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A Review on Phytochemicals and Pharmacological Activities of *Ficus hispida* Linn.

Name-

1. **Prerna Sharad Markate*- Master in Pharmacology**
2. **Dr. R.J. Mandade – Head of Department Pharmacology (PhD)**
3. **Pooja Bekate- Master in Pharmacology**
4. **Payal Aher- Master in Pharmacology**
5. **Pratiksha Wakde- Master in Pharmacology**

Organization Name-

Sudhakarrao Naik Institute of Pharmacy, Pusad.

Pusad- 445204, Maharashtra, India

Abstract

Herbal plants are potential for a comeback as like sources of ethnic health products in the main due after their vast desire in accordance with synthesize 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* Linn. (FH) belonging to the family Moraceae, has various medicinal 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 pharmacological importance about *Ficus hispida* Linn. 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 used 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. Very few studies has been published in conformity with elaborate the pharmacological activities of *Ficus hispida* Linn. The existing review is, therefore, gives a clear identification of its phytochemical and a considerable pharmacological activities.

Keywords: *Ficus hispida* Linn. Ethno-medicinal, Pharmacological features, Traditional medicinal value, Ailments.

Introduction

Ficus hispida Linn. commonly known as the hairy fig or the rough-leafed stem-fig, is a shrub or tree that can grow up to 15 m tall. It has hairy twigs and opposite leaves, unlike most other Singapore Ficus species which have alternately or spirally arranged leaves. The leaf blades are papery, elliptical with toothed margins and bear prominent veins below. At the proximal end of the petiole, there is also a pair of waxy glands. The branches, leaves and syconia are covered in white to brown hairs. *Ficus hispida* Linn. is a plant associated with many uses. In India, it is commonly cultivated for its pharmacological properties such as antidiarrheal activity as well as neuroprotective and hepatoprotective effects. It is also used as food fodder for farm animals in Nepal. In Thailand, the rough leaves are used in preparing eels for cooking by effectively scraping off their mucilag. *Ficus hispida* Linn. is distributed from Sri Lanka to India, and from South China across Southeast Asia to Australia.

The present approach 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* Linn.

Table 1: Taxonomical classification.

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

General Description

Ficus hispida Linn. 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. 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.

Table 2: Vernacular names.

Language	Vernacular names
Bengali	Dumoor kakodumbar
English	Rough-leaved fig or hairy fig
Hindi	Gobla
Tamil	Peyatti
Telugu	Bhramhamedi

Bioactive compounds

The crops were typically consists of phenanthrolindolizidine 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, terpeneol, and 2,6-dimethyl-1,7- octadiene-3,6-diol. The plant additionally includes ficus hispimines A and B, ficus hispidine, hispiloscine, N-triacontanyl acetate, ficusin A. Venkatachalam et al isolated two enormous phenanthroindolizidine alkaloids, 6-Omethyltylophorinidine and 2-demethoxytylophorine and a novel biphenyl hexahydroindolizine hispidine from stem and leaves over *Ficus hispida* Linn. who are risen from recent publication.

Scientific work and various pharmacological activities of *Ficus hispida* Linn.

Pharmacological activity	Part of plant used	Process of extraction	Impression
Anticorrosive potential	Leaves	Ethanolic extraction	Stigmasterol as the major constituent of *Ficus hispida* Linn. 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.
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.
Anti-diarrhoeal activity	Leaves	Methanolic extraction	The doses of 200 mg/kg and 400 mg/kg methanolic extract of F. hispida leaves significantly reduced the gastrointestinal motility and inhibited the percentage of diarrhoea in anti-diarrhoeal models; but 400 mg/kg dose showed better anti-diarrhoeal activity.
Wound healing	Roots	Ethanolic 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 ethanolic extract of *Ficus hispida* Linn. in all the wound models.
In-vitro antioxidant and antimicrobial study	Various plant part	Methanolic extraction	*Ficus hispida* Linn. 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.
Cardioprotective effect	Leaves	Petroleum ether (bp 60-80°C) and	*Ficus hispida* Linn. leaf extract protects the cardiac tissue by scavenging the free radicals, which is evidenced by the

		then extracted with methanol in a soxhlet extractor.	normalization of the biochemical parameters; these observations support the hypothesis that *Ficus hispida* Linn. has potential for its evaluation as a cardioprotective agent against oxidative myocardial injury.
Antioxidant properties	Fruits, leaves and bark (aerial parts)	Solvents (methanol, ethanol, chloroform and n-hexane)	Ethanol extract of *Ficus hispida* Linn. bark showed highest activity in total antioxidant capacity assay, whereas the methanol extract of *Ficus hispida* Linn. 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
Antibacterial studies	Leaves	Aqueous extraction	Silver ions were reduced by *Ficus hispida* Linn. leaf extract after 5 min, leading to the formation of crystalline silver nanoparticles; the silver nanoparticles produced by the F. hispida extract were characterized by UV-VIS spectrophotometry, in addition, F. hispida extarct was tested for anti-microbial activity by agar well diffusion method against the pathogenic bacteria Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus and Bacillus subtilis.
Anti-inflammatory effects	Leaves	Ethanolic 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)
Hypoglycemic activity	Bark	Ethanol extraction	FH showed significant reduction of blood glucose level both in the normal (and diabetic 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. There was a significant increase in the glycogen content of the liver, skeletal muscle and cardiac muscle. The amount of glycogen present in the cardiac muscle was more than the glycogen present in the skeletal muscle and liver

Thrombolytic activity and antimicrobial properties	Various plant part	Ethanolic extraction	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 however, significant thrombolytic activity was demonstrated by the crude ethanol extract .

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 endeavour 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 *Ficus hispida* Linn. revealed the availability of tannins, carbohydrates, flavonoids, triterpenoids, glycosides and many more bioactive compounds, which are act as a palliative of pain, inflammation, fever, diarrhoeal, neuro-pharmacological disorders, antioxidants and diabetes. Present activities confirmed main pharmacological things to do on *Ficus hispida* Linn. and all things to do have been dose based and statistically significant. Presence on β-amyrin acetate, lupeol acetate, and phenolic and flavonoids constituents might also lead a necessary function among it bioactivities. We are promising for these findings may provide intent for in addition chemical and biological study on *Ficus hispida* Linn. in the mankind.

CONCLUSION

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

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