

# The Pharmacognostic and Pharmacological study of *Nyctanthes arbor-tristis*

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## Abstract

*Ayurveda is one of the oldest systems of medicine that uses plants and their extract for treatment and management of various diseased states. The plant plays an important role in drug discovery process and exclusively used to develop a meaningful therapeutic agent.*

*Nyctanthes arbor-tristis belongs to Oleaceae family, which has various medicinal properties. Different parts of the plant are utilized in traditional treatment to cure various diseases like sciatica, chronic fever, skin related diseases. In current research, the methanol and aqueous extracts of Nyctanthes arbor-tristis leaves were evaluated for phytochemical analysis, antioxidant, antibacterial and anti-inflammatory activities.*

*Nyctanthes arbor-tristis has anti-inflammatory activity it is used in treatment of arthritis. Arthritis is a disorder which affect joint and cause joint pain. Phenolic compound, tannins, glycosides, carbohydrates, proteins and alkaloids were present in Nyctanthes arbor-tristis and flavonoids were absent. The fast-dissolving tablets are prepared by direct compression method using other excipients*

**Keyword:** *Nyctanthes arbor-tristis, phytochemicals, antioxidant, antibacterial and anti-inflammatory activities, therapeutic agent.*

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## Introduction:

*Nyctanthes arbor-tristis* Linn. (Oleaceae) is popularly known as 'Night Jasmine' (English) or 'Harsinghar' (Hindi) due to the fact that its flowers emit a very strong and pleasant fragrance during the whole night. [1,2] The major medicinal value is due to presence of phytochemical like nycyantonic acid, beta-sitosterol and oleanolic acid which are present in leaves and responsible for antiviral and anti-inflammatory activity. The present study is aimed to develop a fast-dissolving tablets containing hydro-alcoholic leaf extract of *Nyctanthes arbor-tristis*. [3]

The leaves of *N. arbor-tristis* has many pharmacological properties, extensive work has been done on *N. arbor-tristis* for exploring their pharmacological properties. Traditionally the stem bark is applied in a form of paste for rheumatic joint pain. [4] The major medicinal value is due to presence of phytochemical like nycyantonic acid, friedelin, beta-sitosterol and oleanolic acid which are present in leaves and responsible for antiviral activity. [3]

Fast-dissolving tablets are the solid unit dosages forms that dissolve in saliva without the need of water. Some drugs are absorbed from mouth, pharynx and oesophagus as the saliva passes down in the stomach. FDTs are prepared by various techniques like direct compression, lyophilization and moldings. Direct compression technique is cost effective and simple technique. Mainly super disintegrants are added to a drug formulation to break-up tablet into small particles that can dissolve more rapidly. [5,6]



### Plant Profile:

Synonym: Night Jasmine, Coral Jasmine

English: Night Jasmine

Marathi: Parijat, Prajakta

Hindi: Harsingar

Sanskrit: Parijata

Bengali: Shefalika, Shivuli

Gujarati: Harshanagar

Telugu: Parijatamu

Tamil: Majjapu

### Biological Source:

It is obtained from dried leaves of *Nyctanthes arbor-tristis* belonging to family Oleaceae.

### Geographical Distribution:

*Nyctanthes arbor-tristis* is found on rocky ground in dry hillside and as undergrowth in dry deciduous forest. It is native to Southern Asia, stretching across Northern Pakistan and Nepal through Northern India to Southeast Thailand. It grows at sea level up to 1500m altitude. [4,7]

### Taxonomical Classification:

- Kingdom- Plantae
- Subkingdom- Viridiplantae
- Subdivision- Spermatophytina
- Class- Magnoliopsida
- Subclass- Asterdae
- Family- Oleaceae
- Genus- *Nyctanthes*
- Species- *Nyctanthes arbor-tristis*



**Botanical Description:**

## 1) The leaves:

Leaves are opposite, 5 -10 of 2.5 – 6.3 cm, ovate, acute or acuminate, entire or with a few large, distant teeth, short bulbous hairs rounded; main nerves few, conspicuous beneath; petiole 6cm long, hairy. Leaves are simple, petiolate and stipulate the lamina is ovate with acute or acuminate apex, the margin entire or serrate, somewhat undulated, particularly near the base, the upper surface is dark green with dotted glands, and the lower surface is pale green and softly pubescent.

## 2) The flowers:

Flowers of *Nyctanthes arbor-tristis* are small with delightfully fragrant, sessile in pedunculate bracteates fascicles of 3 -5, peduncles 4- angled, slender, hairy, auxiliary and solitary and in terminal short dichotomous cymes, bracts broadly ovate or sub orbicular, 6- 10 mm long, aciculate, hairy on both sides; Calyx 6-8 mm long, narrowly campanulate, hairy outside, glabrous inside, truncate or obscurely toothed or lobed, ciliated.

## 3) The fruits:

Fruits of *Nyctanthes arbor-tristis* are a capsule of 1-2 cm diameter, long and broad, obcordate orbicular, compressed, 2-celled, separating into 2 flat 1-seeded carpels, reticular veined, glabrous.

## 4) The Seed:

The seed is compressed and is 1 per cell. Seeds is exalbuminous, Testa thick, the outer layer of large transparent cells and heavily vascularized. phytosterols, phenolic compounds, tannins.

## 5) The Bark:

Bark of *N. arbor-tristis* plant is dark gray or brown in color and rough and firm. Bark surface is dip pled due to sealing of circular backs and patchy due to gray, brown color regions Sealing off the bark by circular flakes. The inner bark is creamy white, soft and collapsed and non-collapsed phloem zone distinctly visible.

**Traditional Uses:**

The popular medicinal use of this plant is Anti-helminthic and Anti-pyretic besides its use as a laxative, in rheumatism, skin ailments and as a sedative. The flowers of *N. arbor-tristis* are used in India to provoke menstruation. The inflorescence is used to treat scabies and other skin disease. The flowers are used in treatment of mouth ulcer. [8] Decoction of flowers is also used in treatment of gout.[4] The flower juice is used as a hair tonic a preventing graying of hair and baldness. [9]

Take 6-7 leaves, put in 200 ml of water and boil it and make into 100 ml decoction, at the end add pepper powder and 3 drops of lemon. Drink the Kashaya 3-4 times a day. The leaf juice is used to treat loss of appetite, piles, liver disorders, biliary disorders, intestinal worms, chronic fever, obstinate sciatica. rheumatism and fever with rigors. The extracted juice of leaves acts as a chola gouge, laxative and mild bitter tone. It is given with little sugar to children as a remedy for intestinal ailments.

**Morphological Characters:**

Macroscopic and organoleptic studies were conducted on intact and powdered materials. Sample was washed, air dried in shade and observed for colour, shape, odor, taste and other surface characteristics. Leaves which were shade dried for 10-15 days after drying it was pounded to coarse powder and observed for colour, odor, taste.

**Chemical Constituents:**

Alkaloids, Carbohydrate, Glycosides, Terpenoids, Oleanolic acid, Nyctanthic acid, Ascorbic acid & Tannic acid etc.

**Pharmacological Activity:**

Crude extracts of different parts of *Nyctanthes arbor-tristis* has been used as traditional medicines for the treatment of various diseases. Use of different parts of *Nyctanthes arbor-tristis* in Ayurveda, Siddha and Unani system of medicines has been prescribed from time immemorial. [10,11,12]

## 1) Antioxidants activity:

*Nyctanthus arbor-tristis* revealed the presence of flavonoids, tannins, saponins, glycosides, alkaloids, steroids and phenolic compounds. Phenolic compounds have been recognized as antioxidant agents, which act as free radical terminators.

## 2) Anti - inflammatory activity:

The in vitro anti-inflammatory assay of methanol and aqueous extract of *N. arbor-tristis* flower was carried out using egg albumin denaturation assay the results revealed that the activity was in a dose dependent manner. The activity was determined based on the IC<sub>50</sub> value.

## 3) Hepatoprotective activity:

Alcoholic and aqueous extract of the leaves of *N. arbor-tristis* have been reported to demonstrate significant hepatoprotective activity in carbon tetrachloride and acetaminophen induced liver damage in rat models.

## 4) Antimicrobial and antifungal activity:

Phenolic compounds and tannins in ethanolic extract of leaves are found to be active against *Staphylococcus aureus* and *Salmonella paratyphi*. Antimicrobial evaluation of aqueous and alcoholic extract of leaves against numerous Gram positive and Gram-negative strains revealed that *Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Klebsiella pneumonia*, *E. coli*, *P. marginata* and *Staphylococcus epidermis* were found more susceptible to the aqueous extract whereas *Micrococcus luteus*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Bacillus subtilis* were more sensitive to methanolic extract.

## 5) Antiviral activity:

The ethanolic extract, n-butanol fractions and two pure compounds, *Arbortistoside C*, isolated from the NA possess pronounced inhibitory activity against encephalomyocarditis virus (EMCV) and Semliki Forest virus (SFV). The in-vivo ethanolic extract and the n-butanol fraction at daily doses of 125mg/kg weight protected EMCV infected mice against SFV by 40 and 60% respectively.

**Conclusion:**

*Nyctanthes arbor-tristis* was a traditional medicinal plant which having various medicinal activities. The leaves of *Nyctanthes arbor-tristis* Linn. are used extensively in Ayurvedic medicine for the treatment of various diseases such as sciatica, chronic fever, rheumatism, and internal worm infections, and as a laxative, diaphoretic, and diuretic. Leaves are used in cough.

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