

Pharmacology of *Ficus arnottiana* (Miq.) Miq. - A Review

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Abstract

Ficus arnottiana (Miq.) Miq. (Moraceae) is an important traditional medicinal plant distributed throughout India, mostly in rocky hills of 1,350 m elevations¹. It is commonly known as Paraspipal and Kodiarasu. The fruits of the plant contain β sitosterol, gluacol acetate and glucose, friedelin². Sterols, alkaloids, carbohydrates, tannins, phenols etc., are present in the bark extracts³. Bark and leaf extract of this plant is being used in the traditional medicine. Bark of the plant is used as astringent, aphrodisiac, demulcent, depurative and emollient. It is also useful against inflammation, diarrhea and diabetes, burning sensation, leprosy, ulcer, scabies, wounds and skin diseases⁴.

Key words : Chemical constituents; Pharmacological effect, Pharmacology; *Ficus arnottiana*; Moraceae.

Plants are used as a source of medicine that has been inherited as one of the important component of the health care system. India is the largest producer of medicinal herbs and is appropriately called the botanical garden of the world⁵⁻⁶. Plants used for traditional medicine contain a wide range of substances that can be used to treat chronic as well as infectious disease⁷⁻⁸.

Ficus arnottiana (Miq.) Miq. (Moraceae)⁸:

Plants of *Ficus* species are used extensively in various parts of the world against a wide range of ailments. The synergistic action of its metabolite production is most probably responsible for the beneficial effects of the plant. *Ficus* is a large genus of trees or

shrubs, often climbers with milky juice, widely distributed throughout the tropics of both hemispheres, but particularly abundant in South-east Asia and Polynesia. About 65 species of *Ficus* occurs in India. The genus is remarkable for the large variation in the habitat of its species. It contains some of giants of the vegetable kingdom such as Banyan tree, Pipal tree and Indian rubbers and also small wiry climbers like *Ficus pumila* L. and *Ficus scandens* Roxb. Traditionally, various parts of the *Ficus* species are used for medicinal purpose.

Chemical Constituents: The fruit of the plant contain β - sitosterol, gluacol acetate, glucose and friedelin.

Classification of *Ficus arnottiana* (Miq.) Miq.

Kingdom	Plantae
Division	Magnoliophyta
Phylum	Tracheophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Rosales
Family	Moraceae
Genus	<i>Ficus</i> L.
Species	<i>arnottiana</i>

Common names : Paras papal, Amakan-niyam, Tevavaracu, Kapitanah, Crown

Distribution : India and Sri Lanka

Description: Deciduous independent trees, to 10 m high, aerial roots absent; bark surface grey-brown, smooth, tuberculate-lenticellate; blaze pink; latex milky. Leaves simple, alternate spiral; stipules 3-5 cm long, lateral, reddish-green, glabrous, cauducous, leaving annular scars; petiole 3-10 cm long, slender, red, not articulated, glabrous; lamina 6-20 x 5-13 cm, broadly ovate, base deeply cordate, apex caudate-acuminate, margin entire, slightly undulate, glabrous, coriaceous; 5-7-ribbed from base, lateral nerves 5-8 pairs, pinnate, slender, prominent, intercostae reticulate, prominent. Flowers unisexual; inflorescence a syconia, in axillary pairs or crowded near the apex, sessile or shortly pedunculate, globose, glabrous, orifice plane; bracts 3, 1 x 2-2.5 mm, ovate, thin, eventually cauducous; flowers of 4 kinds; tepals red, more or less gamophyllous, 3-4 lobed, fleshy; male flowers sessile, around the orifice and sparsely scattered in the interior of the syconia; stamens

1, subsessile; anthers 2-celled, ovate-oblong, dehiscence longitudinally; female flowers sessile, sparsely scattered in the interior of syconia, cream, somewhat reddish on stylar side; ovary superior, depressed globose; style filiform; stigma flat gall flowered stalked; neutar flowers few. Synconium yellowish-brown when ripe; 5-7 mm across; achenes smooth.⁹

Morphology :

Ficus arnottiana grows wild in the forests of Dehradun district of Uttarakhand mainly on rocks. *Ficus* can also be grown from seed. Natural regeneration is done by seed. It grows on rocks, chiefly on dry rocks, inside shoals, sometimes grows on tress as an epiphyte wild. Small tree, bark dark brown. Leaves alternate, acuminate at apex and ribbed. Young leaves reddish, venation prominent on the ventral side. Petiole about 6 to 8 cm, glandular at apex. Figs axillary on leafed or leafless branchlets, paired or rarely crowded, globose about 0.7 cm long. Peduncle up to 4 mm long. Oriface plane. Tepals 3 to 4 lobed. Ovary depressed globose, style filiform. Gall flowers stalked. Syconus fruit.

Global Distribution: Asia: India, Sri Lanka.

Local Distribution:

Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand.

Physicochemical characteristics :

Physicochemical analysis of *Ficus arnottiana* fruit powder showed: loss on drying 8.99%, total ash 5.88%, acid insoluble ash 0.60%, water soluble 33.10 % and alcohol soluble extractive 28.80%¹⁰.

Pharmacological effects : Leaf of the plant has aphrodisiac activity while the bark of the plant have astringent, demulcent, depurative, emollient, refrigerant, urinary astringent and constipating effects. Bark is also useful in the diabetes, burning sensation, and pruritis and in vaginopathy. The root of the plant is used as astringent. ⁸Mamta farswan *et al.*, (2008) have reported the hypoglycemic effect to *Ficus arnottiana*. Bark extract on Streptozotocin induced diabetes in rats. ⁹Mamta farswan *et al.*, have reported the Hypoglycemic and Antioxidant activity of An isolated compound from *Ficus arnottiana*. Gregory *et al.*,⁷ have reported the antiulcer activity of *Ficus arnottiana* leaf extract.¹²⁻¹⁵ In spite of being one of the well-known medicinal plant used in Indian traditional medicine, there has been very little scientific data available pertaining to the pharmacological properties of *Ficus arnottiana*¹¹.

The anti-ulcer activity and acute toxicity of Ficus arnottiana leaf methanolic extract for the first time:

Approach: Freshly collected *F. arnottiana* leaves were dried, powdered and extracted in methanol. To study the anti-ulcer activity, Wistar rats were orally administered with different doses of the extract (0, 250 and

500 mg kg⁻¹ body weight day⁻¹) or with the reference drug omeprazole (8 mg kg⁻¹) for 10 days. After induction of ulcer using 5 mL kg⁻¹ ethanol, stomachs of these animals were analyzed for gastric volume, ulcer area and gross pathological changes.

Our results showed that *F. arnottiana* methanolic extract could prevent ulcer in rats in a dose-dependent manner. Histological studies revealed that the extract had mucoprotective activity. The extract did not show any acute toxicity even at the dose of 5000 mg kg⁻¹ indicating that the extract has no lethal effect.

Preliminary phytochemical screening of this extract identified the presence of important secondary metabolites like flavonoids and tannins. Conclusion/Recommendations: From this study, it is clear that *F. arnottiana* leaf extract had significant anti-ulcer activity in animal models. It had mucoprotective activity and gastric antisecretory activity. The extract is non-toxic even at relatively high concentrations.¹²

Antiinflammatory activity: In spite of being one of the well-known medicinal plants used in Indian traditional medicine to treat several ailments, studies pertaining to the pharmacological properties of *Ficus arnottiana* are very scarce. The aim of this study was to evaluate, experimentally, the anti-inflammatory effect of ethanolic extract of the leaves of *F. arnottiana* in carragenan induced paw edema in rats at a dose level of 100, 200 and 300mg/kg, orally. The extract was administered for the anti-inflammatory activity 1 h prior to carragenan injection in the sub plantar region.

Paw edema was measured by plethysmometer on 1st and 3rd h, after carragenan injection. The extracts at all the doses significantly prevented the inflammation in dose dependent manner which was comparable to that of Diclofenac Sodium (5 mg/kg, intraperitoneal). Our results showed that *F. arnottiana* ethanolic extract could prevent inflammation in rats in a dose-dependent manner. The extract did not show any acute toxicity even at the dose of 5000 mg/kg indicating that the extract has no lethal effect. Preliminary phytochemical screening of this extract identified the presence of important secondary metabolites like flavonoids and tannins.¹³

Analgesic activity of Ficus arnottiana :

Leaves extract the methanolic extract leaves of *Ficus arnottiana* was used to evaluate the Analgesic activity. The above activity was evaluated using the eddy's hot plate and heat conduction method and acetic acid induced writhing in mice in mice. The dose used for the test of activity (100, 200, 400 mg/kg ip). The extract at all doses tested significantly ($p < 0.001$) inhibited acetic induced writhing and also significantly ($p < 0.05$) prolonged the reaction latency to pain thermally induced in mice by the hot plate. The phytochemical screening revealed the presence of alkaloids flavonoids glycosides saponins tannins which might be responsible for the observed analgesic and anti-inflammatory activity. This study showed that *Ficus arnottiana* possess significant anti-inflammatory and analgesic properties in rodents which supported the folkloric claim for the use of the plant as a medicine.¹⁴

The current review highlights the

chemical constituents and pharmacological effects of *Ficus arnottiana* as a promising plant for many medical purposes as results of effectiveness and safety.

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