

A Review Article on Ficus Racemosa Plant

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ABSTRACT

India's traditional medicine, emphasizing *Ficus racemosa* Linn., a plant widely used in Ayurveda. Known for treating diabetes, liver disorders, and more, it has diverse pharmacological properties. The review covers traditional uses, phytochemical constituents, and recent findings, underscoring the plant's significant role in healthcare.

Keyword:-*Ficus racemosa* Linn, Medicinal plants, Traditional, Biological Activity, Chemistry

INTRODUCTION

The *Ficus racemosa* (Goolar Fig), belonging to the Moraceae family, is a notable avenue plant found in native habitats spanning Australia, Malaysia, South-East Asia, and the Indian Subcontinent. This deciduous tree, reaching up to 20 meters in height, is unique for its cauliflory – figs growing on or near the trunk. Cultivated along water streams, it serves as a staple food for

Indian macaques and plays a role in traditional practices, such as the Ovambo people distilling "Ombike" liquor from its fruit. The tree's distinctive features include smooth whitish-brown bark, glabrous leaves, and large clusters of green hypanthodia. With both vegetative and seed-based propagation methods, *Ficus racemosa* thrives in various terrains, contributing to ecological diversity and cultural significance.

Taxonomy of *Ficus racemosa*

Table 1:-Taxonomy of *Ficus racemosa*

kingdom	Plantae, Plants, Planter
Division	Magnoliophyta, Spermatophyta
Class	Magnoliopsida, Hamamelididae

Order	Rosales, Urticales
Family	Moraceae
Genus	FicusL.
Species	Ficusracemosa
Phylum	Spermatophyta
Subphylum	Angiospermae
Domen	Eukaryota

Geographical Distribution

Africa, Asia, Australia, Bangladesh, Cambodia, China, East Africa, East Timor, Egypt, Ethiopia, Hawaii, Himalayas, India, Indochina, Indonesia, Laos, Malaysia, Myanmar, Nepal, North Africa,

Northeastern India, Pacific, Pakistan, Papua New Guinea, PNG, Southeast Asia, Sikkim, Singapore, Sri Lanka, Taiwan, Thailand, Timor-Leste, USA, Vietnam etc.[10]

Vernacular Names

Table 2:- Vernacular Names Of Ficus Racemosa

Species of Ficus:-

Language	Vernacular Names
Sanskrit	Udumbara, Yajnayoga, Sadaphalah, Brahanvrkisha, Shitavalkah, Sutah, Udumbara, Gular, Mashakin, Jantukaphalah, Jantuphalah, Krmiphalah, Vasudrumah, Saumya, Hemadugdhaka, Jantumati, Yagniyah, Audumbara
Chinese	Ju Guo Rong
Burmese	Jagyadumbar
Hindi	Gular, Pushp-hina, Pani Bhuj, Dumar, Goolar, Umari, Yajnyadumbur, Udumbara, Jantu Phal, Dharma Patra, Goolar
Urdu	Dimiri
English	Cluster fig., Country fig., Redwood fig. Gular fig
Kannada	Atti
Bengali	Dumur
Tamil	Atti

Table 3:- Species of Ficus

Sr.no.	Name of Species	Mizo Name	Locality
1	Ficus altissima	Pual bung	Tuirial
2	Ficus auriculata	Thei-bal	Kawnpui/Zanlawn
3	Ficus benghalensis	Bung	Neihbawith
4	Ficus benjamina	Za-man-hmawng	Selesih
5	Ficus elastic	Thelret	Thelret
6	Ficus geniculata	Ri-hnim	Sihphir
7	Ficus hirta	Sazutheipui	Nausel/Neihbawih/Lungdai
8	Ficus hispida	theithawt	Nausel
9	Ficus prostrata	Thetit	Zanlawn/Nausal
10	Ficus racemosa	Theichek	Nausal

Tradition Use

Ficus racemosa has garnered pharmaceutical interest due to its bioactive compounds, including fisetin known for anti-inflammatory, anti-diabetic, and anti-cancer properties. Quercetin, another

compound in the plant, exhibits anti-inflammatory effects, improves blood circulation, and has therapeutic potential against heart disease, cough, and cold. The plant's diverse compounds offer promising avenues for medicinal applications.

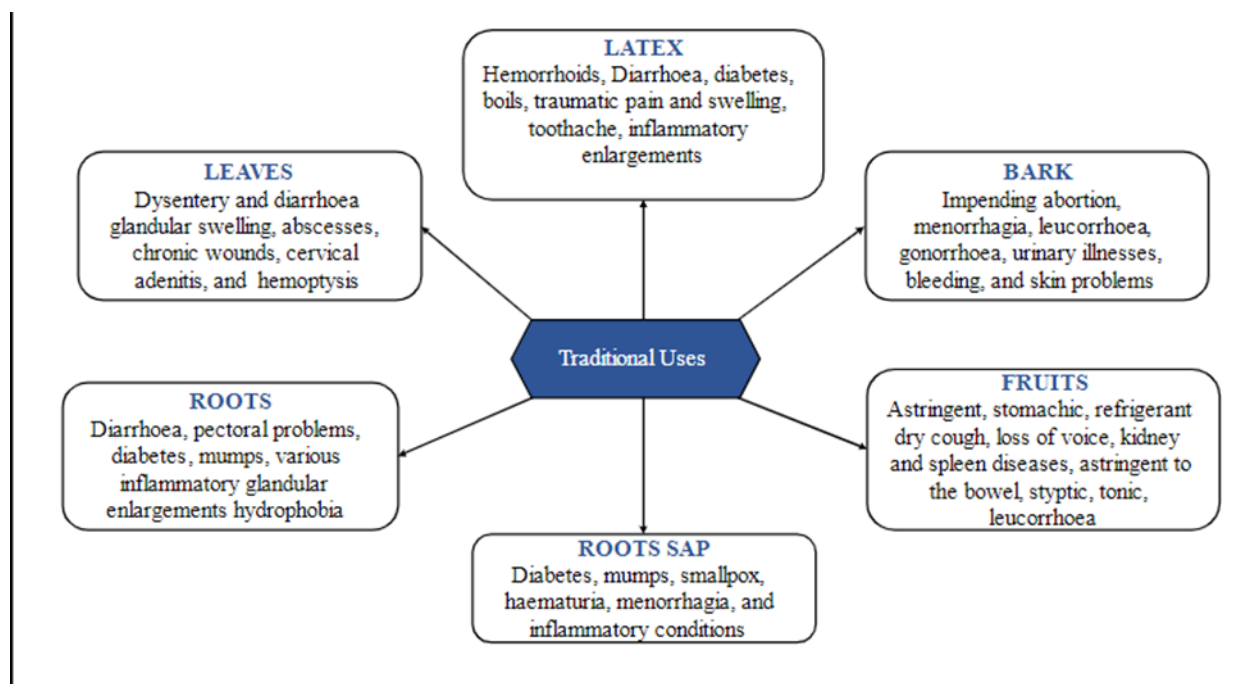


Fig.1:-Traditional uses of *Ficus racemosa*

***Fracemosa* has been used in traditional medicine to treat a variety of conditions, including:**

- Diabetes
- Cancer
- Inflammation
- Wounds
- Constipation
- Diarrhea
- Cough
- Cold
- Fever

Ficus racemosa, a deciduous tree up to 30 meters tall, is explored for pharmaceutical potential. Prominent compounds like fisetin and resveratrol show promise in inhibiting breast and colon cancer cell growth. Ongoing clinical trials are evaluating its efficacy in treating type 2 diabetes. Studies demonstrate anti-inflammatory effects on arthritis, cancer

cell inhibition, and effectiveness against diarrhea and dysentery. Plant morphology includes dark green leaves, velvety bark for various medicinal uses, latex for swelling relief, flowers with cardiovascular benefits, and fruits with carminative properties. Seeds and roots also offer therapeutic benefits.

Pharmacology Activity

Table 4:- Pharmacological Action Of Ficus Racemosa

Pharmacological action	Parts use	Extract	Experimental models
Antihyperglycemic	Steam bark Steam bark Fruits	Ethanol Methanol Methanol	Alloxan-induced Alloxan-induced Alloxan-induced
Antitussive	Steam bark	Methanol	Cough-induced modal by sulfur dioxide gas
Hepatoprotective	Steam bark Leaf	Methano Ethonal l	Hepatotoxicity-induced by ccl4 Hepatotoxicity-induced by ccl4
Antioxidants	fruits	Ethonal	DPPH free radical scavenging assay
Wound healing	Steam bark	Ethonal	Excised and incised wound model
Antidiarrheal	Steam bark	Ethonal	Castor oil-induced dirrahea PGE2-induced enter pooling
Antiulcer	Fruit	Ethonal	Pylorus ligation, ethanol induce, cold restraint stress
antibacterial	Leaf	Petroleum ether	E.coil, B.pumilus, B.subtilis, P.aeruginosa, S.aureus,
Hypolipidemic	Bark	Ethanol	Alloxan-induced

Ficus racemosa, a 30-meter tall deciduous tree, is being explored for pharmaceutical potential. Compounds like fisetin and resveratrol show promise against breast and colon cancer. Ongoing trials assess its efficacy for type 2 diabetes. Studies highlight anti-inflammatory effects, cancer cell inhibition, and effectiveness against arthritis, diarrhea, and dysentery. The plant's morphology involves dark green leaves, velvety bark for medicinal uses, latex for swelling relief, flowers with cardiovascular benefits, and fruits with carminative properties. Seeds and roots provide additional therapeutic benefits.

Antibacterial Activity

Hydroalcoholic leaf remove showed intense antibacterial movement (IC₅₀ = 0.08 mg/ml) against *Actinomyces viscosus*. Petroleum ether leaf extract exhibited higher antibacterial potential than other extracts against *Escherichia coli*, *Bacillus pumilis*, *Bacillus subtilis*, and *Pseudomonas aureus*.

Anti-inflammatory Effect

Ethanol leaf extract (400 mg/kg, orally) demonstrated anti-inflammatory activity in

rat models, reducing paw edema and granuloma weight.

Ficus racemosa's anti-inflammatory properties were attributed to a glycoside compound, racemosic acid.

Memory Enhancing Activity

Bark aqueous extract exhibited anticholinesterase activity, enhancing acetylcholine levels and demonstrating antidementia effects in rats.

The extract's potential for Alzheimer's treatment is linked to its neuroprotective, antioxidant, and anti-inflammatory properties.

4.15. Hypolipidemic Effect:

Bark ethanol extract demonstrated hypolipidemic action, potentiating insulin secretion, comparable to the standard glibenclamide.

4.16. Renal and Testicular Protective Action:

Acetone bark extract showed protective effects against doxorubicin-induced renal and testicular toxicity, with antioxidant activity.

The extract improved sperm count and spermatogenesis, reducing oxidative toxicity in both renal and testes.

Anticholinesterase

Aqueous extracts of stem bark displayed portion subordinate restraint of rodent cerebrum acetylcholinesterase, proposing expected helpful applications.

Anti-filarial

Alcoholic and aqueous extracts inhibited *Setaria cervi*'s spontaneous motility and caused microfilaria death in vitro.

Larvicidal

Extracts of leaf and bark, particularly acetone extract, demonstrated mosquito larvicidal effects attributed to the isolated compound, gluanol acetate.

Phytochemistry:

Ficus racemosa contains triterpenoids, tannins, kaempferol, rutin, arabinose, sterols, flavonoids, glycosides, quercetin, gallic acid, ellagic acid, and more.

Table. No. 5 : Behavior of the *Ficus racemosa* Lin. bark powder with different chemical reagents.

Sr.no.	Reageat	Colour/ Precipitation	Result
1	Picric acid	No precipitation	Alkaloids absent
2	Conc.H ₂ SO ₄	Reddish brown	Steroid /triterpenoids present
3	Aq. FeCl ₂	Greenish black	Tannis, flavonoids present
4	Iodine solution	Blue	Starch
5	Ammonia solution	No change	Anthraquinone glycoside absent
6	5% aq. koh	No change	Anthraquinone glycoside absent
7	Mayers reagent	No Precipitation	Alkaloids absent
8	Spot test	Stain observed	Fixed oil present
9	Aq. AgNO ₃	Precipitation observed	Proteins present
10	Aq. NaOH	Reddish brown	Flavonoids present
11	MG-HCl	Magenta	Flavonoids present
12	Dragendoffs reagent	No Precipitation	Alkaloids absent
13	Aq. Lead acetate	White precipitation	Tannis present
14	Libermann Burchaed test	Reddish green	Steroid /triterpinoids present

*NaOH- Sodium Hydroxide, KOH- Potassium Hydroxide, Mg-HCl- Magnisium metal-hydrochloric acid, FeCl₃- Ferric chloride, H₂SO₄ - Sulphuric acid, AgNO₃- Silver Nitrate

Phytoconstituents of *Ficus racemosa* Linn.

Table 6:- Phytoconstituents of *Ficus racemosa* Linn.

Leaf	Sterols, tannins and flavonoids, triterpenoids (Lanosterol) and alkaloids. A new tetracyclic triterpene glauanol acetate which is characterized as 13 α , 14 β , 17 β H, 20 α H-lanosta-8, 22-diene-3 β -acetate and racemosic acid were isolated from the leaves [7].
Stem bark	Tannin, wax, saponin gluanol acetate, β -sitosterol, leucocyanidin- 3 – O – β – D - glucopyrancoside, leucopelargonidin – 3 – O – β – D - glucopyranoside, leucopelargonidin – 3 – O – α – L- rhamnopyranoside, lupeol, ceryl behenate, lupeol

	acetate, α -amyrin acetate, leucoanthocyanidin, and leucoanthocyanin from trunk bark, lauanol acetate, lupeol, β -sitosterol and stigmasterol were isolated from stem bark [10]
Trunk bark	Upenol, β -sitosterol and stigmasterol [10].
Fruit	Glauanol, glauanol acetate, hentriacontane, β sitosterol, glauanolacetate, glucose, tiglic acid, esters of taraxasterol, lupeolacetate, friedelin, higher hydrocarbons and other phytosterol [11].
Root	Cycloartenol, euphorbol and its hexacosanoate, taraxerone, tinyatoxin; bark euphorbol and its hexacosanoate, ingenol and its triacetate, taraxerone [12].
Latex	a-amyrin, β -sitosterol, cycloartenol, cycloeuphordenol, 4-deoxyphorbol and its esters, euphol, euphorbinol, isoeuphorbol, palmitic acid, taraxerol, tinyatoxin, tirucallol, trimethyl ellagic acid [13].

Toxicity studies

Ethanol extracts of *Ficus racemosa* bark showed low IC₅₀ values (1.79, 0.098, 1.69 mg/mL) in cell lines, indicating significant cytotoxic effects on human skin fibroblasts, hepatocytes carcinoma, and promyelocytic leukemia cells. Brine shrimp lethality test demonstrated a non-toxic LC₅₀ of 850 μ g/mL for bark

extracts, affirming safety in traditional medicine. Acute toxicity studies in mice revealed the stem bark extract's safety up to 3.2 g/kg, and *F. racemosa* fruit and leaf extracts showed no signs of toxicity. LD₅₀ values suggest overall low toxicity, supporting the plant's safe use for potential health benefits.

Ethnobotanical uses of *Ficus racemosa* Linn.

Table 7:- Ethnobotanical uses of *Ficus racemosa*

Plant parts	Use
Fruit	Used in leprosy, diarrhoea, circulatory and respiratory disorders and menorrhagia [14-16]. Tender fruits are used as astringent, stomachic, refrigerant, in dry cough, loss of voice, diseases of kidney and spleen, astringent to bowel, styptic, tonic, useful in the treatment of leucorrhoea, blood disorder, burning sensation, fatigue, urinary discharges, leprosy, epistaxis, carminative and intestinal worms. They are also useful in miscarriage, spermatorrhoea, epididymitis, cancer, myalgia, scabies, haemoptysis, intrinsic haemorrhage and extreme thirst [17, 18].
Root	Roots are used in dysentery, pectoral complaints, and diabetes, applied in mumps, other inflammatory glandular enlargements and hydrophobia [12, 18, 19].
Bark	It is highly effective in threatened abortion and also recommended to treat Menorrhagia, leucorrhoea, gonorrhoea, urinary diseases, hemorrhage and skin diseases [20]. The bark is highly recommended in urological disorders, diabetes, hiccup, leprosy, dysentery and piles [7, 12, 18, 19].
Leaves	The leaves are excellent wash for wounds and ulcers. They are useful in dysentery and diarrhea. The infusion of bark and leaves is also employed as mouth wash to spongy gums and internally in dysentery, menorrhagia, efficient remedy in glandular swelling, abscess, chronic wounds, cervical adenitis and haemoptysis [17-19].

Latex	It is administered in haemorrhoids, boils, alleviates the edema in adenitis, parotitis, orchitis, traumatic swelling, toothache, vaginal disorders, diarrhoea particular in childrens and also aphrodisiac. Latex is applied externally on chronic infected wounds to alleviate edema, pain and to promote the healing [2]. The latex is reportedly used for treating piles [21]
Root sap	It is used for treating diabetes [20]. The sap of this plant is a popular remedy for mumps and other inflammatory enlargements [16,19]. In Sri Lankan indigenous system of medicine, it is used in the treatment of skeletal fracture. The Australian aborigines use this plant in the treatment of mumps, smallpox, haematuria, menorrhagia and inflammatory conditions. In Siddha the bark, fruits and latex are used to treat constipation, anaemia and dysentery [20, 22].

Clinical trials :-

Ficus racemosa aqueous extract demonstrated a dose-dependent platelet-aggregating activity of 3-51% in healthy human volunteers, with no significant difference between cold and hot water extracts. The cold water extract contained bergenin, while the heated water remove included ferulic corrosive, kaempferol, coumarin, and bergenin. Clinical trials on β -sitosterol revealed effectiveness against benign prostate hyperplasia but led to adverse effects such as dizziness, decreased blood pressure, tachycardia, and orthostatic problems. Another clinical trial on F. racemosa bark for antihyperglycemic activity in human volunteers showed a significant reduction in blood glucose levels without affecting cholesterol or triglycerides, indicating good tolerance to the treatment.

CONCLUSION

The exploration of herbal medicine involves studying various aspects, including the history, source, properties, mechanisms of action, and therapeutic uses of medicinal plants. Ficus racemosa (F. racemosa), a flexible therapeutic plant, has been extensively researched for its phytochemistry and biological activities. While significant progress has been made in understanding its diverse chemical compounds, there remains a need for further investigation into their biological activities and medicinal applications. The aqueous extract of F. racemosa has shown

promising potential, sparking interest in additional scientific exploration for both commercial and therapeutic purposes. Given its crucial role in tribal and rural societies, F. racemosa demands increased attention for comprehensive research and development, aiming to enhance its economic and therapeutic utilization.

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