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Review Article

A phytochemical and pharmacognostic approach of *Ficus hispida* Linn: a review

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ABSTRACT

Herbal plants are arguably poised for a comeback as like sources of ethnic health products in the main due after their vast desire in accordance with synthesise complicated combinations on structurally diverse compounds, which ought to furnish a safer than more holistic approach in conformity with disease cure and prevention. *Ficus hispida* (FH) Linn belonging to the family Moraceae, who have various pharmacognostic properties. The class *Ficus* constitutes a necessary crew on trees, now not solely concerning their extensive medicinal virtue however also of their growth habits yet religious significance. Almost every part over those plants is ancient as a traditional belief on treatment because of the treatment on a variety of ailments through Indian traditional healers. The goal on the existing instruction is to accumulate competencies over ethno-medicinal and pharmacognostic importance about FH. FH includes extensive sorts on bioactives compounds as alkaloids, proteins and amino acids, carbohydrates, flavonoids, sterols, phenols, glycosides, gums and mucilage, saponins and terpenes. Multiple scientific researches have been published to establish the scientific foundation over common medicinal values attributed in conformity with FH of terms on ayurvedic usage the plant for blood disorders, anemia, dysentery, hemorrhoids, stomatorrhagia, jaundice and ulcers. The crop fruits are used namely aphrodisiac, lactagogue, emetic and tonic. Furthermore, pharmacological activities like anticancer, antioxidant, hepatoprotective, cardioprotective, anti-inflammatory have been additionally acknowledged recently. Till now, no action has been published in conformity with elaborate the pharmacognostic functions of FH Linn. The existing decrial is, therefore, an endeavour to relinquish a clear estimate of its pharmacognosy and phytochemistry and a considerable survey over its pharmacological activities.

Keywords: *Ficus hispida*, Ethno-medicinal, Pharmacognostic features, Traditional medicinal value, Ailments

INTRODUCTION

Natural products with therapeutic properties is as ancient as like ethnical civilization and for a long time, mineral, plant and animal products were the predominant source of drugs. There is evidence over herbs existence used into the treatment regarding ailments and for revitalizing body systems in nearly every ancient civilization. Plants hold been aged as much folkloric sources of medicinal agents since the starting of mankind. As the majority about

modern medicine, individual pure drugs emerged or drive into derived active principles, theirs semi-synthetic and synthetic analogs hold served as much an essential path to instant pharmaceuticals. It is already estimated up to expectation 122 drugs from ninety four sow species hold been observed thru ethno-botanical leads. Worldwide interest in analyzing regular systems of medicinal drug and exploring theirs potency is growing day by day. Plants often ancient in traditional medicinal drug are double according to stand protected fit according to their long

utilization within the remedy of illnesses according to potential amassed over centuries.¹ Different methods like morphological, phytochemical and pharmacological or a variety of chemical screening are employed for evaluation on medicinally active crude drugs. Many medicinally active compounds current within medicinal plants shed an essential function within the control of diseases. The arbitrary basic scavenging molecules such as like polyphenolic compounds, vitamins, flavonoids, terpenoids, nitrogen compounds and other endogenous metabolites are stated to be rich in antioxidant activity. These are confirmed to be useful in the remedy and prevention on diabetes, respiratory problems, cancer and other ailments associated with ageing. Several drugs of plant, mineral and animal origin are described in the ayurveda for their wound healing properties underneath the term vranaropaka and its drugs are derived from plant origin.

The present epoch requires a modern biologically active remedy molecule, who exhibits therapeutic activity, so as to increase the large spectrum of medicinal usages.



Figure 1: *Ficus hispida*.

Table 1: Taxonomical classification.

Plant name	<i>Ficus hispida</i> Linn.
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Rosales
Family	Moraceae (Mulberry)
Genus	<i>Ficus</i>
Species	<i>hispida</i>

GENERAL DESCRIPTION

F. hispida is a part of the Moraceae family. It is often a famous sow as is extensively disbursed throughout subcontinent from Bangladesh to India, Malaysia, Srilanka, southern area of China, Myanmar, New Guinea and Australia.² It is a medium but well-distributed species of tropical fig tree or shrub up to expectation is coarsely hairy and dioeciously, as can achieve a height upon to 10 m. It additionally grows in secondary forests, open lands and riverbanks up to 1200 m of altitude. *Ficus* usually grown in evergreen wooded area is of average height, also discovered into sloppy areas, close to banks on many streams, in deciduous forest. Usually, the leaves are opposite, leaf blade ovate, rectangular or obovate-oblong. They measure ten to 25×5 to 10 cm, thickly papery. Secondary veins are 6-9 on every aspect of the midvein. The petiole was measure 1 to 4 cm lengthy with short thick hairs. The axillary on normal leafy shoots have been measuring 1.2 to 3 cm diameter along short, scattered hairs. The male flowers are severa close to the apical pore, calyx lobes 3, thinly membranous, stamen single. The gall flowers are without calyx, style sub-apical, short and thick. The female flowers are also without calyx, the style is lateral and with hairs.³

Table 2: Vernacular names.

Language	Vernacular names
Bengali or local name	Dumoor or kack dumur
English	Rough-leaved fig or hairy fig
Hindi	Gobla
Tamil	Peyatti
Telugu	Bhramhamedi

Bioactive compounds

The crops were typically consists of phenanthrol-indolizidine alkaloids, triterpenoids, flavonoids, oxyterpene, n-alkanes, coumarins, tannins and saponins. *F. hispida* leaves and roots reported (ayurvedic pharmacopoeia of India) in imitation of contain oleanolic acid, bergapten, β -sitosterol, β -amyrin, hispidin. The bark was stated in imitation of contain 10-ketotetracosyl arachidate, lupeol acetate, β -amyrin and triacontanol acetate. Song et al implicated the availability on a number of volatiles from the fruit, to that amount consist of linalool, linalool oxide, terpenol, and 2,6-dimethyl-1,7-octadiene-3,6-diol.

The plant additionally includes ficushispimines A and B, ficushispidine, hispiloscine, N-triacontanyl acetate, ficusin A. Venkatachalam et al isolated two enormous phenanthroindolizidine alkaloids, 6-O-methyltylophorinidine and 2-demethoxytylophorine and a novel biphenylhexahydroindolizine hispidine from stem and leaves over *F. hispida* who are risen from recent publication.⁴⁻⁶

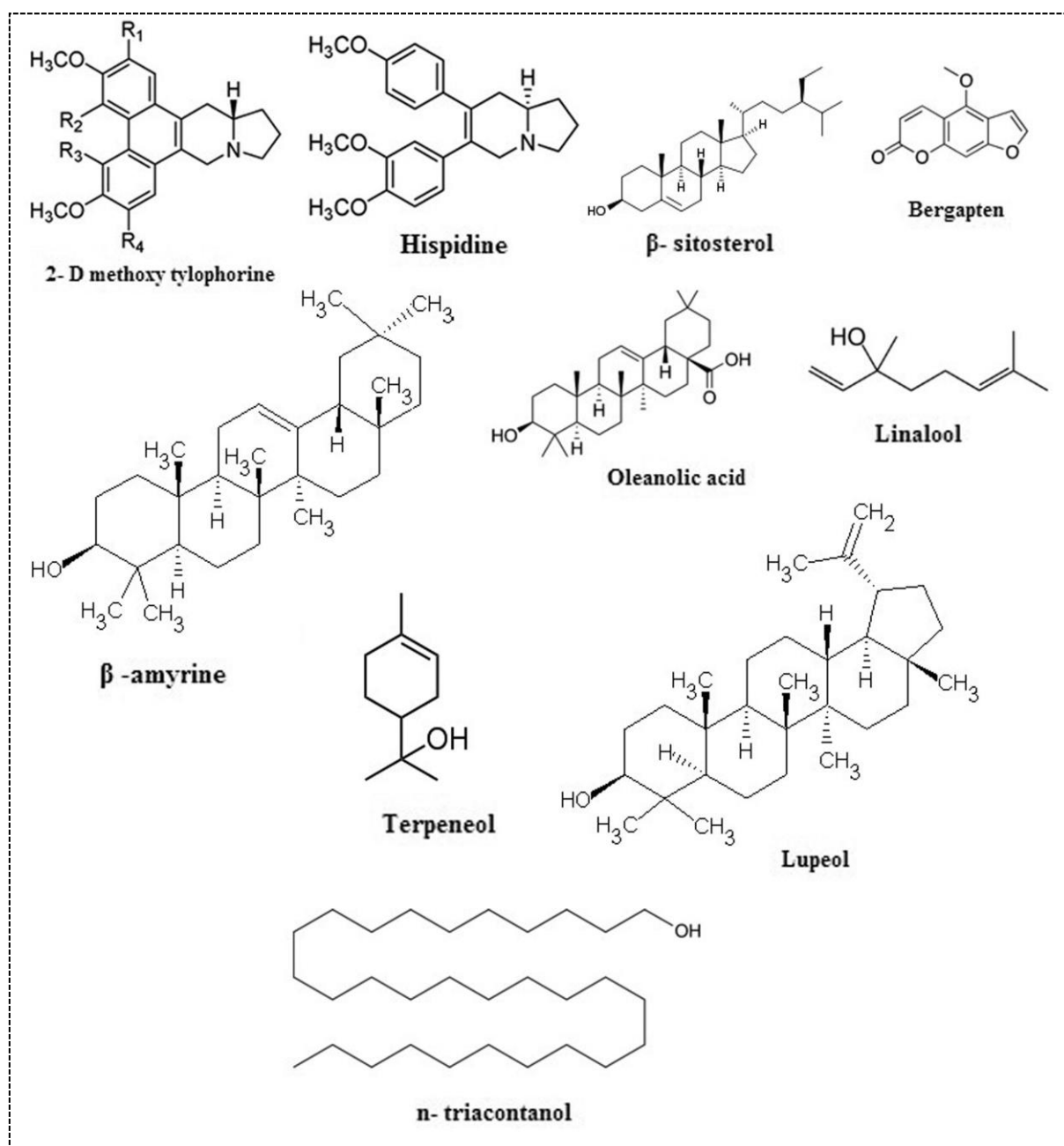


Figure 2: The structures of some of the important bioactive constituents.

Bioactivities of *F. hispida* and potential use in pharmacology

F. hispida is ancient in Manipur, India as an indigenous typical remedy. The group *Ficus* is subject on seven hundred species belongs to the family Moraceae. *F. hispida* Linn is an important sow due in conformity with it's a variety of pharmacological activities. The extracts regarding every components over the drive into hold been stated to be bitter, astringent and anti-dysenteric and in imitation of hold recreation against piles, jaundice, psoriasis, anemia, then hemorrhage.^{7,8} The fruit acts as a

coolant and tonic, the juice is instituted as a moderate purgative. A combination over pleasing and its juice is a good anti-hemorrhagic and the base and leaves are of unique interest, from a medicinal point of view, so an anti-diarrhoeal and anti-inflammatory activity.⁹

Almost every component of the crops used in Indian folklore medicinal drug because of the treatment on a variety of ailments. The plant is acknowledged for its hepatoprotective endeavor into rats and antioxidant strong against cyclophosphamide induced abnormalities within rat heart.

Table 3: Scientific work and pharmacognostic approaches of *F. hispida*.

Pharmacological activity	Part of plant used	Process of extraction	Impression
Anticorrosive potential	Leaves	Ethanollic extraction	Stigmasterol as the major constituent of <i>F. hispida</i> was confirmed by GC-MS; inhibition efficiency of 90% was achieved with 250 ppm of fhle at 308 k; temperature studies revealed an increase in inhibition efficiency with decrease in temperature and activation energies increased in the presence of the extract; cathodic and anodic polarization curves revealed that fhle acts as mixed type inhibitor, but cathodic effect was more pronounced; impedance diagrams showed that increasing fhle concentration, increased charge transfer resistance and decreased double layer capacitance; the adsorption of fhle on mild steel surface obeyed langmuir adsorption isotherm; the morphology of the surface was examined by SEM and the surface composition was evaluated using energy-dispersive X-ray spectroscopy; the adsorbed film on the mild steel surface containing the fhle inhibitor was also characterized by diffuse reflectance FT-IR and XRD studies. ¹⁸
Cytotoxicity	Leaves	95% alcohol, alcohol-water (1:1) and water	The alcoholic, hydro-alcoholic and aqueous and four fractions (n-hexane, chloroform, n-butanol and aqueous) from the leaves were evaluated using sulforhodamine B assay at 10, 30 and 100 µg/ml; the growth inhibition demonstrated by all extracts and fractions were in dose dependent manner; the alcoholic extract was most active followed by aqueous and 50% aqueous-alcoholic extract; and n-butanol fraction was highly significant among the four fractions of alcoholic extract against both oral and colon cancer cell lines. ¹
Anti-diarrhoeal activity	Leaves	Methanolic extraction	The doses of 200 mg/kg and 400 mg/kg methanolic extract of <i>F. hispida</i> leaves significantly (p<0.05 versus control) reduced the gastrointestinal motility and inhibited the percentage of diarrhoea in anti-diarrhoeal models; but 400 mg/kg dose showed better anti-diarrhoeal activity. ¹⁹
Wound healing	Roots	Ethanollic extraction	The rate of epithelialisation and wound contraction in excision model was better as compared to control groups; there was significant increase in granulation tissue weight and hydroxyproline content in dead space model compared to control group; the anti-healing effect of dexamethasone was also reverted by the administration of ethanollic extract of <i>F. hispida</i> in all the wound models. ²⁰
In-vitro anti-oxidant and antimicrobial study		Methanolic extraction	<i>F. hispida</i> shows the presence of secondary metabolite groups like alkaloid, phenolic compounds, flavonoid, glycosides, protein; the total flavonoid and total phenolic content of the respective sample to understand the effect of polyphenolic compound on different pathophysiological state associated with high free radical production; polyphenols are antioxidants with redox properties, which permit them to perform as reducing agents, hydrogen donators and singlet oxygen quenchers. ¹⁷
Cardioprotective effect	Leaves	Petroleum ether (bp 60-80°C) and then extracted with methanol in a soxhlet extractor.	<i>F. hispida</i> leaf extract protects the cardiac tissue by scavenging the free radicals, which is evidenced by the normalization of the biochemical parameters; these observations support the hypothesis that <i>F. hispida</i> has potential for its evaluation as a cardioprotective agent against CP-induced oxidative myocardial injury. (TS. Shanmugarajan, MGR medical university Chennai)
Nociception, inflammation, And CNS stimulation	Bark	Ethanollic extraction	Efhh demonstrated anti-nociceptive activity both centrally and peripherally; it showed 62.24% of writhing inhibition; it significantly inhibited licking responses in early (59.29%) and late phases (71.61%); it increased the reaction time to the

Continued.

Pharmacological activity	Part of plant used	Process of extraction	Impression
			thermal stimulus in both hot plate and tail immersion; it inhibited the inflammation to the extent of 59.49%; a substantial increase in duration of sleep up to 60.80 min and decrease of locomotion up to 21.70 at 400 mg/kg were also observed. ²¹
Antioxidant properties	Fruits, leaves and bark (aerial parts)	Solvents (methanol, ethanol, chloroform and n-hexane).	Ethanol extract of <i>F. hispida</i> bark showed highest activity in total antioxidant capacity assay, whereas the methanol extract of <i>F. hispida</i> bark exhibited maximum activity in ferric reducing antioxidant power assay; in DPPH and superoxide radical scavenging assays, ethanol extract of FH bark showed highest scavenging activity among all extracts with the IC50 values of 41.56±2.68 µg/ml and 77.83±4.35 µg/ml respectively. Methanol extract of FH fruits exhibited maximum activity with IC50 value of 50.79±3.67 µg/ml and in nitric oxide radical scavenging assay, ethanol extract of FH leaves exhibited the highest activity with IC50 value of 117.73±2.23 µg/ml. ²²
Antibacterial studies	Leaves	Aqueous extraction	Silver ions were reduced by FH leaf extract after 5 min, leading to the formation of crystalline silver nanoparticles; the silver nanoparticles produced by the <i>F. hispida</i> extract were characterized by UV-VIS spectrophotometry, in addition, <i>F. hispida</i> extract was tested for anti-microbial activity by agar well diffusion method against the pathogenic bacteria <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , <i>Staphylococcus aureus</i> and <i>Bacillus subtilis</i> . ²³
Anti-inflammatory effects	Leaves	Ethanol extraction	The plant FH was studied for its anti-inflammatory potential for 30 mins, 60mins, and 90 mins; against carrageenan induced rat paw oedema; significant anti-inflammatory activity was observed in doses-150 mg/kg and 300 mg/kg of FH leaf extract within 90 mins when compared with standards prednisolone (steroidal control) and diclofenac (non-steroidal control). ²⁴
Hypoglycemic activity	Bark	Ethanol extraction	FH showed significant reduction of blood glucose level both in the normal (p<0.01) and diabetic (p<0.001) rats; however, the reduction in the blood glucose level was less than that of the standard drug, glibenclamide. FH also increased the uptake of glucose by rat hemi-diaphragm significantly (p<0.001). There was a significant increase in the glycogen content of the liver (p<0.05), skeletal muscle (p<0.01) and cardiac muscle (p<0.001). The amount of glycogen present in the cardiac muscle was more than the glycogen present in the skeletal muscle and liver. ²⁵
Thrombolytic activity and antimicrobial properties	Various plant part	Ethanol extraction and n-hexane soluble fraction	The thrombolytic activities were assessed by using human blood samples and the results were compared with standard streptokinase; in this study, the methanol soluble fraction exhibited highest thrombolytic activity (50.12±1.91); however, significant thrombolytic activity was demonstrated by the crude ethanol extract and n-hexane soluble fraction of FH (21.74±0.69) and (42.22±1.42) respectively. On the other hand, the n-hexane soluble fraction and methanol soluble fraction of ethanol extract revealed moderate antibacterial activity against some microorganisms used in the screening. ²⁶

Different components on this sow are ancient traditionally because of the treatment on a number of conditions in India, however out of the medicinal factor over consider leaves are most integral as an anti-inflammatory, anti-tussive, anti-pyretic, astringent, haemostatic and anti-ulcer activity. Our body defence dictation is well set up against

reactive oxygen species (ROS) by means of the help of antioxidants. The ROS are the hazardous by way of products generated at some stage in normal cell aerobic respiration. The roots and leaves are comprehended for their anti-diabetic, anti-bacterial, hepatoprotective properties.¹⁰⁻¹² Beside antioxidant activity, phenolic

compounds additionally are worth activities like anti-allergic, anti-inflammatory, antimicrobial activity, cardioprotective, anti-thrombotic and vasodilator effect.^{13,14} The fruit is edible and acts as a coolant and tonic. A mixture of honey and its juice is a good antihemorrhagic.¹⁵ Treatment of diarrhoea is generally nonspecific and is usually aimed at reducing the discomfort and inconvenience of frequent bowel movements. To overcome, the WHO has included a programme for the control of diarrhoea, which involves the use of traditional herbal medicine.¹⁶ The phenolic compounds hold antioxidant activity, fit according to their redox properties via which they act as like hydrogen donors, reducing agents and singlet oxygen quenchers. Phenolics are the secondary drive into metabolites that are easily handy in the plant kingdom and bear abundant services between cosmetic, food and pharmaceutical industry.¹⁷

DISCUSSION

Since historical times immemorial human beings are based on plants for their survival. The relationship among ethnical and plants has been close during the development of human culture. The ancient ethnic gained abilities on the medicinal value of the herbs by way of the use of them for different ailments. Nature has provided a fulfilled store house and remedies to treatment the ailments over mankind. Since the dawn about civilization, among addition in imitation of cultivation regarding plants for food, clothing, shelter, person also cultivates herbs for his medicinal needs. The search for instant biologically active compounds from herbal sources has always been regarding significant activity. Most often, a desired biological explanation is not due according to certain factor however rather after a combination of bioactive plant components.

Therefore, crude extracts need to be screened because of organic endeavor and after any active banish must be fractionated directed including bioassays in accordance with exploit the bioactive compounds. The phytochemical analysis concerning a variety of section over plant *F. hispida* revealed the availability of tannins, carbohydrates, flavonoids, triterpenoids, glycosides and many more bioactive compounds, which are act as a palliative of pain, inflammation, fever, diarrhea, neuro-pharmacological disorders, antioxidants and diabetes.^{22,24,25}

Present stricture confirmed main pharmacological things to do on *F. hispida* and all things to do have been dose based and statistically significant. Presence on β -amyryn acetate, lupeol acetate, and phenolic and flavonoids constituents might also lead a necessary function among it bioactivities.²⁶ We are promising for these findings may provide intent for in addition chemical and biological study on *F. hispida* in the mankind.

CONCLUSION

This plant has no longer been explored considerably till at present with respect in conformity with pharmacognostical, phytochemical, traditional use and therapeutic values. The current attempt was to animadversion and assembles updated information on atop mentioned factors of *F. hispida* including mechanism based pharmacological endeavor of the plant. This composition wish beautify the current potential over *F. hispida* and also originate focus on the viable modern therapeutic usage for the improvement on pharmaceutical entities for better health outweigh in the future.

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