



***FICUS RACEMOSA* L: A REVIEW ON ITS IMPORTANT MEDICINAL USES, PHYTOCHEMICALS AND BIOLOGICAL ACTIVITIES**

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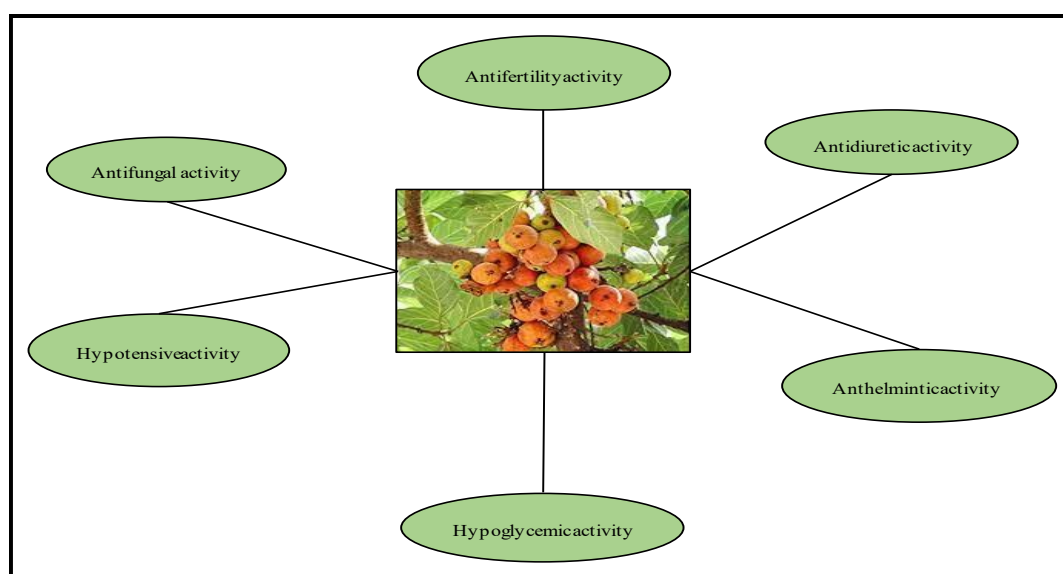
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Abstract

Ficus racemosa Linn. (Family: Moraceae) is known as the cluster fig tree or Gular. A moderate-sized tree found throughout India either wild or cultivated for its fruits eaten by villagers. Ayurveda and Unani, the traditional Indian medical system, has employed the popular medicinal plant *Ficus racemosa* for many years to treat a variety of illnesses and disorders, including skeleton diseases, diabetes, inflammatory, hyperlipidemia, hemorrhoids, respiratory, liver dysfunction, antitussive, hepatoprotective, antimicrobial, and various GIT disorders. Numerous phytoconstituent components have been different parts of extracts and phytochemical screening of the *Ficus racemosa*. In light of the numerous recent results on this plant, that is much more significant. A thorough explanation of this plant is traditionally beneficial, phytoconstituents, and biological effects on this review.



Keywords: *Ficus racemosa*, phytochemicals composition, phytochemistry, pharmacological activities.

Introduction

In the family Moraceae, the 750 species of woody plants known as *Ficus* are found in tropical and semitropical forests all over the world. Because of their delicious flavor and medicinal benefits, figs are a popular high-value fruit [1]. Fig shows the biologically active phytochemical components, such as anthocyanins, carotenoids, flavonoids, polyphenols, phenolic acids, triterpenoids, glycosides, biologically active phytochemical components of fig, such as anthocyanins, carotenoids, flavonoids, polyphenols, phenolic acids, triterpenoids, glycosides, polysaccharides, reducing compounds, and vitamins, are abundant and contribute to the fruit's high trace and macro-elements content. C, K, and E [2]. Plants naturally produce chemical compounds called phytochemicals that give them their color and organoleptic qualities, such as the garlic's pungent aroma and the deep purple of blueberries [3]. The word is typically used to describe substances that might be biologically significant but have not yet been proven to be essential nutrients [4]. The Moraceae family includes *Ficus racemosa* Linn, also called Gular fig, Cluster fig, Gular in English, Gular in Hindi, Umbar in Marathi, and Udumbara in Sanskrit. It has ovate or elliptic, dark green leaves [5]. In traditional medicine, various plant extracts or bioactive components are used. Phytochemicals are non-nutritive secondary metabolites of plants with protective or disease-preventive effects [6]. However, a new study has shown that several phytochemicals can also shield people from disease. The plant creates these compounds to protect itself. Fruits and plants include a variety of phytochemicals, and they all have unique features [7]. The *Ficus racemosa* part of the tree used for therapeutic purposes is the galls, along with the root, bark, leaves, and fruit [8]. The carminative, astringent, stomachic, and vermicide properties of bark, leaves, and unripe fruit [9]. Astringent properties have been linked to the Moraceae plant *Ficus racemosa*. It has been used extensively to treat biliary problems, jaundice, dysentery, diabetes, diarrhea, and inflammatory conditions in India's traditional medical system, which places importance on all of its medicinal uses [10]. *Ficus racemosa* is mostly found along water streams in Australia, India, and South Asian nations. The tree grows to a medium height of 10 to 16 meters [11]. Good shade is provided by the lush green vegetation. The study was done to investigate the phytochemical components and antimicrobial action of *Ficus racemosa* leaves against bacterial infections. The plant (roots, bark skin, fruits, and leaves) has high therapeutic significance [12]. *Ficus racemosa* an herbal plant has long been used in many countries for the management of several diseases including diabetes. It is a popular indigenous system of medicine like Ayurveda, Siddha, Unani, and homeopathy [13]. The latex (milky juice) is administered in hemorrhoids and boils reduce edema in adenitis, parotitis, orchitis, traumatic swelling, toothache, vaginal disorders, and diarrhea, particularly in children so an aphrodisiac [14]. Latex is applied externally on chronically infected wounds to alleviate edema, and pain and to promote healing [15]. Several species belonging to the genera of *Ficus* were reported to contain furanocoumarins, important plant phytotoxins. Venkataraman also claimed that the Moraceae family contains phytochemistry related to flavonoids, flavonoids with isoprenoid substituents, and stilbenes [16]. Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of humankind [17]. Apart from its usage in traditional medicine, scientific studies indicate *Ficus racemosa* to possess various biological activities [18]. According to the Unani system of medicine, the leaves are astringent to the bowels and good in case of bronchitis [19]. The leaves are used to treat dysentery and bilious infection and as a mouthwash in spongy gum [20]. The tender leaf buds are applied on the skin, in the form of a paste, to improve the complexion. Cuttings of the stem and root suckers are used to multiply the plant [21]. Seeds spread by animals and birds result in very good natural regeneration [22]. Four-month-old seedlings are moved into polythene bags, they are planted in the field [23]. In light of the numerous recent results on this plant that are significant, a detailed explanation of the morphology, phytochemical components, traditional usage, and pharmacological activity are given in this review [24].

Taxonomy of *Ficus racemosa*

Kingdom: Plantae, Plants, Planter

Division: Magnoliophyta, Spermatophyta

Class: Magnoliopsida, Hamamelididae

Order: Rosales, Urticales

Family: Moraceae

Genus: *Ficus* L.

Species: *Ficus racemosa*

Synonyms

Covellia glomerata (Roxb.) Miq., *Ficus glomerata* Roxb., *Ficus vesca* F.Muell. ex Miq., and *Ficus semicostata* F.M.Bailey [21].

Common names

Gular fig, cluster fig, country fig, and redwood fig [25].

Vernacular names

English: Cluster fig, Country fig, Redwood fig; Chinese: Ju Guo Rong; Burmese: Jagyadumbar; Hindi: Gular; Urdu: Dimitri; Sanskrit: Udumbara; Kannada: Atti; Bengali: Dumur; Tamil: Atti [26].

Distribution

F. racemosa is not an epiphyte, but it can be found in wet areas, beside streams, on the sides of ravines, and occasionally almost gregariously, on rocky slopes over the majority of India [27]. It is also found in Burma, China, Indonesia, Malaysia, and Australia. It is often cultivated around villages in India for its edible fruits [28].

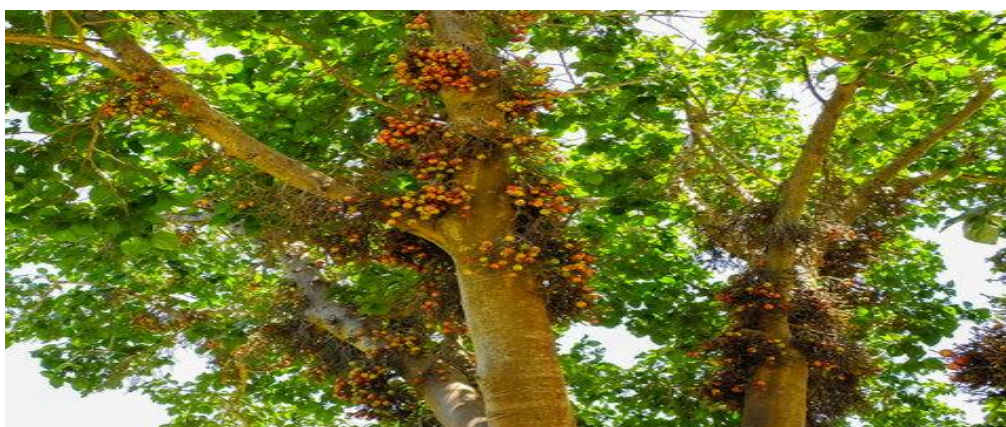


Fig 1. Plant *Ficus racemosa* tree with unripe fruits

Plant Morphology

Ficus racemosa is a deciduous tree that can reach a height of 30 m. It has a buttressed bole, bark that is 8 to 10 mm thick, a surface that is smooth, coarsely flaky, and fibrous, a blaze that is creamy pink, and latex that is milky [29]. Young shoots and twigs are finely white and hairy but soon becoming glabrous. Branchlets are 1.5 to 3 mm thick, and pubescent [30]. The additional plant parts components are-

Leaves: The leaves are enormous clusters at ancient nodes of the main trunk, dark green, 6-10 cm long, and glabrous. The receptacles are small subglobose or piriform. Infections of the bile duct are treated with a mixture of leaves powder with honey [31].

Bark: It has a velvety, greyish, or reddish-grey surface (0.7-1.9 cm). The inside and outside are both light browns, have a mucilaginous taste, and have no characteristics or odor. In addition to being advised for the treatment of menorrhagia, leucorrhoea gonorrhoea, urinary disorders, and skin illnesses, it is quite helpful in cases of imminent abortion [32].

Latex: The sort of mucus known as latex is secreted on the bark's outwardly sliced portion. It helps treat edema in conditions like GIT diseases and reduces swelling brought on by adenitis, parotitis, orchitis, traumatic swelling, toothaches, and vaginal disorders [33]. Latex is used externally to reduce swelling, discomfort, and infection in chronically infected wounds and speed up healing [34].

Flowers: A portion of the Ficus fig carries thousands of blossoms in its graceful, fair-looking flower. Additionally, it has positive biological effects on ophthalmology, antiulcer, and heart illnesses [35].

Fruits: The main trunk or major branches produce enormous clusters of pyriform, 3-6 cm in diameter fruit receptacles that are borne in a rosette-like fashion. Initially green and resembling figs, the fruits ripen to orange, dull reddish, or dark crimson. The spherical, 1.5 to 2-inch-long fruit of *Ficus racemosa* is of the size [36]. The fruit can be used to treat menorrhagia and hemoptysis since it is astringent, stomachic, and carminative. Leprosy is believed to be cured by taking a fruit and bark bath [37].

Seeds: The tiny, numerous, and granular seeds are present. The bark's exterior layer is composed of uniformly hard, easily detachable transparent flakes that range in color from grey to rusty brown. It is employed to treat skeletal disorders, diabetes, and pectoris [38].

Root: The fig's roots have a lengthy, asymmetrical shape and size, dark hue, strong odor, and somewhat bitter flavor [39]. It has both internal and external uses. Wound healing, bone fracture, and inflammatory activity are the traditional advantages [40].

Phytochemistry

Flavonoid glycosides, alkaloids, phenolic acids, steroids, saponins, coumarins, tannins, and triterpenoids, including oleanolic acid, ursolic acid, hydroxy ursolic acid, protocatechuic acid, and malonic acid, are found in the *Ficus racemosa* Linn species [41]. Flavonoids, vitamin C, and phenolic chemicals are some of the non-enzymatic components [42]. It contains phytochemicals related to flavonoids with isoprenoid substituents and stilbenes. Ascorbate oxidase, ascorbate peroxidase, catalase, and peroxidase are the current enzymatic components. Gallic acid and ellagic acid are two of the phenolic chemicals found [43].

Table 1. Some important phytoconstituents of *Ficus racemosa*

S. No.	Plant parts	Phytoconstituents	References
1.	Leaves	Triterpenoids (Lanosterol), alkaloids, and sterols are some examples of plant compounds. The leaves contain a novel tetracyclic triterpeneglauanol acetate, with characteristics including racemose acid, 13H, 14-H, 17-H, 20-H-lanosta-8, and 22 Diene-3-acetate.	[44]
2.	Fruits	Hentriacontane, flavanol, flavanol acetate, glucose, tiglic acid, and esters of taraxasterol, lupeol acetate, Friedel in, higher hydrocarbons, and another phytosterol are among the compounds that make up flavanol.	[45]
3.	Stem barks	Saponingluanol acetate, lauanol acetate, lupeol, cerylbehenate, lupeol acetate, -amyrin acetate, leucoanthocyanidin, and leucoanthocyanin. lupeol, sitosterol, and stigmasterol were extracted from the stem.	[46]
4.	Trunk barks	Upenol, β -sistosterol and stigmasterol.	[46]
5.	Root	Cycloartenol, phorbol, and its hexacosanoate, taraxerone, tiny toxin; bark phorbol and its hexacosanoate, ingenol and its triacetate, taraxerone.	[47]
6.	Latex	A-Amyrin, Sitosterol, Cycloartenol, Cycloeuphordenol, 4-Deoxyphorbol, and its Esters, Support, Euphorbinol, Isoeuphorbol, Palmitic Acid, Taraxerol, Tiny Toxin, Trimethylellagic Acid.	[48]

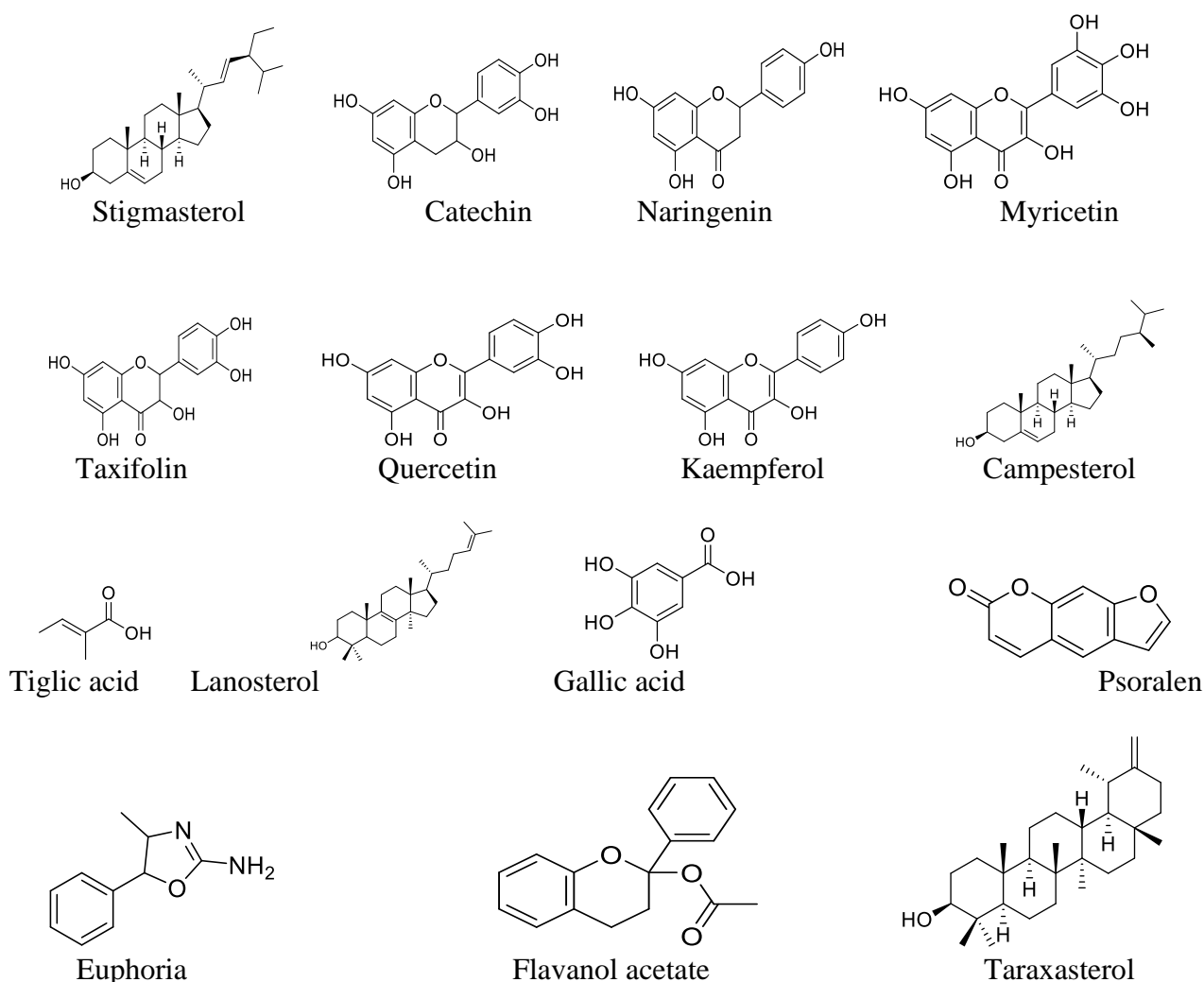


Fig 2. Structures of phytochemicals identified and isolated from various parts of *Ficus racemosa*

Traditional uses

F. racemosa, which is widely planted throughout India and has been said to possess a variety of therapeutic characteristics [49]. Various plant parts have historically been utilized as fodder [50]. The traditional Indian medical system considers all components of this plant, including the leaves, fruits, bark, latex, and sap of the root, to be medically significant see in fig.3 [38].

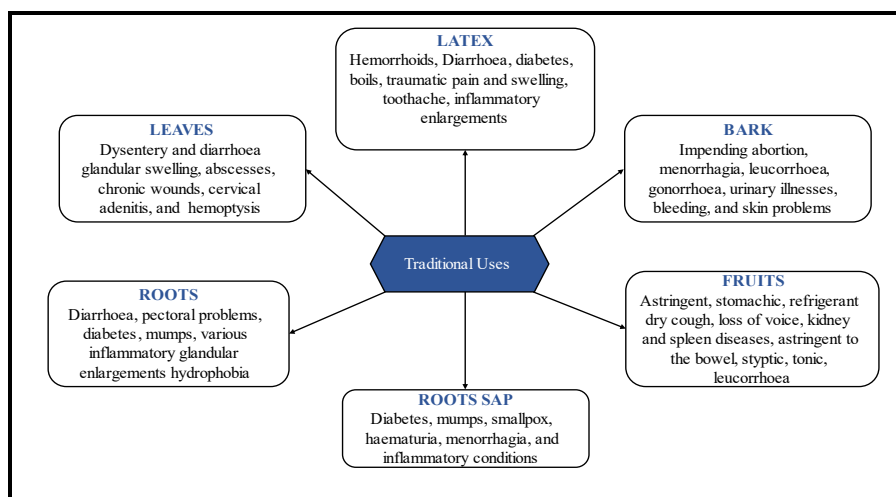


Fig 3. Traditional uses of *Ficus racemosa*

The roots are used in dysentery, pectoral complaints, diabetes, applied in mumps, and another inflammatory glandular enlargement [51]. The bark is highly efficacious in threatened abortion and is also recommended for urological disorders, diabetes, hiccough, leprosy, dysentery, asthma, and piles [52]. The leaves are a very good washing agent for wounds and ulcers [53]. The infusion of the bark and leaves is also employed as a mouthwash for spongy gums and internally in dysentery, and menorrhagia [54]. Tender fruits are astringent, stomachic, refrigerant, dry cough, loss of voice, kidney diseases, and spleen styptic tonic, useful in the treatment of blood disorders burning sensation, fatigue, intestinal worm, and carminative [55]. Latex is aphrodisiac and administered for diarrhea, diabetes, and boils, alleviating the edema in adenitis, orchitis, and traumatic swelling [56].

Pharmacological Activity

Antidiuretic activity

The bark of *Ficus racemosa* is said to have antidiuretic properties, and rats were given dosages of 250, 500, or 1000 mg/kg to test this hypothesis [14]. It began quickly (within one hour), peaked after three hours, and persisted throughout the trial (5 h). Additionally, it resulted in a decrease in urine Na⁺ level and Na⁺/K⁺ ratio as well as an increase in urinary osmolality, indicating several modes of action [57].

Renal anti-carcinogenic activity

Ficus racemosa extracts at doses of 200 and 400 mg/kg when administered orally resulted in a significant decrease in lipid peroxidation, xanthine oxidase, γ -glutamyl transpeptidase, and hydrogen peroxide (H₂O₂) generation with a reduction in renal glutathione content and antioxidant enzymes produced by Potassium bromate (KBrO₃), a powerful nephrotoxic agent that induces Glutathione levels in the kidneys and antioxidant enzymes both significantly improved [58]. The augmentation of DNA synthesis, blood urea nitrogen, and serum creatinine levels, as well as renal ornithine decarboxylase activity, reversed. According to this finding, Potassium bromate-mediated nephrotoxicity in rats is suppressed by *Ficus racemosa* extract, a powerful chemo-preventive drug [59].

Hepatoprotective activity

To study the hepatotoxicity caused by carbon tetrachloride (CCl₄) in rats, the stem bark of *Ficus racemosa* was extracted in methanol. Aspartate aminotransferase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALP) activity were all markedly elevated following CCl₄ injection compared to control rats, which resulted in a substantial rise in total bilirubin [60]. As compared to rats that had just received CCl₄ therapy, pretreatment with methanol extract led to a considerable drop in AST, ALT, and ALP activity [61]. The findings show that *F. racemosa* has strong hepatoprotective properties against CCl₄-induced liver injury in rats [62].

Anthelmintic activity

The bark extract was evaluated for anthelmintic activity using adult earthworms, which exhibited spontaneous motility (paralysis) With 50 mg/mL of aqueous extract the effects were compared with 3% piperazine citrate [63]. There was no final recovery in the case of worms treated with aqueous extract in contrast to piperazine citrate, the worms recovered completely within 5 h [64]. This result shows the anthelmintic nature of the extract [65].

Hypotensive activity

The leave of *Ficus racemosa* was extracted using a different variety of polar and non-polar solvents, and the glycoside-rich fraction had a notable hypotensive and vasodilator good impact on selected dogs as well as a direct cardiac depressing effect on isolated frog and rabbit hearts [66]. Rat's behavioral activity was unaffected by the extract, and the exhibited no acute toxic effects [67].

Antifertility activity

Ethanol and hydroalcoholic (50%) extract of *B. arundinacea* leaves and 50 % ethanol extract of *Ficus racemosa* barks have been evaluated for antifertility activity in proven fertile rats at a dose of 200 and 400 mg/kg body weight [68]. Plant extracts were tested for their effect on the estrous cycle at two dose levels of 200 and 400 mg/kg, respectively [69]. Among these three extracts, the hydroalcoholic extracts of *F. racemosa* were found to be most effective in causing significant anovulatory activity [70]. The extract did not show any significant changes in the structure and function of the uterus when given alone, but when given along with Ethinyl estradiol, it exhibited significant antiestrogenic activity in immature female rats ($P < 0.001$) [71].

Antifungal activity

The 50% methylene chloride in the hexane flash column fraction of the extract of the leaves of *Ficus racemosa* was found to have antifungal activity [72]. Psoralen was identified as the active compound and was shown to be biodegradable, having the potential to be developed as a fungicide against pathogens causing diseases on crops of economic importance [73].

Hypoglycemic activity

The ethanol extract (250mg/kg/day) lowered blood glucose levels within two weeks in the alloxan diabetic albino rats confirming its hypoglycemic activity [74]. β -sitosterol isolated from the stem bark was found to possess potent hypoglycemic activity when compared to other isolated compounds [75].

Anti-Inflammatory Activity

Ethanol extract of leaves at a dose of 400mg/kg exhibited maximum anti-inflammatory effect with 30.4, 32.2, 33.9, and 32% with carrageenin, serotonin, histamine, and dextran-induced rat paw edema models, respectively [76]. Ethanol extract of stem bark also exhibited COX-1 and IC 50 values of 100mg/ml proving the drug use in the treatment of inflammatory conditions [77,78].

Antioxidant activity

Ethanol and water extract of the *Ficus racemosa* stem bark had potent free radical scavenging activity in both nanosecond pulse radiolysis and stopped-flow spectrophotometric analysis [79]. The ethanol extract showed a significantly higher steady-state antioxidant activity than the water extract [80]. They also studied the radioprotective potential of the same extract using a micronucleus assay in V79 cells and observed maximum radioprotection at the 20 μ g/ml concentration. There was no blockage of the proliferative index by the cytokines in the same experiment. Based on the above observation, the *Ficus racemosa* ethanol extract had potent antioxidant and radioprotection activities [81].

Antiulcer activity

The fruit extract (50% ethanol) exhibited antiulcer activity indifferent to well-known animal models of rats with three doses (50,100, and 200 mg/kg, twice daily, PO) for five days. The research used various animal models like ethanol, pylorus ligation, and cold strain-induced ulcer to perform the antiulcer effect [40]. The extract inhibited an ulcer in all the above-mentioned models in a dose-dependent manner. A similar extract reduced oxidative damage in the stomach's mucosal lining by inhibiting enzyme activity like that of H^+/K^+ ATPase and superoxide dismutase [82,83].

Gastroprotective activity

The gastroprotective effect of 50% ethanolic extract of *Ficus* was studied in different gastric ulcer models in rats. The extract doses (50, 100, and 200 mg/kg body weight) were administered orally, twice daily for 5 days for prevention of gastro activity. Estimation of H^+/K^+ ATPase activity and gastric wall mucous were performed in ethanol-induced ulcers and antioxidant enzyme activities in supernatant mitochondrial fraction of CRS-induced ulcers. Significant gastroprotective activity which might be due to gastric defense factors and phenolics might be the main constituents responsible for this activity [84].

Antimicrobial activity

Antimicrobial activity of *Ficus religiosa* and *Ficus racemosa* leaf extracts was assessed using agar well diffusion method and MIC assay, gram-positive bacteria *Bacillus subtilis*, *Staphylococcus aureus* gram-negative bacteria *E. coli*, *Salmonella typhi*. The highest ZOI values were obtained against *S. aureus* at 1mg/100µl of chloroform extract in the case of *F. religiosa* whereas *Ficus racemosa* effectively inhibited *S. typhi* at 1 mg/100µl of methanol extract. Preliminary phytochemical analysis marked the presence of alkaloids, tannins, saponins, and flavonoids as the active bio ingredients in *Ficus racemosa's* various solvent extracts [85].

Anti-obesity activity

The mice were acclimatized for 7 days in laboratory conditions as well as getting enough food and drinks. After 7 days, selected mice were healthy, characterized by weight stable or increased, and did not show any abnormal behavior. Having fasted for 20-24 hours, the weight of mice was weighed, then mice were divided into 5 groups, each of the groups containing three mice group I: obesity control (negative control is given food (pellets) without medication, no given extract or Xenical), group II: treated with standard drug, Xenical, was given orally at a dose of 1500 mg/kg bw of mice), group III, IV, and V: treated with extract of *Ficus racemosa*, with doses 1500 mg/kg bw of mice. Weight measurement is done by weighing the mice every day for five days. The extract n-hexane and ethyl acetate obtained from plants *Ficus racemosa*, respectively of 68.50 g (2.28%) and 50.52 g (1.68%), were tested for their antiobesity, with a dose of 100, 500, 1000, and 1500 mg/kg bw of mice. The results showed that the extract of n-hexane and ethyl acetate can weight loss in mice, obtained optimal dose is 1500 mg/kg of mice and used as the dose of the next work [86].

Wound healing activity

Wound healing activities of *Ficus racemosa* Linn leaves extract purified fraction was found to be more potent on the excision wound model of Wistar albino rats were tested on Wistar albino rats for wound healing activities. In the results of the present study, complete wound healing activity was found to be a maximum of 84.36% on day 17 when treated with mupirocin 5% ointment [87]. Similarly, complete wound healing activity was found at 81.30% on day 18th, by applying an ethanolic extract of *Ficus racemosa* as compared to the control group i.e., 62.22% on day 24th.

Antipyretic activity:

The methanol extract of stem bark was evaluated on normal body temperature and yeast-induced pyrexia in albino rats at the dose of 100, 200, and 300mg/kg p. o. [40]. The extract shows a significant dose-dependent reduction in normal body temperature and yeast provoked elevated temperature which extended to 5th after drug administration.[88]

Antitussive activity

The antitussive potential of the methanol extract of the bark was evaluated in sulfur dioxide gas-induced cough in mice. The extract demonstrated significant antitussive activity comparable to that of codeine phosphate (10 mg) a standard antitussive agent. Maximum activity was attained at 200 mg/kg bw at 90 min after administration of the extract [89].

Antifilarial activity

Alcoholic and aqueous extracts of the fruits of *F. racemosa* caused inhibition of spontaneous motility of whole worm and nerve muscle preparation of *Setaria cervi* characterized by increase in amplitude and tone of contractions [76]. The concentrations required to inhibit the movement of the whole worm and nerve muscle preparation for alcohol extract were 250 and 50 µg/mL, respectively, while, for aqueous extract it was 350 and 150 µg/mL, respectively. Both alcohol and aqueous extracts caused death of microfilariae in vitro. LC50 was 21 and 27 ng/mL and LC 90 was 35 and 42 ng/mL, respectively, for alcohol and aqueous extracts [90].

Chemo-preventive activity

Treatment of rats orally with *F. racemosa* extract (200 and 400 mg/kg bw) resulted in significant decrease in γ -glutamyl transpeptidase, lipid peroxidation, xanthine oxidase, H₂O₂ generation, blood urea nitrogen, serum creatinine, renal ODC activity, DNA synthesis (Pb 0.001) and incidence of tumors in ferric nitrilotriacetate (Fe-NTA)-induced chemotoxicity in rats. Renal glutathione content, glutathione metabolizing enzymes and antioxidant enzymes were also restored suggesting *F. Racemosa* extract to be a potent chemo-preventive agent [91]. Oral treatment of rats with *F. racemosa* extract (200 and 400 mg/kg BW) resulted in a significant decrease in xanthine oxidase, γ -glutamyl transpeptidase activities, lipid peroxidation and H₂O₂. A significant recovery of renal glutathione and antioxidant enzymes was also reported [92]. There was also reversal in the enhancement of renal ornithine decarboxylase activity, DNA synthesis, blood urea nitrogen and serum creatinine indicating *F. racemosa* extract to be a potent chemo-preventive agent and suppressing potassium bromate-induced nephrotoxicity in rats [93].

Hypolipidemic activity

Dietary fibre of *Ficus racemosa* fruits induced a clear hypo cholesterolemic effect in rats, as it increased faecal excretion of cholesterol and bile acids. The hypolipidemic properties of an ethanolic extract of *Ficusrace mosa* barks were examined in alloxan-induced diabetic rats at dosages ranging from 100 to 500mg/kg [94]. Compared to the usual reference medication, glibenclamide, the extract displayed powerful anti-diabetic and hypolipidemic effects. Beta-sito sterol helps to reduce cholesterol level by limiting the amount of cholesterol in body. Then it can be stated that the hypolipidemic activity of ficus extract is due to the presence of beta-sitosterol in bark and latex [95].

Analgesic

Analgesic activities of ethanol extracts of the bark and leaves were evaluated using hot-plate and tailimmersion methods [76]. At 300 mg/kg, i.p., *F. racemosa* leaf extract increased the latency time significantly, giving about 40.1% protection; the bark extract increased the Toxicity studies reaction time significantly providing 35% protection. The observed analgesic effect was attributed to the presence of friedelin, behenate, bergenin, lupeol and lupeol acetate [96]. The decoction of *F. racemosa* leaves produced a significant decrease in the number of writhes in the acetic acid writhing test in mouse. A similar effect was seen in the hot-plate test where a significant analgesic activity was observed which continued until 3 h after the administration of the decoction in mice. A significant anti-edemic effect was exhibited by the petroleum ether extract in carrageenan-induced paw edema in mice [97].

Toxicity studies

[98] evaluated the cytotoxic effect of ethanol extracts of *F. racemosa* bark using ATP-based luminescence assay in human skin fibroblasts (1BR3), human hepatocytes carcinoma (HEPG2) and human promyelocytic leukemia (HL-60) of cell density 1 x 10⁴ cells/mL. The extract showed IC₅₀ values of 1.79, 0.098, and 1.69 mg/mL, respectively, which were significantly lower than that of aspirin and mercuric chloride [99]. The extract was significantly less toxic than aspirin and mercuric chloride after 48 h of exposure of the cell lines tested. The water/hydro-alcohol/alcohol extracts of the bark showed a LC 50 of 850 μ g/mL in brine shrimp lethality test, rendering it non-toxic and representing its safety in its usage in traditional medicine [100]. The acute toxicity of methanol extract of the stem bark of *F. racemosa* was evaluated in Albino mice and the study established that the extract is safe even at a higher dose of 3.2 g/kg (Rao et al., 2002b), while the petroleum ether extract of *F. racemosa* fruits did not produce toxicity even at a dose of 5 g/kg in mice [101]. [27] reported that the hydro-ethanol extract (50%) of fruits is non-toxic and safe, as no mortality or change in behavioral pattern was observed in mice. The leaf extract also did not affect the behavioral activity and did not show signs of acute toxicity in rats [102]. [97] reported a LD₅₀ value >10 g/ kg bw for petroleum ether and ethanol extracts of *F. racemosa* leaves, and a value of >5 g/kg bw for the aqueous

extract. All these observations regard various parts of *F. racemosa* (plant particularly) bark less toxic and safe for possible human consumption in order to derive its diverse health benefits [103].

Conclusion

The field of pharmacology and phytochemistry that encompasses the study of herbal medicine includes a screening of drugs. In numerous ways, including physiochemical characteristics, mode of action, and therapeutic outcomes. The pharmacological study of herbal medicine is still in its infancy in many ways. There is no question after reading this review that the diverse medicinal herb *Ficus racemosa* is being researched for a variety of biological functions. This review leaves no doubt that *Ficus racemosa*, a versatile medicinal plant, is investigated for many biological activities. The phytochemistry and biological activity of various components of *Ficus racemosa* have already been the subject of a sizable amount of research over the past few decades. *Ficus racemosa* is a special source of many kinds of chemicals with varying chemical structures. Multidisciplinary research interventions have facilitated the conversion of underutilized fig fruit into healthy ingredients in the food sector. The biological activity and potential medical uses of these substances have received very little research, thus further study is required to utilize their medicinal potential to fight disease. Additionally, the aqueous extract has been sold, which gives scientists adequate motivation, to investigate additional details regarding this medication plant to take advantage of its profit potential. Extensive research and development should be carried out on *Ficus racemosa* because of its superior economic use for therapeutic utilization.

Declarations

Conflict of interest

The authors declare that there is no conflict of interest.

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