

# Review on *Nyctanthes Arbortristis*

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## Abstract

*Nyctanthes arbor-tristis* (N. Arbortristis) is one of the most useful traditional medicinal plants in India. It is distributed widely in sub-Himalayan regions and Southwards to Godavari. Each part of the plant has some important medicinal value and is thus commercially exploitable. It is now considered as a valuable source of several unique products for the medicines against various diseases and also for the development of some industrial products. The present review is to focus on the potential Phyto-chemicals and pharmacological activity of plant N. Arborists. Various parts of the plant like seeds, leaves, flowers, bark and fruits have been investigated for their significant pharmacological activity. Phyto-chemicals like flavonoid, glycoside, oleanic acid, essential oils, tannic acid, carotene, friedeline, lupeol, glucose, benzoic acid have been reported for significant hair tonic, hepatoprotective, anti-leishmaniasis, anti-viral, anti-fungal, anti-pyretic, anti-histaminic, anti-malarial, anti-bacterial, anti-inflammatory and anti-oxidant activities of Night jasmine and emphasizes the need for further exploring available information.

**Keywords:** *Nyctanthes arbor-tristis*, N. Arbortristis, anti-inflammatory, anti-bacterial, hepatoprotective, anti-microbial, Harsingar, Night jasmine

## Introduction

*Nyctanthes arbortristis* (N. arbortristis) is a valuable medicinal plant which belongs to the family Oleaceae. The plant generally grows in tropical and subtropical region. N. arbortristis commonly known as Night jasmine, Harsinghur & Parijat. The flowers start falling after midnight and by the day break, the plant appears dull. The generic name 'Nyctanthes' has been coined from two Greek words 'Nykhtha' (Night) and 'anthos' (flower) [1, 2]. It is usually a shrub or a small tree having brilliant, highly fragrant flowers, which bloom at night and fall off before sunrise, giving the ground underneath a pleasing blend of white and red. Thus, during the day the plant loses all its brightness and hence is called "Tree of sadness" (arbor-tristis). It is also known as Harsinghar, Coral Jasmine, Parijat, queen of the night and night flowering jasmine [3]. It is a *Nyctanthes arbortristis* of India, distributed in sub-Himalayan region and also found in Indian garden as ornamental plant.[3,35]

The plant is tolerant to moderate shade and can grow on rocky ground in dry hill shades, dry deciduous forests or at sea-level up to 1500 m altitude with a wide range of rainfall patterns, from seasonal to non-seasonal and is tolerant to moderate shade. It is often cultivated in gardens due to its most pleasant and

peculiar fragrance 14. 51. In India, it grows in the outer Himalayas and is found in tracts of Jammu and Kashmir, Nepal to East of Assam, Bengal, Tripura extended through the Central region up to Godavari in the South. Flowering usually occurs from July to October. *N. arbortristis* prefers a secluded and semi-shady place to grow [6,33] *N. arbortristis* is one of the well-known medicinal plant. It is a common wild hardy large shrub or small tree. Different parts of this plant are used in Indian systems of medicine for various pharmacological actions like as anti-leishmaniasis, anti-viral, anti-fungal, anti-pyretic, anti-histaminic, anti-malarial, anti-oxidant 171, anti-inflammatory [8,34] and many more activities.

Herbs have been always the main principle form of medicine since traditions in India and now a day it becomes most popular throughout the world. Important large shrub of tropical and subtropical regions of the world that has been traditionally used to provoke menstruation, for treatment of scabies and other skin infections as hair tonic 191, chalogogue and Herbal medicines are not only providing traditional and ethnic medicine but also promising for highly efficient novel bioactive molecules. Since ages, man has been dependent on *N. arbortristis* for curing various body diseases [4]. From ancient civilization various parts of different plants were used to pain, control suffering and counteract disease. Most of the drugs used in primitive medicine were obtained from plants and are the earliest and principle *N. arbortristis* source of medicines[5,32].

#### **Taxonomical classification of plant:-**

**Class :**Eudocots

**Division :**Angiosperms

**Family :**Oleaceae

**Genus :**Nyctanthes

**Kingdom :**Plantae

**Order :**Lamiales

**Species :**Nyctanthesarbertristes[9,31]

**The plant is named In different vernacular languages**

**English :**Coral

**Marathi :**Parijatak,Kharbadi, Kharrasi , Khursali

**Hindi :**Srigading

**Bengali :**Harisngar

**Malyalam :**Mannapu, Pavizhamalli ,Parijatakam

**Sanskrit :**Parijata, Parijatah , Parijataka, Sephalika.

**Punjabi :**Harisinghar

**Tamil:**Manjhapu, Pavala-Malligai, Pavazha-Malligai.

**Thai:**karanikaa

**Kannada:**Goli, Harsing, Parijata

#### **Characteristic Features of Nyctanthesarbortristis**

*N. arbortristis* is a deciduous tree grows up to 10 m tall, with quadrangular branches and grey or greenish-white rough bark [10,30,36] (Fig.1). The leaves are rough, hairy, decussately opposite, and simple. The flowers are arranged at the tips of branches. It grows well in loamy soils. The plant requires conditions varying from full sunlight to partial shade and needs to be watered regularly Flowering usually occurs from July to October. The whole plant is of medicinally useful.

**Leaves:** Leaves are opposite, 5-10 by 2.5-6.3 cm, ovate, acute or acuminate, entire or with a few large distant teeth, short bulbous hairs rounded or slightcuneate, main nerves few, conspicuous beneath, petiol 6cm long, hairy. Leaves are simple, petiolate and exstipulate [11]. The lamina is ovate with acute or acuminate apex, the margin entire or serrated, somewhat undulated, particularly near the base, the upper surface dark green with dotted glands, and the lower surface pale green and softly pubescent. N. arbortristis venation is unicostate, reticulate with an average of 12 lateral veins leaving the midrib. The petioles are about 5-7.7-10 mm long with adaxial concavity.

**Seeds:** The seed is compressed and is 1 per cell. Seeds are exalbuminous, testa thick, the outer layer of large transparent cells and heavily vascularised 1. 13, (Fig.1)

**Flowers:** The flowers are arranged at the tips of branches terminally or in the axils of leaves and are small, often seen in clusters of 2-7 together, delightfully fragrant, sessile in pedunculate bracteate fascicles of 3-5, peduncles 4-angled, slender, hairy, auxiliary and solitary and in terminal short trichotomous chymes, bracts broadly ovate or suborbicular, 6- 10 mm long, apiculate, hairy on both sides, Calyx 6-8 mm long, narrowly campanulate, hairy outside, glabrous inside, truncate or obscurely toothed or lobed, ciliated. Corolla globrous rather more than 13 mm long, tube 6-8 mm long, orange colour, about equalling the limb, lobes white corolla with an orange-red center and sessile with campanulate calyx, unequally obcordate, cuneate [11, 13,29]. (Fig.1)

**Fruits:** Fruits of N. Arbortristis are acapsule of 1-2 cm diameter, long and broad, obcordate orbicular, compressed, 2- celled, separating into 2 flat 1-seeded carpels, reticularly veined, glabrous. [11, 12] Macroscopic character of fruit: the fruit is flat, brown and heart cordate-shaped to rounded- capsule, around 2 cm in diameter with two celled opening transversely from the apex, each containing a single seed. Microscopically fruit showed typical character of fruit. In the epicarp epidermal cells were compactly arranged, polygonal cells with slightly anticlinal walls covered by a thin cuticle followed by 1-3 layers of collenchyma, Spongy Parenchymatous tissue, sclerenchymatous fibres and oil gland [13, 14,28], (Fig.1)

**Stem & Bark:** It is large shrub growing up to 10 m tall, with quadrangular branches. Bark of N. arbortristis plant is dark gray or brown in colour and rough and firm. Bark surface is dipped due to scaling off of circular barks and patchy due to gray brown colour regions. Scaling off the bark by circular flakes. Inner bark is creamy white, soft and collapsed and non-collapsed phloem zone distinctly visible..



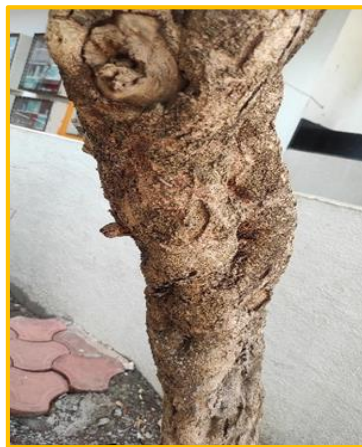
Seed



Leaves



Plant stem



Flower



Trunk

Plant part	Chemical Constituents	Biological activity
Leaves	D-mannitol, $\beta$ -sitosterole, flavanol, glycosides- astragaline ,nicotiflorinoleanoic acid ,methysalicylate, ascorbic acid, lupeol, glucose and fructose, benzoic acid	Antibacterial, antileishmanial, Antifungal, Immunomodulatory.
Stem	Glycoside-naringenin-4-0- $\beta$ - glucapyranysl- $\alpha$ - xylopyranoside and $\beta$ - sitosterol	Antipyretic, Antioxidant
Bark	Glycosides and alkaloids	Antimicrobial.
Flower	Essential oil ,nyctanthin , d-	Diuretics , Antioxidants ,

	mannitol, tannin and glucose, carotenoid, $\beta$ -monogenetobioside- $\beta$ -Dmonoglucosideestar of $\alpha$ -crocetin, glycoside viz $\beta$ -monogenetiobiosides ester of $\alpha$ -crocetin (or crosin -3, $\beta$ -digentiobioside ester of $\alpha$ -crocetin	Antiinflammatory , Antibilious , sedative antifilarial
Flower Oil	A-pinene, p-cymene, 1-hexanol methylheptanone, phenylacetaldehyde, 1-deconoldanisaldehyde	As as perfume
Seed	Arbortristoside A and B glycerides of linoleic oleic, lignoceric, stearic, nyctanthacid, 3-4 secotritarpaneacid	Antibacterial , Antifungal , immunomodulatory

### Pharmacological activities and Medicinal use of Nyctanthesarbortristis

#### a. Hepatoprotective activity

Ethanollic leaf extract of Nyctanthesarbortristis protect against carbon tetrachlo- ride – induced hepatotoxicity in rat. For this investigation rats were pretreated with ex- tract (100Omg/kg body weightday, p.o. for7 days) prior to the administration of a single dose of CC4 (1.0Oml/kg, s.c.). In studythe leaf extract of Nyctanthesarbortristis and silymarin restored all serum and liver parameters which were altered by (CC4) from the normal level, also prevent loss of body weight, both candidate are also pro- tected against (CC4) induced increase in liver weight and volume. These effects may be mediated by the antioxidant present in the plant.[14,27]

#### b. Antihistaminic and antitryptaminer-gicactivityl

The aqueous soluble of the alcoholicextract of Nyctanthesarbortristis leaves (4.0and 8.0g/kg oral) significantly protect against histamine aerosol – induced asphyxia (2% at 300 mm Hg) in guinea pigs. Arbor- tristosid A and arbortristosid C present in Nyctanthesarbortristis was reported to beAntiallergic.[15]

#### c. Antibacterial activity

Methanolic and aqueous extract of the Nyctanthesarbortristis leaves were in- vestigated for in-vitro bactericidal activities against staphylococcus aureus, Bacillus subtilis, E. coli and Pseudomonas aerugi- nosa by disk diffusion method. Both extractswere active against the bacteria except for Pseudomonas aeruginosa which was resistant to the aqueous extract. An earlier study tested the in-vitro antimicrobial and antifun- gal activity of stem bark chloroform, petro- leum ether, and ethanolic extract of Nyctanthesarbortristislinn.[16] By cup plate method angianst Staphylococcus aureus, Micrococcus luteus, BacilluS Subtilis, E. coli, Pseudononas aeruginosa, Candida albicans and Aspergillus niger using

ciprofloxacin and fluconazole as a standard drug. The chloroform extract were found to be both antimicrobial and antifungal activity whereas the petroleum ether and ethanol extracts possess only antimicrobial activity.

#### **d. Antiviral activity**

The ethanolic extract, n-butanol fractions and two pure compounds, arbortristo- Side A and arbortristoside C, isolated from *Nyctanthes arbortristis* 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 125 mg/kg weight protected EMCV infected mice against SFV by 40 and 60% respectively.[17]

#### **d. Ant-filarial activity**

The chloroform extract of the flowers and a pure compound isolated from *Nyctanthes arbortristis* plant exhibit larvicidal activity against *Culex quinquefasciatus* Say, a common filarial vector. The free radical scavenging potential of the different extracts of leaves of *Nyctanthes arbortristis* was evaluated in-vitro[18,37]

#### **f. Anti-Oxidant activity**

By employing diphenyl-picryl-hydrazyl (DPPH) assay method. In this investigation the antioxidant which present in the plant extracts reacted with DPPH, which is a stable free radical and converted it to 1, 1-diphenyl-2-picrylhydrazyl which was measured at 517 nm. The scavenging effect of plant extracts and standard (ascorbic acid and BHT) on the DPPH radical decreases in the following manner: Ascorbic acid > Butanol > Ethyl acetate > BHT > Pet ether, and it was found to be 93.88% for ascorbic acid at concentration of 10 mg, for BHT, Butanol, Ethyl acetate and Pet ether was found to be 97.42%, 95.22%, 84.63% and 82.04% at concentration of 100 ng respectively. In this investigation different extract of *Nyctanthes arbortristis* leaves possess concentration dependent free radical scavenging activity.[20]

#### **g. Anti-Nociceptive and Anti-Pyretic activity,**

The aqueous soluble fraction of ethanolic extract of the leaves exhibited significant aspirin-like antinociceptive activity which was evidenced by inhibition of acetic acid-induced writhing in albino mice but fails to elicit morphine-like analgesia which was tested via the rat tail flick and mouse tail-clip methods.

#### **h. Anticholinesterase activity**

The aqueous extract of *Nyctanthes arbor-tristis* stimulated the activity of acetylcholinesterase in mice, it antagonize the inhibition of this enzyme by malathion.

#### **i. Immunopotentiator activity**

The anti-immunosuppressive effect of an aqueous extract of *Nyctanthes arbor-tristis* was determined in three to four week old Swiss albino mice (20-25g) which were exposed to the extract, malathion. *Nyctanthes arbortristis* leaf aqueous extract reverted humeral, non-specific and cell-mediated immunological parameters to normalcy as the values of antibody titres of the non-specific immune

parameters and of cell-mediated immune parameters were raised by extract. The T-cell number, Fc receptor-bearing cell counts, complement receptor-bearing lymphocytes and IgG-bearing B-cells of the extract-treated malathion mice were also increased towards normalcy while the phagocytic index was greater than in malathion mice not treated with the extract. The results showed that aqueous extract of leaf of *Nyctanthes arbor-tristis* showed immunopotentiator activity with the effective capacity for potentiating both humoral as well as cell-mediated immune responses. [21]

#### **j. Sedative activity**

The sedative potential of a hot infusion of the flowers (3.7, 7.5, 12.5, 18.7 mg/kg, p.o.) were examined in rats using the Rat hole-board test at 2 h post-dosing. In this test, each rat was placed at the center of the standard rat hole-board apparatus and observed for 7.5 min. The number of rears, number of head dips, cumulative time spent on head dips, and locomotory activity were monitored and the time spent per head dip computed. Male rats exhibited a dose-dependent conscious sedative activity (at 7.5 & 12.5 mg/kg, p.o.) while female rats remained unaffected. [22]

**kj. Anti-inflammatory activity** The water-soluble fraction of the ethanol extract elicited significant anti-inflammatory activity against acute inflammatory oedema produced in rats by different phlogistic agents, namely carrageenin, formalin, histamine, 5-hydroxytryptamine and hyaluronidase. The extract significantly reduced acute inflammatory swelling in the knee joint of rats induced by turpentine oil. The leaf and fruit extracts also showed anti-inflammatory action in the mouse model of arthritis which was elicited by immunological methods, namely, injections of Freund's complete adjuvant into the sub-planter surface of the right hind paw on days 0 and 12 and PPD-induced tuberculin reaction. [23,24]

In subacute models of carrageenin-induced

granuloma pouch and cotton pellet granuloma, rats were fed daily with the extract for 6 days from the day of pouch formation or for 5 days from the day of pellet implantation. Granulation tissue formations in both models were significantly inhibited by the extract. The ethanolic extract of the orange tubular calyx of *N. arbor-tristis* and the isolated carotenoid (200 mg/kg, i.p.) showed significant inhibition of carrageenan-induced rat paw edema when compared to the standard drug (diclofenac sodium) and untreated control. [25]

#### **Traditional uses**

CNS depressant activity showed in seeds, leaves and flowers extract of plant (advance). The *Nyctanthes arbor-tristis* showed activity against encephalomyocarditis virus (EMCV) and Semliki forest virus (SFV).

#### **Conclusion**

In this present article we have reviewed phytochemical screening. *N. arbor-tristis* has tremendous potential pharmacological activities are widely distributed in medicinal plant of *Nyctanthes arbor-tristis* and it revealed the importance of herbal and ayurvedic pathway for effective treatment of sciatic diseases considering its tremendous potential pharmacological activities. It has been helpful in pointing out the correlation between the biological activity and nature of the chemical constituents [26]

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