

A Review Study on Phytochemical and Pharmacological Properties of *Ficus benghalensis* (Indian Banyan Tree)

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ABSTRACT

Ficus benghalensis (commonly known as a Banyan tree) is an evergreen tree and belongs to the family Moraceae. *Ficus benghalensis* is an important medicinal plant that has a number of bioactive compounds. The whole plant of *Ficus benghalensis* (leaves, fruits and bark) are used as anti-oxidant, anti-cancer, anti-microbial properties and also used in the treatment of several diseases. The present review aims to update the information on the phytochemical and pharmacological properties, botanical description of *Ficus benghalensis*.

Keywords : Medicinal, Anti-microbial, Antidiabetic, Phytochemical

I. INTRODUCTION

Plants have been the major source of drugs in Indian system of medicine and other ancient systems in the world. Earliest description of curative properties of medicinal plants is found in Rig-Veda. Charaka Samhita and Sushruta Samhita give extensive description on various medicinal herbs. There are 400 different tribal and other ethnic groups in India which constitute about 7.5% of India's population. In 2001, researchers identified 122 compounds used in modern medicine which were derived from ethno medical plant sources [1], 80% of these compounds have had an ethno medical use identical to the current use of the active synthetic drugs [10]. Tribal, rural and primitive societies have discovered solution for treatment of disease to almost all their needs and their problems from the natural resources around them [3].

The genus *Ficus* includes some 750 species of plants occurring in most tropical and subtropical forests throughout the world. The genus is remarkable for the large variation in the habits of its species [5].

II. METHODS AND MATERIAL

1. Taxonomic Classification

Kingdom = Plantae
Sub Kingdom = Tracheobiota
Super division = Spermatophyta
Division = Magnoliophyta
Class = Magnoliopsida
Subclass = Hamamelidae
Order = Urticales
Family = Moraceae
Genus = *Ficus*
Species = *Ficus benghalensis*

2. Synonyms

Sanskrit = Vata
English = Banyan tree
Hindi = Vada
Bengali = Bot
Gujrati = Vad
Marathi = Vad
Telugu = Maricheta
Tamil = Vada
Malyalam = Perala
Punjab = Bera

3. Botanical Description

Leaves broadly ovate, obtuse, the base cordate; lamina 10-30 cm long, 7-20 cm wide, very coriaceous, puberulous beneath; lateral veins 5-7 pairs, the basal pair prominent, reaching 1/3 of lamina length; petiole 1.5-7 cm long, 5mm wide, puberulous, stipules thick, 1-1.5 cm long and wide, puberulous. Figs paired sessile, puberulous, depressed globular, 1.5-2 cm diam., maturing orange to red; ostiole broadly unbonate, enclosed by 3 flat apical bracts; basal bracts 3, foliaceous, obtuse, 3-7 mm long, 10-15 mm wide puberulous. Male flowers pedicellate; tepals 2 or 3. Female flowers sessile; tepals 2 or 4. Gall flower pedicellate; tepals 3 or 4 inch [6].

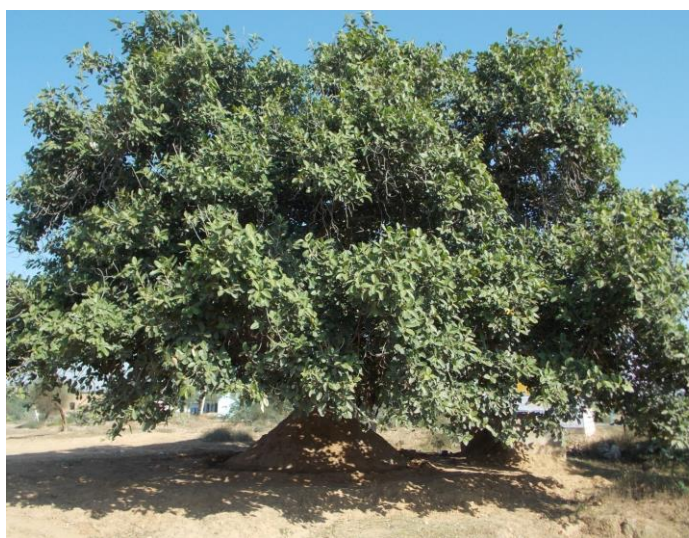


Figure 1: Plant of *Ficus bangalensis*

III. RESULTS AND DISCUSSION

1. Distribution

Ficus benghalensis is native to India where it grows from low altitudes to 2,000 ft (610 m), especially in dry regions [9]. Riffle [11] reports that *F. benghalensis* is native to a wide area of Asia, from India through Myanmar (Burma), Thailand, Southeast Asia, southern China, and Malaysia.

2. Chemical Constituents

Stem bark contains a number of anthocyanidin derivatives (methyl ethers of leucodelphinidin-3-O-L-rhamnoside, leucopelargonidin-3-O-L-rhamnoside, Lecocyanidin-3-O-D-galactosyl cellobioside) and

aliphatic long chain ketones (pentatriacontan-5-one, tetratriacont-20-en-2-one, heptatriacont-6-en-10-one), besides-beta-sitosterol glucoside and meso inositol. The leaves contain 9.63% crude protein, 26.84% crude fibres, 2.53% calcium oxalate and 0.4% phosphorous. The various qualitative chemical tests of ethanol extract and aqueous extract of leaves contain sterols, flavanoids, phenol, tannins and saponins in large amount whereas aromatic acids, carbohydrates, triterpenoids, gums, mucilage, and volatile oils were totally absent in this plant. The flavonols of the leaves have been identified as quercetin-3-galactoside and rutin [7], [12], [15].

3. Pharmacological Properties

Anthelmintic

The methanolic, chloroform, and pet ether extracts of the roots of *Ficus benghalensis* have potent Anthelmintic activity when compared with conventionally used drug and is equipotent to standard anthelmintic drug [2].

Analgesic activity

The analgesic activity of Stem bark extraction of *Ficus benghalensis* tested using acetic acid induced writhing model on rats, showed significant analgesic activity [15].

Immunomodulatory

To evaluate the Immunomodulatory activity of the aerial roots of *Ficus benghalensis*. The successive methanol and water extracts exhibited a significant increase in the percentage phagocytosis versus the control. In the in vivo studies, the successive methanol extract was found to exhibit a dose related increase in the hypersensitivity reaction, to the SRBC antigen, at concentrations of 100 and 200 mg/kg. It also resulted in a significant increase in the antibody titer value, to SRBC, at doses of 100 and 200 mg/kg in animal studies [4].

Hypolipidemic

Hypolipidemic effect of the water extract of the bark of *Ficus benghalensis* was investigated in alloxan induced diabetes mellitus in rabbits showing a good glycemic control also corrects the abnormalities in serum lipid profile associated with diabetes mellitus. In view of the

ability of the water extract of *Ficus benghalensis* to improve carbohydrate and lipid metabolism [13].

Anti-diabetic and Ameliorative effect:

The aqueous extract of *Ficus benghalensis* bark at a dose of 500 mg/kg/day exhibited a significant anti-diabetic and ameliorative activity as evidenced by histological studies in normal and *Ficus benghalensis* treated streptozotocin induced diabetic rats [8].

Antistress and antiallergic

Various extracts of *Ficus benghalensis* bark was screened for its antiallergic and antistress potential in asthma by milk-induced leucocytosis and milk-induced eosinophilia. Aqueous, ethanol, and ethyl acetate extracts showed significant decrease in leucocytes and eosinophils in the order given while petroleum ether and chloroform extracts were inactive. This shows the application of polar constituents of *F. benghalensis* bark as antistress and antiallergic agents in asthma [14].

IV. CONCLUSION

In the traditional system of medicine, the plant is generally used in the treatment of several health problems and diseases. *Ficus benghalensis* has important pharmacological activities such as anthelmintic, antistress and antiallergic, antioxidant, antidiabetic, hypolipidemic, wound healing and growth promoting as discussed in the present paper.

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