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A REVIEW ARTICLE ON *FICUS RACEMOSA* LINN.

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ABSTRACT: *Ficus racemose* linn is a popular medicinal plant in India, which has long been used in Ayurveda, the ancient system of Indian medicine, for various diseases/disorders including diabetes, liver disorders, inflammatory conditions, respiratory and urinary diseases. Ficus species possessed a broad range of biological properties including antiepileptic, antidiabetic, anti-inflammatory, antifungal, Natural radioprotector, memory enhancing, antiulcer, antipyretic, antifertility, antitumorigenic, anti-thyroid, antiobesity, antinociceptive activities. A wide range of phytochemical constituents have been identified and isolated from various parts of *Ficus racemosa*.

INTRODUCTION: Ayurveda is a medical system that recorded the therapeutic properties of plants. Diseases can be prevented and improved by applying Traditional Chinese Medicine (TCM) treatments. Many incurable, chronic, and geriatric diseases can be treated. Traditional Chinese Medicine is innocuous, simple and low-priced. The genus Ficus is a very important and important group of trees available in various places and in China that have various medicinal values and play an important role in various treatment purposes. Ficus is divided into four species groups: *Ficus rasemosa*, *Ficus microcarpa*, *Ficus benghalensis*, and *Ficus religiosa*. *Ficus racemosa* is a medium-sized tree in the Moraceae family *Ficus racemosa* is known by many other names, including yajnayoga, udumbara, goolar, dumar, bodda, heibong, jantuphalam, dimri, yoggadumur, and so on. This plant grows in the forest or on hillsides near a good water source, such as a pond or riverfront. *Ficus racemose* linn. is a rapidly growing tree that can grow up to 12 m can grow in semi-shade, either with no shade, and loves wet soil to flourish. Wasps and this fruit-bearing tree pollinate the blossoms [1]. It is unusual in that its figs grow on or close to the tree trunk, termed cauliflory. In India the tree and its fruit are called 'gular' in the north and 'atti' in the south. The fruits are a favourite staple of the common Indian macaque. In Kerala it is consider as one among nalpamara. It serves as a food plant for the caterpillars of the butterfly the Two-brand Crow (Euploeasylvester) of northern Australia.

The Ovambo people call the fruit of the Cluster Fig 'eenghwiyu' and use it to distill 'Ombike', their traditional liquor [2]. *Ficus Recemosa* Lin is a large dedicious tree distributed throughout India particularly in evergreen forests and moist localitie. Root bark leaves fruit and galls are part of tree used for therapeutic activity. India is known for its rich

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diversity of medicinal plants and hence called botanical garden of the world. Many of the natural products in plants of medicinal value offer us new sources of drugs which have been used effectively in traditional medicine.

It has been used in ritual sacrifice. It is one of the ksirivriksa – latex oozes out when the leaves are cut or plucked. It is one of the plants from a group, called pancavalkala, meaning the thick bark skins of five herbs, *viz*. udumbara, vata, asvattha, parisa and plaksa.

The decoction of pancavalkala is used internally or for giving enema in bleeding per rectum and vagina. Maharishi Charka has categorized udumbara as mutra sangrahaniya – anti-diuretic herb [3].

The genus Ficus is an important group of trees which has various chemical constituents of promisive medicinal value. It is a sacred tree of Hindus and Buddhists. Four species of this genus constitute the group "Nalpamaram", namely, *F. racemosa, F. microcarpa, F. benghalensis* and *F. religiosa* (Athi, Ithi, Peral and Arayal respectively). Susruta has described the properties of the plant, like astringent, promotes callus healing in fractures (bhagnasandhaniya), alleviates *Rakta pitta*, burning sensation and obesity, and useful in vaginal disorders.

Synonyms: *Ficus glomerata* Roxb.
Vernacular Names:

Sanskrit: Sadaphala,

Assamese: Jangedumuru, Yagyadimru

Bengali: Jagnadumur, Yagnadumur,

English: Cluster Fig. Country fig.

Gujrati: Umbro, Umerdo

Hindi: Gulara, Gular

Kashmiri: Rumbal

Marathi: Atti, Gular, Umber

Oriya: Jajnadimbri, Dimbiri

Punjabi: Kath Gular, Gular

Tamil: Atti

Telugu: Atti, Medi

Urdu: Gular

Taxonomical Classification: "The study of the identification, taxonomy and nomenclature of organisms, including the classification of living things with regard to their natural relationships and study of variation and the evolution of taxa". Classification of *Ficus racemosa* is given below: (Shah *et al.*, 2016).

Kingdom: Plantae

Sub-kingdom: Tracheobionta

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Division: Magnoliophyta

Superdivision: Spermatophyta

Class: Equisetopsida, Magnoliopsida

Subclass: Hamamelididae

Order: Rosales, Urticales

Family: Moraceae

Genus: Ficus

Species: *Ficus racemosa* Linn.[4].

Distribution: *F. racemosa* is not epiphytic but is found throughout greater part of India in moist localities, along the banks of streams, sides of ravines and also on rocky slopes, sometimes almost gregariously. It is also found in Burma, China, Indonesia, Malaysia, and Australia (DMP, 1982). It is often cultivated round villages in India for its edible fruits (CSIR, 1952) [5].

Habit and Habitat: The plant grows all over India in many forests and hills. It is frequently found around the water streams and is also cultivated. The tree is medium tall, growing 10-16 meters in height. The rich green foliage provides a good shade. The bark is reddish grey and often cracked [6].

FIG. 1: FICUS RACEMOSA

Ethnobotanical Uses of *Ficus racemosa* Lin.: Phytochemical and Pharmacological potential of different parts of *F. racemose*:

Plant part	uses
Fruits	Fruits Ficus racemosa Linn. used in leprosy, diarrhoea, circulatory and respiratory disorders and menorrhagia. [12,14] 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, epitasis, carminative and intestinal worms. They are also useful in miscarriage, spermatorrhoea, epididymitis, cancer, myalgia, scabies, haemoptysis, intrinsic haemorrhage and extreme thirst
Roots	Roots are used in dysentery, pectoral complaints, and diabetes, applied in mumps, other inflammatory glandular enlargements and hydrophobia
Bark	It is highly effective in threatened abortion and also recommended to treat Menorrhagia, leucorrhoea, gonorrhoea, urinary diseases, hemorrhage and skin diseases. The bark is highly recommended in urological disorders, diabetes, hiccough, leprosy, dysentery and piles
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.
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. The latex is reportedly used for treating piles
Root Sap	It is used for treating diabetes. The sap of this plant is a popular remedy for mumps and other inflammatory enlargements. 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, heamaturia, menorrhagia and inflammatory conditions. In Siddha the bark, fruits and latex are used to treat constipation, anaemia and dysentery [7]

Isolated Compounds: Phytochemistry

Plant Part	Compounds
Leaves	Triterpenoids, tannins, kaempferol, rutin, arabinose, bergapten, psoralenes, flavonoids, Ficusin, coumarin, phenolicglycosides, and saponins
Fruits	Sterols, triterpenoids, flavonoids, glycosides, tannins,carbohydrates, ß-sitosterol, Gluanol acetate, hentriacontane, tiglic acid of taraxasterol, lupeolacetate, gallic acid Ellagic acid, and alpha-amyrin acetate
stem	Steroids, alkaloids, tannins, glunol acetate, leucocyanidin-3-O-ß-Dglucopyranoside, Leucopelargonidin-3-O-alpha-Lrhamnopyranoside, cerylbehenate, lupeolacetate, Alpha-amyrinacetate, lupeol
Bark	Bergenin, racemosicacid, friedelin, ß-sitosterol, ß-amyrin, and lupeol acetate [7]

Pharmacological Activity:

Antiepileptic Activity/Anticonvulsant Activity: Based on the investigations, it may be concluded that the ethanolic extract of bark of *Ficus racemosa* exhibited significant antiepileptic activity. The presence of flavonoids may partially contribute the significant activity of EEFR by enhanced GABAergic neurotransmission which responsible for the antiepileptic effect [8].

Antidiabetic Activity: The present study reveals that the qualitative and quantitative determination of phytochemicals present in the methanolic extract of *Ficus racemosa* leaves. It also deals with the antioxidant, glucose diffusion, glucose uptake and α- Amylase inhibition assay of the leaves sample. Our results revealed that *F. racemosa* has potential antidiabetic activity. Due to its effective pharmacological activities, in future it may be used

for the treatment of many diseases like diabetics. As we are keenly interested in the study of traditional medicinal plants and our team have also published our articles in the plants such as *Allium sativum* (Rathnasamy S *et al.,* 2014), *Solanum trilobatum* (Balakrishnan P *et al.,* 2015), Leucas www.wjpr.net Vol 6, Issue 15, 2017. 919 Balakrishnan *et al.* World Journal of Pharmaceutical Research aspera (Nagarasan S, Boominathan M 2016), Adhatodavasica (Nagarasan S, Boominathan M 2016) [9].

Anti-Inflammatory Activity: The anti-inflammatory activity of the extract of *F. racemosa* leaves against acute pedal oedema has been shown in **Table 1, Table 2, Table 3, Table 4**, which showed significant anti-inflammatory activity and the results were comparable to that of phenylbutazone, a prototype of a non-steroidal anti-inflammatory drug. The extract (400 mg/kg, i.p.) showed a maximum 30.4% inhibition in carrageenin, 32.2% inhibition in serotonin, 33.9% inhibition in histamine and 32.0% inhibition in dextran induced rat [10].

Antifungal Activity: Antifungal activity of tlze leaf extract: The preliminary screening of the flash col.umn fractions for antifungal activity was done by tlc plate bioassay method using Cladosporiz~ mcladosporioides. Two of the flash columi~ fi-actions (1: l methylene chloride: hexane and 4:l hexane : methylene chloride) showed inhibitory zones in the bioassay. The I: 1 methylene chloride: hexane fraction was chosen for the study ofthe inhibitory action against plant pathogens because of its higher inhibition and greater weight of residue (5.3 g). The fraction inhibited the growth of all fungi examined. The % illhibition of' each fungus by 1: 1 methylene chloride: hexane fraction of *F. raceinosa* leaf' extract obtained using agar plate bioassay is given in **Table 1**. The highest inhibition was against Curvz~laria sp. The inhibitory activity of the test samples increased with increase in concentration except in *C. cassiicolu* [11].

Natural Radioprotector: Phytochemical Screening Preliminary phytochemical screening of FRE indicated the presence of steroids, triterpenoids, polyphenolics, coumarins, flavonoids and tannins, while alkaloids and saponins were absent. HPLC chromatogram of FRE (700 ppm) was found to contain constituents eluting between 1.02 min to 3.60 min and 12.7 to 18.42 min with major peaks at 1.877 and 16.277 min. This fingerprint served as a standard for comparison in the subsequent preparation of FRE. Bergenin was identified in FRE by HPLC using sample isolated from a different source and comparing its UV spectrum [12].

Memory-Enhancing Activity: [Alzheimer's disease: AD is a complex neurodegenerative disorder, leading to accelerated cognitive decline and dementia. The clinical treatment strategy of AD mainly involves elevation of cholinergic hypofunction and administration of anti-inflammatory drugs, antioxidants, and lifestyle management. The plant extract selected for investigation shown to have antioxidant and anti-inflammatory activity from previous studies. It is evident from our study that administration of this extract elevated Ach levels and improved memory in rats. The collective pharmacological actions attributed by *F. racemosa* extract may serve as beneficial and supporting agent in the treatment of AD [13].

Antiulcer Activity: The current investigation supported the conventional claim of the experimental plant by demonstrating that the leaves extract of *Ficus racemosa* in various solvents had strong antiulcer action. According to fractionation experiments, the methanol fraction had the strongest antiulcer efficacy, while the chloroform fraction was determined to be the least effective. The leaves of *Ficus racemosa* might be promising choice for the treatment of PUD in people due to their antiulcer action and safety profile [14].

Antipyretic Activity: In this study brewer's yeast induced increases in rectal temperature in rats by approximately 2.24°C, while LPS increased the rectal temperature by approximately 1.84°C. Therefore, the lower doses of EFR (50 and 100 mg/kg) had less efficacy in reducing rectal temperature in the brewer's yeast-induced pyrexia model compared to the LP Sinduced fever model. It can be concluded that the EFR at all doses tested demonstrated antipyretic effect. Additional studies are required to determine if their mechanism of action involves the inhibition of TNF-α and prostaglandin synthesis [15].

Antifertility Activity: Clinical assessment of male antifertility agents should include acceptability, safety and efficacy during and after the treatment. The above results revealed the potential, reversible male antifertility effect of hydroalcoholic extract *F. racemosa* bark [16].

Anti-Thyroid Activity: The present findings inferred that the gathering treated with the most noteworthy convergence of plant concentrate indicated great come about as that of the standard medication and was underpinned by histopathological investigations of the thyroid gland of exploratory rats. In this manner, it could be inferred that ethanolic concentration of *Ficus racemosa* bark can possibly overcome hyperthyroidism in albino rats.

The treatment of ethanolic concentrate of bark of *Ficus racemosa* have indicated noteworthy changes in thyroid hormone level and lipid profile level in diverse exploratory gatherings of rats. The measurement of *Ficus racemosa* extract 450 mg/kg is found to be intense and strong towards the opposition to thyroid action, when contrasted and control. Our preliminary results are encouraging, but further molecular studies are needed to clarify the exact mechanism behind the anti-thyroid activity of *Ficus racemosa* [17].

Antinociceptive Activity: In the acetic acid induced writhing test all the extracts significantly suppressed the frequency of acetic acid induced writhing in mice. Among the extracts, the ethanolic extract of the fruit showed the most potent antinociceptive activity (61.38% writhing inhibition, $P < 0.001$) whereas the bark extract showed the least (42.76% writhing inhibition, $P < 0.02$) (Dclofenac-Na, used as the positive control exhibited a writhing inhibition of 75.17% as compared to control and the result was statistically significant ($P < 0.001$) [18].

Anti-Obesity: Based on the results obtained can be concluded that the test results showed *F. racemosa* extract contains secondary metabolites, terpenoids and steroid group. The crude extract ethyl acetate at a dose of 1500 mg / kg bw of mice, can lose weight by 1.38%. All fractions A, B, and C, can reduce the body weight of rats. Fraction of A may reduce weight of mice as much as (2.89%) is greater than the fraction of B (2. 57%) and the fraction C (0.56%), while A44 pure isolates can lose weight in mice as much as 2.31%. Characterization of isolates A44 with 1 H-NMR, IR and mass spectra, allegedly fraction of A44 is β-amyrin acetate [19].

Antitumorigenic Effect: It can be concluded that the *in-vitro* cytotoxicity study by Trypan blue assay revealed the concentration-dependent cytotoxic activity of MEFrB, MEFrF and MEFrL to DLA tumor cells with the fifty percent effective dose (ED50) at 54 µg, 58 µg, and 60 µg, respectively. The MTT assay also showed the cytotoxic effect to DLA tumor cells at the concentration-dependent and the ED50 was found to be 40µg (MEFrB), 42 µg (MEFrF), and 46 µg (MEFrL) and indicated their antitumorigenic potential [20].

CONCLUSION: In many respects, the pharmacological investigation of herbal medicine is just beginning. This review leaves no doubt that *F. racemosa*, a versatile medicinal plant, is investigated for many biological activities. Quite a significant amount of research has already been carried out during the past few decades in exploring the phytochemistry ang biological activities of different parts of *Ficus racemosa*. *F. racemosa* is unique source of various types of compounds having diverse chemical structures.

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