation of *Ficus carica* was undertaken and led to the identification of over 100 compounds, summarized in Table-3. Several coumarins were isolated from it. Multiple flavonoids have been identified from its stem, leaves and roots. Also prominent were triterpenoids from the roots, leaves and the latex.

Phytochemical studies revealed the presence of numerous bioactive compounds: arabinose, β-amyrins, β-carotenes, glycosides, β-setosterols and xanthotoxol[39].

Carbohydrate: Figs are high-carbohydrate food and an extraordinarily good source of dietary fiber. Ninety-two per ent of the carbohydrates in dried figs are glucose, fructose and sucrose. The rest is dietary fiber, insoluble cellulose in the skin, soluble pectin in fruit.

Mineral contents of figs closely resembles that of human milk. The most important mineral in dried figs is iron. Figs have about 50 % as much iron as beef liver. Calcium and potassium are also present[40].

Lipids: Various lipid compounds have been identified from the fruit of the fig tree. The main groups are triacylglycerols, free and esterified sterols, mono-and digalactosyl diglycerides, ceramide oligosides, cerebrosides, esterified sterol glycosides and phosphatidyl glycerols[41]. Fatty acids in fig fruit, determined were myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid and linolenic acid[5,27,42]. Dried seeds have also been found to contain fixed oil[27]. Sitosterol was the most predominant sterol in all parts of fig. Campesterol, stigmasterol and fucosterol were also detected[42]. A mixture of 6-O-acyl-β-D-glucosyl-β-sitosterols, the acyl moeity being primarily palmitoyl and linoleyl with minor amounts of stearyl and oleyl, has been isolated from fig (*Ficus carica*) latex and soybeans[43].

Phenolics: The analyzed phenolics present at the highest content were rutin, followed by (+)-catechin, chlorogenic acid, (-)-epicatechin, gallic acid and finally, syringic acid[44].

Coumarins: Besides their ubiquitous polyphenols, figs have other compounds, specifically benzaldehyde and the coumarins, furocoumarins including angelicin, marmesin, psoralen, umbelliferone and bergapten[9]. Fruits of the dark-coloured Mission variety fig contain the highest levels of polyphenols, flavonoids and anthocyanins, having cyanidin-3-O-rhamnoglucoside (cyanidin-3-O-rutinoside; C3R) as the main anthocyanin[45].

Enzyme: The latex contains enzymes such as ficin, proteases, lipodiastases, amylase, proteolytic enzymes: diastase, esterase, lipase, catalase and peroxidase[27]. The Fig fruit contains, tyrosin, cravin, lipase, protease[41].

Flavonoids: The major flavonoid contents of leaf extracts from *Ficus carica* was found to be quercetin and luteolin[46].

Five triterpenoids newly isolated from the leaves of *Ficus carica* investigated by open mouse ear assay. Total methanolic extract, calotropenyl acetate, methyl maslinate and lupeol acetate showed potent and persistent irritant effects[47].

The chemical constituents of *Ficus carica* cited in various literatures have been listed in the Table-3.

Pharmacological activities

Ficus carica has been reported to exhibit antioxidant, anti-HSV, Haemostatic, hypoglycemic, hypo-lipidemic activities, antispasmodic and anti-platelet activities. The 6-O-acyl-β-D-glucosyl-β-sitosterols along with its palmitoyl, linoleyl, stearyl and oleyl derivatives isolated from the fruit of *Ficus carica* exhibited strong cytotoxic effect[26].

Anticancer activity: Besides their polyphenols, figs have other compounds with anticancer activity, specifically benzaldehyde and the coumarins. Benzaldehyde has been used successfully to treat terminal human carcinomas. Treatment of squamous cell carcinomas with benzaldehyde induced the cancer cells to change into keratinized, normal squamous cells. Coumarins, isolated from the volatile extract of fig have also been used for the treatment of prostate cancer. The fig compound angelicin are currently being investigated for the treatment of skin cancer and have been recommended for clinical trials because they have low skin phototoxicity[9].

The extracts from latex of *Ficus carica* was found to have the highest *in vivo* antitumor activities, using At PDT bioassay (Agrobacterium tumefaciens Potato Disc Tumor bioassay)[48]. A mixture of acyl moeity with minor amounts of stearyl and oleyl, isolated from fig (*Ficus carica*) latex and soybeans have been shown *in vitro* inhibitory effects on proliferation of various cancer cell lines[43].

Antioxidant: The extract prepared from the leaves of *Ficus carica* L. was evaluated for α-tocopherol content, total flavonoid and total phenol content and were investigated for antioxidant capacities. The results visibly confirmed that these extracts have antioxidant capacity, which are consistent with total flavonoid and phenol contents[49].

In another study, fruits of different verities of fig were analyzed for polyphenols and anthocyanins contents. It was found that dark-coloured Mission variety contained the highest levels of polyphenols, flavonoids and anthocyanins than red Brown-Turkey variety, exhibiting the highest antioxidant capacity which is correlated well with the amounts of polyphenols and anthocyanin[45].

Hepatoprotective activity: The methanol extract of the leaves of *Ficus carica* was evaluated for hepatoprotective

TABLE-3
CHEMICAL CONSTITUENTS OF FIG (*Ficus carica*) COLLECTED FROM VARIOUS LITERATURE

Name of the comp.	m.f.	Class	Parts	Ref.
Adrenaline	$C_9H_{13}NO_3$	Neurotransmitter	–	78
Aflatoxin B_1	$C_{17}H_{12}O_6$	Mycotoxin	Fruit	78,79
Aflatoxin B_2	$C_{17}H_{14}O_6$	Mycotoxin	Fruit	78,79
Aflatoxin G_1	$C_{17}H_{12}O_7$	Mycotoxin	Fruit	78,79
Aflatoxin G_2	$C_{17}H_{14}O_7$	Mycotoxin	Fruit	78,79
Alanine	$C_3H_7NO_2$	Amino acid	Fruit	39,78
Amylase	–	Enzyme	Latex	26
β-Amyrin	$C_{30}H_{50}O$	Triterpene	Leaf	39,78
Apigenin-glycosides	–	Glycoside	Fruit	39
Angelicin	$C_{11}H_6O_3$	Coumarin	Fruit	9,78
Arabinose	$C_5H_{10}O_5$	Aldopentose	Fruit	39,78
Arachidic acid	$C_{20}H_{40}O_2$	Fatty acid	Fruit	39
Arginine	$C_6H_4N_4O_2$	Amino acid	Fruit	39,78
Ascorbic Acid	$C_6H_8O_6$	Vitamin	Leaf and Fruit	39,78
Aspartic acid	$C_4H_7NO_4$	Amino acid	Fruit	39,78
Azinphos-methyl	$C_{10}H_{12}N_3O_3PS_2$	Insecticide	–	78
Baurenol	$C_{30}H_{50}O$	Sterol	Leaf	80
Benzaldehyde	C_7H_6O	Aromatic aldehyde	Fruit	81
Bergapten	$C_{12}H_8O_4$	Coumarin	Leaf	80
Cadalene	$C_{15}H_{18}$	Hydrocarbon	Leaf	39,78
Calcium	Ca	Mineral	Leaf and Fruit	78
Caltropenyl acetate	$C_{32}H_{52}O_2$	Ttiterpenoid	Leaf	50,82
Campesterol	$C_{28}H_{48}O$	Sterol	Plant	50
5-Carboxypyranocyanidin-3-rutinoside	–	Anthocyanin	Fruit	83
β-Carotene	$C_{40}H_{56}$	Tetraterpenoid	Fruit	39
γ-Carotene	$C_{40}H_{56}$	Tetraterpenoid	Fruit	78,81
(+)-catechin	$C_{15}H_{14}O_6$	Flavonoid	Fruit	44
Catalase	–	Enzyme	Latex	27
Cerin	–	Latex	Plant	78
Ceramide oligosides,		Lipid	Fruit	41
Cerebrosides,			Fruit	41
Chlorogenic acid	$C_{16}H_{18}O_9$	Phenolic	Fruit	44
Citric acid	$C_6H_8O_7$	Organic acid	Latex, Fruit	39,84
Carotenoids	–	Pigment	Leaf	81
Caoutchouc	–	Latex	Leaf	39,78
Copper	Cu	Mineral	Fruit	39
Cyanidin-3,5-diglucoside	$C_{27}H_{31}O_{16}Cl$	Anthocyanin	Fruit	78,81
Cyanidin-3-monoglucoside	–	Anthocyanin	Fruit	78,81
Cyanidin-3-rhamnoglucoside	$C_{27}H_{31}O_{15}$	Anthocyanin	Fruit	78,81
Cyanidin-3-rutinose dimmer	–	Anthocyanin	Fruit	83
9,19-cycloarlane	–	Terpenoid	Leaf	50
p-Cymene	$C_{10}H_{14}$	Hydrocarbon	Leaf	39,78
Cystine	$C_6H_{12}N_2O_4S_2$	Amino acid	Fruit	39
(*E*)-2-Decenal	$C_{10}H_{18}O$	Aldehyde	–	78
Diastase	–	Enzyme	Latex	39,27
Digalactosyl diglycerides	–	Lipid	Fruit	41
4',5'-Dihydroxy-psoralen	–	Coumarin	Leaf	80
Dopamine	$C_8H_{11}NO_2$	Neurotransmitter	–	78
Endo-B-N-acetylglucosaminidase	–	Enzyme	–	81
(-)-epicatechin	$C_{15}H_{14}O_6$	Phenolic compound	Fruit	44
Epirutin	–	Flavonoid	–	78,81
Esterase	–	Enzyme	Latex	39,81
Ficin	–	Enzyme	Latex	81
Ficusin	$C_{11}H_6O_3$	Latex	Leaf	39,78
Ficusogenin	$C_{27}H_{44}O_5$	Triterpenoid	Leaf	39,80
Ferulic acid	$C_{10}H_{10}O_4$	Phenol	Plant	39
Fixed oil	–	Lipid	Seed	27
Fructose	$C_6H_{12}O_6$	Carbohydrate	Fruit	39,40
Fucosterol	$C_{29}H_{48}O$	Sterol	Plant	50
Fumaric acid	$C_4H_4O_4$	Organic acid	Latex, Fruit	39,84
Furocoumarinic acid-O-β-D-furnglucoside	$C_{17}H_{18}O_9$	–	–	78
Gallic acid	$C_7H_6O_5$	Organic acid	Fruit	44
Glucose	$C_6H_{12}O_6$	Carbohydrate	Fruit	40,78

Germacrene D	$C_{15}H_{14}$	Sesquiterpenes	–	78,81
Guaiacol	$C_7H_8O_2$	Aromatic oil	Leaf	39,78
Galactose	$C_6H_{12}O_6$	Carbohydrate	Leaf	39,78
Galacturonic acid	$C_6H_{10}O_7$	Monobasic acid	Leaf	39,78
Glutamic acid	$C_5H_9O_4$	Amino acid	Fruit	39,78
Glycine	$C_2H_5NO_2$	Amino acid	Fruit	39,78
Glycolipids	–	Lipid	Fruit	41
Glycoside	–	–	Fruit	39
Guaiazuline:	$C_{15}H_{18}$	Sesquiterpene	Root	39,78
(Z)-3-hexanol	–	Volatile oil	–	81
Z)-3-hexenyl acetate	–	Volatile oil	–	81
Histidine	$C_9H_6N_2O_3$	Amino acid	Fruit	39,78
Imperatorin	$C_{16}H_{14}O_4$	Furocoumarin	–	78
Iron	Fe	Mineral	Fruit	39
Isoimperatorin	$C_{16}H_{14}O_4$	Furocoumarin	–	78
Isoschaftoside	$C_{26}H_{28}O_{14}$	Coumarin	–	78,81
Isoleucine	$C_6H_{13}NO_2$	Amino acid	Fruit	39,78
Isoquercitrin	–	Flavonoid	Leaf	80,81
Isovaleric acid	$C_5H_{10}O_2$	Organic acid	–	78
Lupeol	$C_{30}H_{50}O$	Sterol	Leaf	80
Lupeol acetate		Ttiterpenoid	Leaf	50,81
Lutein	$C_{40}H_{56}O_2$	Pigment	Fruit	39,81
Linoleic acid	$C_{18}H_{32}O_2$	Fatty acid	Fruit	27,39
Linolenic acid	$C_{18}H_{30}O_2$	Fatty acid	Fruit	27,39
Lipase	–	Enzyme	Fruit and Latex	27,39
Lipodiastases	–	Enzyme	Latex	26
Leucine	$C_6H_{13}NO_2$	Amino acid	Fruit	39,78
Luteolin	$C_{15}H_{10}O_6$	Flavonoid	Leaf	46
Lysine	$C_6H_{14}N_2O_2$	Amino acid	Fruit	39,78
3-Methylbutyl acetate	$C_7H_{14}O_2$	Ester	Fruit	39,78
Malic acid	$C_4H_6O_5$	Organic acid	Fruit and Leaf	39,84
Malonik acid	$C_3H_4O_4$	Dicarboxlic acid	Fruit	39
Magnesium	Mg	Mineral	Fruit	39
Manganese	Mn	Mineral	Fruit	39
Marmesin	$C_{14}H_{14}O_4$	Coumarin	Leaf	9,80
Methionine	$C_5H_{11}NO_2S$	Amino acid	Fruit	39,78
Manoheptulose	$C_7H_{14}O_7$	Carbohydrate	–	78
24-Methylenecycloartanol	$C_{31}H_{52}O$	Sterol	Leaf	80
Methyl maslinate	–	Triterpenoid	Leaf	47
6-(2-methoxy-Z-vinyl)-7-methyl-pyranocoumarin	–	Coumarin	Leaf	50
Methyl salicylate	$C_8H_8O_3$	Volatile analgesic	–	81
Myristic acid	$C_{14}H_{28}O_2$	Fatty acid	Fruit	37,39
Monogalactosyl diglycerideses		Lipid	Fruit	41
Neoxanthine	–	Carotenoid	Leaf	39
Neutral lipids	–	Lipid	Fruit	41
Niacin	$C_5H_4NCO_2H$	Vitamins	Fruit	39
Noradrenaline	$C_8H_{11}NO_3$	Neurotransmitter	–	78
Nonanoic acid	$C_9H_{18}O_2$	Lipid	–	78
Nonanal	$C_9H_{18}O$	Aldehyde	–	78
Oxypeucedenin hydrate	$C_{17}H_{18}O_6$	–	–	78
Oleic acid	$C_{18}H_{34}O_2$	Fatty acid	Fruit	37,39
Oleonolic acid	$C_{30}H_{48}O_3$	Fatty acid	Leaf	81,82
Octacosane	$C_{28}H_{58}$	Hydrocarbon	–	78
(*E*)-2-Octenal	$C_8H_{14}O$	Aldehyde	–	78
Octanoic acid	$C_8H_{16}O_2$	Fatty acid	–	78
Ochratoxin A	$C_{20}H_{18}ClNO_6$	Mycotoxin	–	78
Oxalic acid	$C_2H_2O_4{\cdot}2H_2O$	Organic acid	Latex, Fruit	39,84
Pantothenic acid	$C_9H_{17}NO_5$	VitaminB_5	Fruit	39
Pectin		Carbohydrate	Leaf and Fruit	39,78
o-Phenylphenol	$C_{12}H_{10}O$	Phenol	–	78
Pelargonadin-3-rhamnoglucosid	–	Ttiterpenoid	Fruit	78,81
Pentosan	–	Polysaccharide	Leaf and Fruit	39
Phenylalanine	$C_9H_{11}NO_2$	Amino acid	Fruit	39
2-Phenylethanol	$C_8H_{10}O$	Alcohol	–	78
2-Phenylethylacetate	$C_{10}H_{12}O_2$	Ester	–	78
Phospholipids	–	Lipid	Fruit	41

Phosphorus	P	Mineral	Fruit	39
Phosphatidyl glycerols	–	Lipid	Fruit	41
Potassium	K	Mineral	Fruit	39
Propectin	–	Polysaccharide	Fruit	78
Protease	–	Enzyme	Fruit	26
Psoberan	$C_{23}H_{14}O_7$	Coumarin	Leaf	78,81
Psoralen	$C_{11}H_6O_3$	Coumarin	Leaf and Root	80
Pectose	–	Carbohydrate	Fruit	78
Peroxidase	–	Enzyme	Latex	37,78
Pyrrolidine carboxylic acid	$C_6H_{11}NO_2$	–	Fruit	39,78
Palmitic acid	$C_{16}H_{32}O_2$	Fatty acid	Fruit	27,78
Quercetin	$C_{15}H_{10}O_7$	Flavonoid	Leaf	46,78
Quinic acid	$C_7H_{12}O_6$	Organic acid	Latex	39,84
Raffinose	$C_{18}H_{22}O_{16}$	Carbohydrate	–	78
Resin	–	Latex	Plant	78
Riboflavin	$C_{17}H_{20}N_4O_6$	Vitamin	Fruit	39
Rutin	$C_{27}H_{30}O_{16}$	Flavonoid	Leaf	80
Rhamnose	$C_6H_{12}O_5$	Carbohydrae	Leaf	39,78
β-Sitosterol	$C_{29}H_{50}O$	Sterol	Leaf and Root	80
Sucrose	$C_{12}H_{22}O_{11}$	Carbohydrate	Fruit	40,78
Sapogenin	–	–	Leaf	82
Serine	$C_3H_7NO_3$	Amino acid	Fruit	39
Serotonin	$C_{12}H_{10}N_2O$	Monoamine	–	78
Stachyose	$C_{24}H_{42}O_{21}$	Carbohydrate	–	78
Stigmasterol	$C_{29}H_{48}O$	Sterol	Plant	50
Scopoletin	$C_{10}H_8O_4$	Coumarin	–	78,81
Schaftoside	$C_{26}H_{28}O_{14}$	Glycoside	Fruit	39,78
Shikimic acid	$C_7H_{10}O_5$	Organic acid	Latex	78
Sedoheptulose	$C_7H_{14}O_7$	Carohydrate	–	78
Sodium	Na	Mineral	Fruit	39
Stearic acid	$C_{18}H_{36}O_2$	Fatty acid	Fruit	37,39
Syringic acid	$C_9H_{10}O_5$	Phenolic	Fruit	44
Tricosane	$C_{23}H_{48}$	Hydrocarbon	–	78
Tetracosane	$C_{24}H_{50}$	Hydrocarbon	–	78
ψ-Taraxasterol	$C_{30}H_{50}O$	Sterol	Leaf	78,82
ψ-Taraxasteryl ester	–	Sterol	Leaf	80
Thiamin	$C_{12}H_{17}N_4O_5$	Vitamin B_1	Fruit	39
Threonine	$C_4H_9NO_3$	Amino acid	Fruit	39,78
Tryptophan	$C_{11}H_{12}N_2O_2$	Amino acid	Fruit	39,78
Tyrosine	$C_9H_{11}NO_3$	Amino acid	Fruit	39
Umbelliferone	$C_9H_6O_3$	Coumarin	Leaf	80
Violaxanthin	$C_{40}H_{56}O_4$	Pigment	Fruit	39,78
Valine	$C_5H_{11}NO_2$	Amino acid	Fruit	39,78
Vitamin A	$C_{20}H_{30}O$	Vitamin	Fruit	78
Vitamin G	–	Vitamin	Fruit	78
Valeric acid	$C_5H_{10}O_2$	Fatty acid	–	78
Xanthitoxin	$C_{12}H_8O_4$	Coumarin	Leaf	39,81
Xanthotoxol	$C_{11}H_6O_4$	Coumarin	Leaf	39,81
Xylose	$C_5H_{10}O_5$	Monosaccharide	Leaf	39,78
Zinc	Zn	Mineral	Fruit	39
6-O-acyl-β-D-glucosyl-β-sitsterol			Fruit	50
6-O-linoleyl-β-D-glucosyl-β-sitsterol		Latex	Fruit	80
6-O-oleyl-β-D-glucosyl-β-sitsterol		Latex	Fruit	80
6-O-palmitoyl-β-D-glucosyl-β-sitsterol		Latex	Fruit	80
6-O-stearyl-β-D-glucosyl-β-sitsterol		Latex	Fruit	80

activity in rats. The extract at an oral dose of 500 mg/kg exhibited a significant protective effect by lowering the serum levels of aspartate aminotransferase, alanine aminotransferase, total serum bilirubin and malondialdehyde equivalent, an index of lipid peroxidation of the liver. These biochemical observations were supplemented by histopathological examination of liver sections. The activity of extract was also comparable to that of silymarin, a known hepatoprotective[50].

In another study liver slice culture model have been used to evaluate *in vitro* hepatoprotective activity of methanolic extract of leaves of *Ficus carica*. The cytotoxicity caused by CCl_4 was estimated by quantization the release of LDH in the medium. CCl_4 induces twice the amount release of LDH from the liver as compared to the cells from untreated liver tissue and this was significantly reduced in the presence of plant extract. The results clearly point out that *Ficus carica* leaves

extract mitigates the CCl_4 induced liver damage by decreasing LDH level[51].

In another study, petroleum ether extracts of *Ficus carica* were tested for antihepatotoxic activity on rats treated with 50 mg/kg of rifampicin orally. The parameters assessed were serum levels of glutamic oxaloacetate transaminase, glutamic pyruvic transaminase, bilirubin and histological changes in liver. Liver weights and pentobarbitione 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[52].

Antidiabetic effect: The antidiabetic effects of *Ficus carica* leaf extracts have been reported previously. The aqueous decoction of fig leaves has caused decline in the levels of total cholesterol and a decrease in the total cholesterol/HDL cholesterol ratio (with respect to the control group), together with a reduction of the hyperglycaemia in rats[35].

The effect of decoction of leaves of *Ficus carica* as a supplement to breakfast, was studied in insulin-dependent diabetes mellitus (IDDM) patients. Post-prandial glycaemia was lower during supplementation with *Ficus carica* and without pre-prandial differences. It was concluded that the addition of *Ficus carica* to diet in insulin-dependent diabetes mellitus could help to control postprandial glycaemia[32].

In another study to investigate the hypoglycaemic activity of *Ficus carica* leaf aqueous extract, was administered to rats in lieu of drinking water for 3 weeks. The extract decreased ($p < 0.025$) plasma glucose in diabetic while not in normal rats. Plasma insulin levels were decreased by treatment ($p < 0.05$) in non-diabetic rats. Lactate released was lower in untreated diabetic *vs.* untreated non-diabetic rats. Thus, *Ficus carica* extract showed a clear hypoglycaemic effect in diabetic rats. Such an effect cannot be mediated by an enhanced insulin secretion, so as yet undefined insulin-like peripheral effect, may be suggested[36].

Inflammatory effect: An aqueous-ethanolic extract of *Ficus carica* was studied for antispasmodic effect on the isolated rabbit jejunum preparations and for antiplatelet effect using *ex vivo* model of human platelets. When tested in isolated rabbit jejunum, *Ficus carica* (0.1-3.0 mg/mL) produced relaxation of spontaneous and low K(+) (25 mM)-induced contractions with negligible effect on high K(+) (80 mM) similar to that caused by cromakalim. *Ficus carica* (0.6 and 0.12 mg/mL) 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(+) (ATP) channels along with antiplatelet activity which provides sound pharmacological basis for its medicinal use in the gut motility and inflammatory disorders[26].

Antibacterial activity: Both in *in vitro* and *in vivo* tests, aqueous extract from *Ficus carica* fruit reduces the survival and the damages (disease incidence and disease severity) caused by bacterial pathogens of kiwifruit (*Pseudomonas syringae* pv. Sy ringae, *Pseudomonas viridiflava*) and of tomato (*Pseudomonas syringae* pv. tomato) plants. The extract shows *in vitro* antimicrobial activity, against all bacterial strains utilized at different concentrations(10^6-10^8 cfu mL^{-1}). *In vivo* tests *Ficus carica* extracts confirm their antimicrobial activity on *Pseudomonas syringae* pv tomato, reducing DI and DS after 2 week until to 60 % and 67 % to 32 % and 22 %, respectively[53].

Antifungal activity: *Ficus carica* has also been evaluated for antifungal activities. In one study a low-molecular-weight protein, isolated from freshly collected latex of the *Ficus carica* was found to possess antifungal activity[54].

Antiviral activity: The antiviral activity of the *F. carica* leaf extract was evaluated in Hep-2, BHK_{21} and CEF human cell lines which showed a significant inhibitory activity with MTC value 0.5 mg/mL, against Newcastle disease virus (NDV). The leaf extracts with ethanol and water recorded TDO values of 55 and 50 mg/mL and TI values of 1100 and 100, respectively. The results suggested that the extract from *F. carica* leaves had significant activity against NDV and may have applications in drug preparation[55].

In other study the extract from the leaves of *Ficus carica* was tested for its anti-virus effects on Hep-2, BHK_{21} and PRK cells. The water extract from the leaves of *Ficus carica* possessed distinct anti-HSV-1 effect. It possessed low toxicity and directly 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 has expensive foreground[56].

Effect on secretion and contents of cholesterol: Leaves of *Ficus carica* were dried, powdered and extracted using methanol. *Ficus carica* leaf on the secretion and cell content of cholesterol in HepG2 cells were studied. Extracts were added to the media in both basal and glucose stimulated conditions and incubated for 48 h. While glucose significantly increased cholesterol secretion (17 ± 0.76 mg dL^{-1}) *vs.* basal condition (6.91 ± 0.66 mg dL^{-1}), co-incubation with extracts reduced secretion of cholesterol in many concentrations of the stimulated condition. On the other hand, cholesterol content of HepG2 in glucose stimulated condition (2.73 ± 0.39 mg dL^{-1}) showed significant increase compared to the basal status (1.96 ± 0.14 mg dL^{-1}) ($p < 0.001$). Moreover such decrease was shown in response to many concentrations of the extracts. These properties making the hydro-extracts of fig leaf a potentially safe intervention to modulate postprandial hyperlipidemia[57].

The results showed that all aqueous extracts can significantly decrease ($p < 0.001$) secretion of cholesterol from the liver cell in both stimulated and basal condition which is resemble to the diabetic animals. These findings are in good agreement with other findings[35,58,59]. However, Future studies will need to examine the mechanism of different FTE effects on the basal and glucose induced lipid changes to deduce if the effect is due to altered de novo cholesterol synthesis or increased catabolism of cholesterol. In conclusion these preliminary data suggest that hydroextract of fig leaf administration may be an alternative method to reduce hyperlipidemia, particularly postprandially induced ones[57].

The ease with which adipose tissue takes up VLDL-TG is the major contributor to fattening of the rooster Hermier showed that plasma VLDL-TG of obese roosters was twice

that of lean roosters. The VLDL-TG in plasma comes from hepatic lipogenesis. Despite knowing the deleterious effects of hepatic lipogenesis, very little is known about the physiological and pharmacological agents mediating the synthesis and secretion of lipids, apolipoproteins and VLDL-assembly and secretion in avian species.

Another study was designed to investigate the possible effect of the fig tree leaves (FTE), on hepatic triglyceride (TG) content and secretion of triglyceride and cholesterol (TC) from the liver of 8 week-old roosters. After administration it was found that fig tree leaf extract drastically reduced these effects to the basal levels in a concentration-dependent manner ($p < 0.001$). we have shown for the first time that fig tree leaf extract can have a novel effect on both the insulin induced triglyceride hepatic storage and insulin induced VLDL-TG secretion *in vitro* It is suggested that that *Ficus carica* leaf extract could be a beneficial supplement to modulate triglyceride and cholesterol secretion from the poultry liver. Interestingly, the decrease in triglyceride secretion observed in the fig tree leaf extract treatment was concurrent with decreases in cell triglyceride content and cholesterol secretion. In agreement with our findings, Canal *et al.*[35] showed that chloroform extract of *Ficus carica* leaves led to a decline in the levels of total cholesterol and total cholesterol/HDL cholesterol ratio in hypercholesterolemic streptozotocin induced diabetic rats. In this respect, Perez *et al.*[36] showed while a *Ficus carica* leaf decoction decreased serum triglyceride values of hypertriglyceridemic rats, it had no effect on cholesterol levels. The mechanism of the effect of fig tree leaf extract on the hepatic lipid is presently unclear[60].

Irritant potential of triterpenoids from *Ficus carica* leaves: The irritant potential of total methanolic extract and five triterpenoids newly isolated from the leaves of *Ficus carica* were investigated by open mouse ear assay. Total methanolic extract, calotropenyl acetate, methyl maslinate and lupeol acetate showed potent and persistent irritant effects[47].

Antiwart activity: A traditional method for the treatment of warts in some rural areas of Iran comprises the use of fig tree (*Ficus carica*) latex as a local treatment. However, there is no scientific evaluation of its efficacy. A prospective, open right/left comparative trial of fig tree latex therapy *vs.* local standard of cryotherapy was carried out. Twenty-five patients with common warts were recruited into the study from an outpatient clinic. The patients were instructed in self-application of fig tree latex to warts on one side of the body. The wart on the opposite side was treated using standard cryotherapy. A 6-month follow-up study was planned. In 11 (44 %) of the 25 patients complete resolution of fig tree latex-treated warts was observed. The remaining 14 patients (56 %) had a complete cure following cryotherapy. Two patients had complete remission on both sides. Two patients failed to respond to either cryotherapy or fig tree latex. It was found that fig tree latex therapy was marginally less effective than cryotherapy. Adverse effects were observed only in cryo-treated warts. At the 6 month follow-up study there was an 18 % recurrence rate. Fig tree latex therapy of warts offers several beneficial effects including short-duration therapy, no reports of any side-effects, ease-of-use, patient compliance and a low recurrence rate. The exact mechanism of the antiwart activity of fig tree latex is unclear but is likely to be the result of the proteolytic activity of the latex enzymes[61].

Antimutagenic activity: Antimutagene activity and high efficiency of antimutagene action of plant extracts from horseradish roots (*Armoracia rusticana*), fig brunches (*Ficus carica*) and mays seedlings (*Zea mays*) and their ability to decrease the frequency of spontaneous and induced by γ-rays chromosome aberrations in meristematic cells of *Vicia faba* and marrow cells of mice have been shown. Comparative assessment of genoprotective properties of peroxidase and the studied extracts has revealed higher efficiency of antimutagene action of peroxidase[62].

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