

**PHYTOPHARMACOGNOSTICAL PROPERTIES OF *Ficus racemosa* Linn.**A Arunachalam\*<sup>1</sup>, N Venkatesan<sup>2</sup>, R Senthilraj<sup>3</sup>, G Vijayakumar<sup>4</sup>, M Karthikeyan<sup>5</sup> and Ashutoshkumar<sup>5</sup><sup>1</sup>Department of Pharmaceutics, Sasikanthreddy College of Pharmacy, Nellore, Andhrapradesh, India.<sup>2</sup>Department of Pharmacology, Sasikanthreddy College of Pharmacy, Nellore, Andhrapradesh, India.<sup>3</sup>Department of Biotechnology, Vikas College of Pharmacy, Jangaon, Andhrapradesh, India.<sup>4</sup>Department of Pharmacy Practice, AKRG College of Pharmacy, West Godavari. Andhrapradesh, India.<sup>5</sup>Department of Pharmaceutics, AKRG College of Pharmacy, West Godavari. Andhrapradesh, India.

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**ABSTRACT**

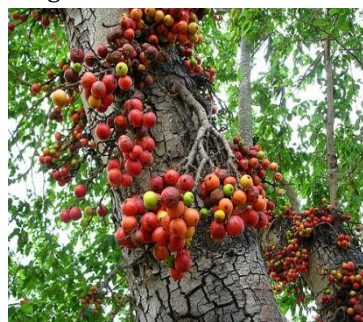
*Ficus racemosa* Linn. is a moderate sized avenue tree found throughout India. It is popular in indigenous system of medicine like ayurveda, siddha, unani and homoeopathy. In the traditional system of medicine various plant parts such as bark, root, leaves, fruits and latex are used in dysentery, diarrhoea, diabetics, stomachache, piles and as carminative and astringent and also as antioxidant and anticancer agent. The present review is therefore, an effort to give a detailed study in Pharmacognostical properties.

**Keywords:** *Ficus Racemosa*, Pharmacognostic study, Protein, Phenol and Tannin.

**INTRODUCTION**

The use of herbal medicines has become a part of general health care by the tribes since time immemorial. The use of modern medicines of synthetic origin imparting dramatic result in a short span in the therapeutic field. Traditional medicaments, chiefly obtained from plants have played a vital role in sustaining diseases free human existence on this planet. Today, there is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival of interest in plant-derived drugs is mainly due to the current widespread belief that "green medicine" is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects<sup>1</sup> the taxonomy treatment of the Moraceae family constitutes large taxa of over fifty genera and nearly 1400 species, including some important groups like Artocarpus, Morus and Ficus. Several species belonging to the genera of Ficus were reported to contain furanocoumarins which is an important plant phototoxins.<sup>2</sup> Antioxidants from figs can protect lipoproteins in plasma from oxidation and produce a significant increase in plasma antioxidant capacity.<sup>3</sup> *Ficus racemosa* Linn (Moraceae) is an evergreen, moderate to large sized spreading, lactiferous, deciduous tree, without much prominent aerial roots found throughout greater part of India in moist localities and is often cultivated in villages for its edible fruit.<sup>4</sup> Different parts of *F. racemosa* are traditionally used as fodder, edible and ceremonial.<sup>5</sup> All parts of this plant (leaves, fruits, bark, latex, and sap of the root) are medicinally important in the traditional system of medicine in India. The leaves powdered and mixed with honey is given in bilious infections.<sup>6</sup> Fruits are a good remedy for visceral obstruction and also useful in regulating diarrhea and constipation.<sup>7</sup>

The astringent nature of the bark has been employed as a mouth wash in spongy gum and also internally in dysentery, menorrhagia and haemoptysis.<sup>8</sup> The bark is antiseptic, antipyretic and vermifugal, and the decoction of bark is used in the treatment of various skin diseases, ulcers and diabetes. It is also used as a poultice in inflammatory swellings/boils and regarded to be effective in the treatment of piles, dysentery, asthma, gonorrhoea, gleet, menorrhagia, leucorrhoea, haemoptysis and urinary diseases.<sup>9</sup> Apart from the usage in traditional medicine, scientific studies indicate *F. racemosa* to possess various biological effects such as hepatoprotective<sup>10</sup>, chemopreventive,<sup>11</sup> antidiabetic,<sup>12</sup> anti-inflammatory,<sup>13</sup> antipyretic,<sup>14</sup> antitussive<sup>15</sup> and antidiuretic<sup>16</sup>. The bark has also been evaluated for cytotoxic effects using 1BR3, Hep G2, HL-60 cell lines and found to be safe and less toxic than aspirin, a commonly consumed anti-inflammatory drug.<sup>17</sup>

*Ficus Racemosa***Taxonomy**

Kingdom : Plantae  
 Division : Magnoliophyta  
 Class : Magnoliopsida  
 Order : Urticales  
 Family : Moraceae  
 Genus : Ficus  
 Species : *F. racemosa*  
 Synonym : *F. glomerata* Roxb.

**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.

**Morphological Characters:** The tree is medium tall with quite rich green foliage that provides good shade. The

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leaves are dark green, 7.5-10 cm long, ovate or elliptic. The fruit receptacles 2-5 cm in diameter, pyriform, in large clusters, arising from main trunk or large branches. The fruits resemble the figs and are green when raw, turning orange, dull reddish or dark crimson on ripening. The seeds tiny, innumerable, grain-like, the outer surface of the bark consists of easily removable translucent flakes grayish to rusty brown, uniformly hard and non-brittle.

## MATERIAL AND METHODS

**Collection and authentication of plants:** The plant materials used in this study were collected from the botanical garden of NBRI and identified and authenticated taxonomically by Dr. Sayyada khaton (Taxonomist) by comparison with the herbarium and voucher specimen was lodged in the departmental herbarium of National Botanical Research Institute Lucknow, India.

**Preparation of 50% ethanolic extract of *Ficus racemosa*:** The freshly collected *Ficus racemosa* fruits (5kg) of were chopped into small pieces, dried in shade/tray drier under controlled conditions and powdered coarsely. The powdered material were defatted with pet-ether twice and then extracted thrice with 50% (v/v) ethanol by cold maceration for three days. The extract was separated by filtration and concentrated on rotavapour (Buchi, USA) and then dried in lyophilizer (Labconco, USA) to get a dry residue. Under reduced pressure to obtain 81.0 g of solid residue (yield 8.1 % w/w).

**Phytochemical investigation of Plant:** 50% ethanolic extract of *F. racemosa* were subjected to qualitative tests for the identification of various active constituents viz, Carbohydrate, Glycoside, Fixed oil, Fats, Proteins, amino acids. Saponins, Phenolics, Tannins, Phytosterol, Alkaloids, Flavonoids.

**Test for carbohydrates and glycosides:** A small quantity of the extract was dissolved separately in 4 ml of distilled water and filtered. The filtrate was subjected to the following testes to detect the presence of Carbohydrate and glycosides.

**Physicochemical Analysis:** Leaf, stem and root were subjected to physicochemical study for determination of ash value and extractive value using the method described by Indian Ayurvedic Pharmacopeia 8. Preliminary Phytochemical Analysis: Qualitative screening of leaf, stem and root was performed for the identification of various classes of active chemical constituents using the methods.

## RESULTS AND DISCUSSION

**Physicochemical Analysis:** The results of extractive values showed the alcohol and 70% alcohol have higher quantity of extract in comparison to other solvent extracts. The successive maceration method was done using the selected solvent in increasing polarity and the finding showed alcohol has a higher percentage of extract (2.25). The soxhlet extraction was also performed same as cold successive method and here also alcohol showed higher percentage of extractive value (5.4). From the finding of extractive value alcohol 70% has been selected for further studies.

**Preliminary Phytochemical Analysis:** The Phytochemical Screening test of the *Ficus racemosa* Linn presented in Table 1. Alkaloid test results of leaf stem and root showed slightly positive in all four tested reagents. However 50% alcoholic extract of leaf, stem and root

showed negative in Mayer's test. Qualitative phytochemical studies of Carbohydrate & Glycoside showed a good characteristic colour and precipitate in all five tested reagent. Slight presence of Saponin was confirmed by foam test in leaf, stem and root in all extracted solvents. Protein and amino acid was found absent in all tests.

**Table 1. Phytochemical investigation of the 50 % ethanolic extract of *Ficus racemosa***

S. No.	Constituents	Tests	FRF
1.	Carbohydrate	Molish's test	+
		Fehling's test	+
2.	Glycoside	Legal's test	+
		Borntrager's test	+
		Baljet test	+
3.	Fixed oil and fats	Spot test	+
		Saponification test	+
4.	Proteins and amino acids	Million's test	+
		Ninhydrin test	+
		Biuret test	+
5.	Saponins	Foam test	-
6.	Phenolics and tannins	FeCl <sub>3</sub> test	+
		Gelatin test	+
		Lead acetate test	+
7.	Phytosterol	Salkowski test	+
		Libermannburchard test	+
8.	Alkaloids	Dragendroff's test	+
		Mayer's test	-
		Wagner's test	-
		Hager's test	-
10.	Flavonoids	Aqueous NaOH test	+
		Con. H <sub>2</sub> SO <sub>4</sub> test	+
		Shinoda's test	-

Where, + = Presence; - = Absence

However in Millon's test alcoholic extract showed slight presence of protein. Phenolic compounds and Flavonoids were abundantly present in all the extracts. However alkaline test showed the moderate result in comparison to other two tests. Libermann-Burchards test showed slight presence of phytosterol in all the extracts. The above qualitative phytochemical screening showed that the whole plant is a rich source of Glycosides, Phenols & Flavonoids. However, presence of protein and alkaloids is limited in whole plants. Carbohydrate Analysis: Total Carbohydrate percentage was analyzed by phenol sulphuric acid methods. The finding showed leaf possesses higher percentage of sugar content (3.58%) as compared to stem (3.04%) and root (2.28%). Protein Analysis: The protein content was estimated by Lowry's method. Protein content was found higher in stem portion (3.12%) as compared to root (2.72%) and leaf (2.41%). Phenol Content Analysis: Total phenols were estimated by using Folin-Ciocalteu reagent. The findings showed stem portion possesses higher percentage of phenols (8.03%) as compared to leaf (3.64%) and root (5.01%). Tannin Content Analysis: Tannins were estimated by Folin-Denis method. Results showed stem possesses higher percentage (5.94%) of tannin as compared to leaf (2.06%) and root (4.65%).

## CONCLUSION

Physicochemical studies reflects that total, water soluble ash content is higher in stem and acid insoluble ash is higher in root. It may be due to the soil components. Extractive value has been found higher in stem water extract, however alcoholic extract has found higher in leaf. Total carbohydrate content has found higher in leaf however, protein, phenol and tannin content found higher in stem portion of *F racemaosas*.

## REFERENCES

1. Ventakamaran K; Wood phenolics in the chemotaxonomy of the Moraceae. *Phytochemistry*, 11, 1972, 571-1586.
2. Swain L E, Downum K R; Light-activated toxins of the Moraceae. *Biochem. Sys. Ecol*, 18, 1990, 153-156.
3. Duenas M, Perez-Alonso J J, Santos-Buelga C, Escribano-Bailon T; Anthocyanin composition in fig (*Ficus carica* L.). *J. Food Compos. Anal*, 2008, pp. 21.
4. Anonymous. *The Wealth of India*. Council of Scientific and Industrial Research, New Delhi, India, 1952, pp. 35-36.
5. Manandhar N P; *Fodder trees*. *The Rising Nepal*, 7, 1972, 1-2.
6. Kirtikar K R, Basu B D; *Indian Medicinal Plants*, 2nd ed, Vol. III, Dehra Dun, 1975, pp. 2327-2328.
7. Vihari V; *Ethnobotany of cosmetics of Indo-Nepal border*. *Ethnobotany*, 1995, 7, 89-94.
8. Chopra R N, Chopra I C, Handa K L, Kapur L D; *Indigenous Drugs of India*, 2<sup>nd</sup> ed, Academic Publisher, Calcutta, 1958, pp. 508-674.
9. Nadkarni K M, Nadkarni A K, Chopra R N; *Indian Materia Medica*, Vol. I, Popular Prakashan, Bombay, 1976, pp. 548-550.
10. Mandal S C, Tapan K, Maity J, Das M, Pal M, Saha B P; Hepatoprotective activity of *Ficus racemosa* leaf extract on liver damage caused by carbon tetrachloride in rats. *Phytother. Res.*, 1999, 13: (5) 430-432.
11. Khan N, Sultana S; Chemomodulatory effect of *Ficus racemosa* extract against chemically induced renal carcinogenesis and oxidative damage response in Wistar rats. *Life Sci.*, 2005, 29, 1194-1210.
12. Rao B R, Murugesan T, Sinha S, Saha B P, Pal M, Mandal S C; Glucose lowering efficacy of *Ficus racemosa* bark extract in normal and alloxan diabetic rats. *Phytother. Res.*, 2002, 16, 590-592.
13. Mandal S C, Saha B P and Pal M; studies on bacterial activity of *Ficus racemosa* leaf extract, *phytother Res*, 2000, 14(4)278-280.
14. Rao B R, Anipama K, Swaroop A, Murugesan T, Pal M, Mandal S C; Evaluation of anti-pyretic potential of *Ficus racemosa* bark. *Phytomedicine*, 2002, 9, 731-733.
15. Rao B R, Murugesan T, Pal M, Saha B P, Mandal S C; Antitussive potential of methanol extract of stem bark of *Ficus racemosa* Linn. *Phytother. Res.*, 2003, 17, 1117- 1118.
16. Ratnasooriya W D, Jayakody J R, Nadarajah T; Antidiuretic activity of aqueous bark extract of Sri Lankan *Ficus racemosa* in rats. *Acta Biol Hung.* 2003, 54(3-4):357-63.
17. Li R W, Leach D N, Myers S P, Lin G D, Leach G J, Waterman P G; A new anti-inflammatory glucoside from *Ficus racemosa* L. *Planta Med.*, 2004, 70, 421-426.