AN OVERVIEW- FICUS BENGALENSIS LINN

Baby Joseph, S.Justin Raj
Interdisciplinary Research Centre, Department of Biotechnology, Malankara Catholic College, Mariagiri, K.K Dist, India.
*Corresponding author’s E-mail: rajstephy6@gmail.com

Accepted on: 08-10-2010; Finalized on: 15-01-2011.

ABSTRACT

Ficus bengalensis Linn is a large evergreen tree found throughout India. It is commonly called Banyan tree. This tree is considered to be sacred in some places. It is used in traditional system of medicine like ayurveda, siddha, unani and homoeopathy. The active compounds isolated from this plant are considered to be very effective in various treatments such as dysentery, diarrhoea, diabetes, leucorrhoea, menorrhagia, nervous disorders, tonic and astringent. According to Ayurvedic system of medicine Ficus bengalensis is widely used in diabetes. This paper reports on its traditional, phytochemical and pharmacognostic properties such as antioxidant, anticancer, analgesic, anti-inflammatory and antipyretic activities of Ficus bengalensis.

Keywords: Bengalenoside, furanocoumarins, flavonoids, astringent, antioxidant, anti tumour, Ficus bengalensis.

INTRODUCTION

Plants have been the major source of drugs in medicine and other ancient systems in the world. Herbalism is a traditional medicine or folk medicine practice based on the use of plants and plant extracts1. Charaka Samhita and Sushruta Samhita give extensive description on various medicinal herbs. 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 species2. Many plants of this genus are used in medicine for the treatment of skin diseases, enlargement of liver and spleen, dysentery, diarrhoea, diabetes, leprosy, lung complaints, leucorrhoea, heart diseases, cough, asthma, piles, ulcers, gonorrhoea and rheumatism3,4. Several species belonging to the genera of Ficus were reported to contain furanocoumarins which is an important plant phototoxins5,6. Ficus bengalensis is commonly known as a Banyan tree. This tree is considered to be sacred tree in India. The plant is a large evergreen tree distributed all over India from sub Himalayan region and in the deciduous forest of Deccan and south India. They are very large, fast growing, evergreen tree up to 3.0 meters, with spreading branches and many aerial roots. Leaves stalked, ovate-cordate, 3-nerved, entire, when young downy on both sides; petiole with a broad smooth greasy gland at the apex, compressed, downy; Bark smooth, light grey-white, 1.27cm thick wood moderately hard, grey or grayish-white. Fruit in axillary pairs, the size of a cherry, round and downy14-16.

Ficus benghalensis

Taxonomy:
Kingdom : Plantae
Division : Magnoliophyta
Class : Magnolipsida
Order : Urticales
Family : Moraceae
Genus : Ficus
Species : F. benghalensis
TRADITIONAL PROPERTIES

Ficus benghalensis is commonly called nyagrodha. Ancient nighntaus and modern pharmacopoeias of Indian Medicine contain much valuable information about the pharmacological properties of various parts of Ficus benghalensis. The tree is regarded everywhere, as a symbol of peace and harmony. It was planted by emperors of the time, Jain, Sanaatanists and Buddhist in India and outside, along pilgrimage and trade routes, to serve as sources of shelter for pilgrims and distance travellers. Wells and stone shelters were available nearby for rest and refreshment. Small worshipping places were also built alongside for prayer or meditation. Banyan tree providing shade for visitors, cultural activities and community worship.

Extracts obtained from various parts of the tree are cooling, alterative and demulcent. The power of astringency, resulting from the presence of tannins, varies from part to part. The latex is said to have an aphrodisiac action. Charaka prescribed aqueous extract of leaf buds of nyagrodha, umburana and ashattha mixed with sugar and honey for checking diarrhoea; milk processed with the areal roots or leaf buds of nyagrodha, in haemorrhages and bleeding piles. The paste of codhra with the decoction of nyagrodha bark for leucorrhoea and other vaginal discharges. Leaf bud of Nyagrodha was prescribed for promoting conception. It is also used as a blood purifier in skin diseases; urinary and urinogenital disorders. Ayurvedic Pharmacology, Dravyaguna, indicates a general Piththa hara property for the plant and its parts because of the predominant kashaaya rasa (astringent components) and sheetha veerya (cooling anabolic activity) of the drug. Nalpamaram is an important group of ayurvedic formulation that constituents the barks of Ficus benghalensis used in the treatment of skin diseases and other ailments.17-28

PHYTOCHEMICAL PROPERTIES

The bark contains leucopelargonolinderin-3-O-α-L rhamnoside and leuco cynidin 3-O-α-D galactosyl cellobioside, glucoside, beta glucoside, pentatriacontan-5-one, beta sitosterolalpha-Dglucose19-20. A glycoside of leucopelargonin was also isolated from the bark and it has antidiabetic effects.21 The leaves contain, crude protein, crude fibres, CaO, phosphorous, rutin, friedelien, taraxosterol, lupeol, β-aminor along with psoralen, bergapten and β-sisterol, quercetin-3-galactoside22. Leucodelphinidin derivative23, bengalenoside, Aglucoside24. Leucopelargonin and leucocynidin derivatives. The latex contains caoytchoue, resin, albumin, cerin, sugar, and malic acid 25,26.

PHARMACOGNOSTIC PROPERTIES

Anti-inflammatory activity

The ethanolic (300 mg) and petroleum ether extracts (600 mg/kg/day) of Ficus benghalensis, significantly reduced (P <0.05) carrageenan-induced paw edema in rats. The ethanolic and petroleum ether extracts showed a greater anti-inflammatory effect compared with the standard drug Indomethacin. The results indicated the ethanolic extract of Ficus benghalensis exhibited more significant activity than petroleum ether in the treatment of inflammation27.

Antihelmintic activity

The extracts from Ficus bengalensis were found not only to paralyze but also to kill the earthworms. The aqueous and methanolic extract was found to be more effective to execute the earthworm when compared to anti helminthic drugs.28

Antidiabetic and ameliorative activity

Oral administration of aqueous extract to fed, fasted and glucose loaded diabetic rats significantly decreased the blood glucose level at 5 hrs and restored the levels of serum electrolytes, glycolytic enzymes and hepatic cytochrome P-450 dependent enzyme systems and decreased the formation of liver and kidney lipid peroxides at the end of 12 weeks. The aqueous extract of Ficus bengalensis at a dose of 500mg/kg/day exhibits significant antidiabetic and ameliorative activity shown by histological studies in normal and streptozotocin induced diabetic rats.29

Analgesic and antipyretic activity

The antipyretic activity of bark of Ficus bengalensis was studied in Brewer’s yeast-induced pyrexia in rats. The extract at all the doses used and the Aspirin significantly inhibited both the analgesic activity for hot plate and tail immersion method also in the antipyretic activity for the method of Brewer’s yeast-induced pyrexia in rats inflammation in a manner that was not dose dependent. The higher analgesic effects of various extracts tested might back to the presence of flavonoids and phenolic compounds. These data suggest that the different extracts of the bark of Ficus bengalensis produce analgesic and antipyretic activities that could be due to the effects of bio active components in the extract.30

Anti bacterial activity

Extract from fruits exhibits antitumor activity in the potato disc bioassay. None of the tested extracts showed any marked inhibition on the uptake of calcium into rat pituitary cells GH4C1. The extracts of the four tested Ficus species had significant antibacterial activity.31

Antioxidant activity

The extract was investigated for its antioxidant activity by 1,1-diphenyl, 2-picryl hydrazyl (DPPH) radical scavenging activity, hydroxyl radical scavenging activity, reducing capacity, hydrogen peroxide activity, total phenolic content using Folin-Ciocalteu’s phenolic reagent. The extract showed maximum scavenging of DPPH radical (96.07%) at 250 μg mL-1 concentration and hydrogen peroxide (69.23%) at 1000 μg mL-1 concentration. The extract shows good results when compared with other
compounds. This shows the scavenging activity of the extract.

**Antitumor activity**

The extract from fruit exhibited anti-tumor activity in the potato disc bioassay. The other tested extracts showed no marked inhibition on the uptake of calcium in to rat pituitary cells GH4C1. The extracts of the four tested *Ficus* species had no significant antifungal activity. The results support the traditional use of these plants in folk medicine for respiratory disorders and certain skin diseases.

**Hypolipidaemic activity**

Three groups of rabbits were fed with cholesterol suspended in ground nut oil to make hyper cholesterol condition (100mg/kg/day). Another group is fed with bark extract of *Ficus bengalensis* at a dose of 50mg/kg/day. Treatment with bark extract decreased the serum cholesterol level by 59%, triacylglycerol by 54% and a decrease in lipid peroxidation. Significant increase in the activities of antioxidant enzymes; superoxide dismutase, catalase, glutathione peroxidase which were depressed in other groups after cholesterol feeding. This results shows that the water extract of the bark of *Ficus bengalensis* has significant hypolipidaemic effects.

**CONCLUSION**

The various extracts of *Ficus bengalensis* showed antiinflammatory effects similar to standard drugs. The presence of flavonoids may be responsible for the anti-inflammatory activity. The water extract of the bark of *Ficus bengalensis* has significant hypolipidaemic effect. Fruit exhibit anti-tumor activity in the potato disc bioassay. It is widely used in the treatment of skin diseases with pitta and rakta predominance and also used in various ailments. Further investigations are processed to isolate and characterize the specific active components of this plant.

**REFERENCES**

4. Chopra, RN, Nayar SL, Chopra IC Glossary of Indian Medicinal Plants (CSIR NEW DELHI),1956, p. II
8. Parrotta John A, Healing Plants of Peninsular India. USA: CABI publishing; 2001, 517
23. Geetha BS, Mathew BC, Augusti KT, Hypoglycemic effects of Leucodelphinidin derivative isolated from


