



A Systematic Review on Pharmacological Actions of *Ficus hispida*

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ABSTRACT

Ficus hispida is commonly known as Hairy fig. It is a shrub or tree mainly found throughout India and also in parts of China, Sri Lanka, Australia and Myanmar. Various parts of *Ficus hispida* like leaf, bark, stem, root, leaves, fruits and also latex is used for medicinal purpose. Different extracts of *Ficus hispida* have been investigated for pharmacological actions such as anti-inflammatory, antineoplastic, hepatoprotective, anticonvulsant, anti-ulcer activities. Phyto constituents such as terpenoids, flavonoids, alkaloids, sterols and glycosides present in *Ficus hispida* contribute to these activities. *Ficus hispida* is rich in pharmacological activities and is used as traditional medicine from ancient times. This review article aims to discuss morphology, phytochemistry and pharmacological actions of *Ficus hispida*.

Keywords: *Ficus hispida*, Hairy fig, Hepatoprotective, Lupeol acetate, Moraceae.

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INTRODUCTION

Since ancient times, traditional medicines play a very important role in prevention and treatment of various illness. It is believed that these medicines are safer than modern drugs.¹ Traditional medicines serve as major sources for new drug discovery. In India, traditional system of medicine includes Ayurveda, Siddha, Unani and Homeopathy. These systems provide great information of therapeutically important herbs. With emerging interest in studying and adopting traditional medicine system, the evaluation of therapeutic activity of herbs is carried out by studying morphology, phytochemistry and using techniques such as chromatography.²

Recent investigations have suggested that among these herbs, fig is one of older herb used due to its rich pharmacological activity. Genus *Ficus* is a vast genus with over 700 species. They belong to family Moraceae. Among these species *Ficus hispida* is valuable herb with various pharmacological activity³.

Ficus hispida known as hairy fig, cultivated mainly in the tropical and subtropical regions of India, China, Sri Lanka, Australia, and Myanmar. Different parts such as root, stem, bark, leaves, fruits, and latex of *Ficus hispida* have been used in traditional medicine.⁴ Previous phytochemical studies on *Ficus hispida* have revealed the presence of various phytoconstituents such as terpenoids,

flavonoids, alkaloids, phenols, sterols, and glycoside. *Ficus hispida* has been reported to show many pharmacological activities such as wound healing, anti-inflammatory, antinociceptive, sedative, antidiarrheal, antiulcer, antimicrobial, antioxidant, hepatoprotective, antineoplastic, and antidiabetic activities. In this review, we summarize the taxonomy, morphology, phytoconstituents, pharmacological properties of *Ficus hispida*¹.

Taxonomical Classification⁵

Table 1: Taxonomical classification of *Ficus hispida*

Domain	Eukaryote
Kingdom	Plantae
Division	Magnoliopsida
Order	Rosales
Family	Moraceae
Genus	<i>Ficus</i>
Species	<i>hispida</i>

Vernacular Names¹

Table 2: Vernacular names of *Ficus hispida*

Gujarathi	Umbar
Hindi	Gobla, Kala umbar, Kagsha
Kannada	Adavi atti, Kada atti
Malayalam	Erumanaakk, Kaattaththi, Paarakam.
Sanskrit	Phalgu, Phanika, Malayuhu
Marathi	Bokeda, Karavati, Bokhada
Tamil	Peyatti
Telugu	Bomma-medi



Distribution

Ficus hispida is commonly known as the hairy fig or the rough-leaved stem fig. It is a shrub or tree that grows up to 15 m tall. It is a dioecious and bat-dispersed species. It is distributed from Sri Lanka to India, and from South China across Southeast Asia to Australia.⁶ It is found throughout India and the Andaman Islands in damp localities.⁷

Phytochemistry

The presence of alkaloids, carbohydrates, proteins and amino acids, sterols, phenols, flavonoids, gums and mucilage, glycosides, saponins, and terpenes have been confirmed by preliminary investigations of *Ficus hispida*.¹ Acharya *et al* has previously reported that *Ficus hispida* bark contains lupeol acetate, β -amyryne acetate, β -sitosterol. Studies on purification of acetates of *n*-triacontanol, β -amyryn and gluanol was carried out from the petroleum ether extracts of the dried bark powder. Isolation of two substantial phenanthroindolizidine alkaloids, 6-O-methyltylophorinidine and 2-demethoxytylophorine, and a novel biphenylhexahydroindolizidine hispidine from stem and leaves of *Ficus hispida* was carried out by Venkatachalam *et al*. Peraza-Sanchez *et al*, have shown the occurrence of known phenanthroindolizidine alkaloid, *n*-alkanes, coumarins, and triterpenoid. Also identified a new norisoprenoid ficustriol from the methanolic extract of leaves and twigs of this plant.⁸

Morphology⁵

Ficus hispida tree grows up to a height of about 10 meters. It is a coarsely hairy shrub or medium sized tree and usually found in secondary forests, open lands and river banks, up to 1200 m in altitude.

Bark

Bark is brownish or blaze pink in color with lantecellate.

Leaves

Leaves are simple, decussate, ovate, oblong, or obovate-oblong in shape and are thickly papery. They are covered with coarse hairs and oppositely arranged on 1-4 cm long petiole. Lamina 7-35 x 3-16 cm (40 x 18 cm in saplings) and is narrow elliptic-oblong, ovate and obovate with rounded subcordate or truncate-subcordate base. Margin is entire or dentate, sometimes irregularly toothed, midrib is three-nerved at base. Secondary nerves are four to nine pairs, often branched, ascending and tertiary nerves broadly reticulo-percurrent.

Flower

Male flowers are found near apical pore and are many in numbers. Three lobed calyx is found which is thinly membranous with one stamen. In female flowers calyx lobes absent. Style is lateral with hairs appearing during the months of June and July.

Fruit

Figs appear in leaf axil on normal leafy shoots, sometimes on leafless branchlets. They are solitary or paired. Yellowed or red in color when mature, top shaped and 1.2-3 cm in diameter.

Pharmacological Activity

Alzheimer's diseases

The ameliorating effect of ethanolic leaf extract of *Ficus hispida* is determined by an animal experiment. In the experiment, animals were treated with ethanolic leaf extract of *Ficus hispida* for periods of 4 weeks dose dependently (200 and 400 mg kg⁻¹). Then animals received a single intracerebroventricular (i.c.v.) injection of A β 25-35 (μ g mouce⁻¹). Behavioral changes in the mice were evaluated using passive avoidance, Y-maze, Hole board and water-maze test and estimation of anti-oxidant enzymes and neurotransmitter levels were done. It was observed that ethanolic leaf extract of *Ficus hispida* at the dose of 400 mg kg⁻¹ significantly ameliorated the cognitive and memory deficits. Ethanolic leaf extract of *Ficus hispida* reduced the A β induced increase in brain levels of thiobarbituric acid reactive substances and also increase in glutathion peroxidase, glutathion reductase and super oxide dismutase activity was found in ethanolic leaf extract of *Ficus hispida* treated group. In Y maze, plus-maze and also in water maze test ethanolic leaf extract of *Ficus hispida* treated group showed a significant alteration in behaviour when compare to negative control.⁹

Hepatoprotective property

Shanmugarajan *et al*, confirmed the hepatoprotective effect of methanolic extract of leaves of *Ficus hispida* on cyclophosphamide mediated oxidative liver injury in Wistar rat. In another study by the same group, explored the hepatoprotective effect of methanolic leaf extract against azathioprin elicited liver injury in Wistar rat liver.¹⁰ Mandal *et al*, investigated for hepatoprotection of leaf extracts in rats by inducing acute liver damage by paracetamol.⁷ The constituents like oleanolic acid and β -sitosterol may be responsible for hepatoprotective property of *Ficus hispida*, which have membrane stabilizing property.¹¹ The presence of triterpenoids and flavonoid in the methanolic extract of leaves of *Ficus hispida* were identified by preliminary phytochemical studies. These constituents have antioxidant activity,¹² so it may also be responsible for the observed protective effects. Glutathione is an enzyme responsible for protection of cell membrane and regulation of cell function. Liu *et al*, demonstrated the role of triterpenoid in glutathione restoration.¹³ Balanehru *et al*, reported that oleanolic acid, hispidin and β -sitosterol act as free radical scavengers and thus might be associated with hepatoprotective effect.¹¹ Recent investigations shows that oleanolic acid,¹⁴ β -amyryn¹³ and phenanthroindolizidine¹ have potent hepatoprotective effect.



Antineoplastic activity

Pratumvinit et al, described the antineoplastic effect of *Ficus hispida* stem. Plant stem is successively extracted with crude ethanol; water, methanol; water, methanol and ethyl acetate fractions and tested against SKBR3, MDA-MB435, MCF7 and T47D human breast cancer cell lines in vitro. Anti-neoplastic activity against T47D cells was found only in the ethanolic fraction.¹⁵ The presence of constituent O-methyltylophorinidine which has been reported to exhibit cytotoxicity for lung, colon, nasopharynx and prostate cancer cell lines may contribute to this effect.¹⁵

Anti-Convulsant and Sedative Activity

The methanol leaf extract of *Ficus hispida* were investigated on various animal models. Some of these models include pentobarbitone sleeping time and hole-board exploratory behaviour for sedation tests, and strychnine, picrotoxin, and pentylenetetrazole-induced convulsions in mice. *Ficus hispida* (200 and 400mg/kg, p.o.), showed a dose-dependent prolongation of pentobarbitone sleeping time and also suppression of exploratory behaviour. *Ficus hispida* at 400mg/kg, prevented seizures induced by strychnine and picrotoxin but not with pentylenetetrazole. Acute oral toxicity test was done up to 14 days and it did not produce any visible signs of toxicity.¹⁶

Anti-Ulcer activity

The methanolic extract of *Ficus hispida* (200 and 400 mg/kg) was found to be in aspirin (ASP) induced ulcer model. It significantly reduced free and total acidity. This effect might be due to its cytoprotective effect rather than antisecretory activity. Various studies suggest that *Ficus hispida* possess potent anti-ulcerogenic as well as ulcer healing properties and also act as a potent therapeutic agent against peptic ulcer disease.¹⁷

CONCLUSION

India is a country with rich knowledge of traditional system of medicine. Major sections of the country are rural where herbal medicines are valued the most. Many herbal drugs are still unknown and has to be investigated for their phytochemical and pharmacological properties. Among these herbal drugs, *Ficus hispida* is used for many medicinal purposes. Various pharmacological actions of *Ficus hispida* has been discussed in this review. Furthermore, not much studies have been carried out for quantitative evaluation of this plant. Further studies should be conducted to explore the properties of *Ficus hispida*.

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