Review on Nyctanthes Arbortristis

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Abstract

Nyctanthesarbor-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 Phytochemicals 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: Nyctanthesarbor-tristis, N. Arbortristis, anti-inflammatory, anti-bacterial, hepatoprotective, anti-microbial, Harsingar, Night jasmine

Introduction

Nyctanthesarbor-tristis (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 'Nykhta' (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 31. It is a Nyctanthesarbortristisof 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. 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].

**Taxanomical classification of plant:-**

- **Class**: Eudocots
- **Division**: Angiosperms
- **Family**: Oleaceae
- **Genus**: Nyctanthes
- **Kingdom**: Plantae
- **Order**: Lamiales
- **Species**: Nyctanthesarbortristis[9,31]

The plant is named In different vernacular languages

- **English**: Coral
- **Marathi**: Parijatak, Kharbadi, Kharrassi, Khursali
- **Hindi**: Srigading
- **Bengali**: Harisinghar
- **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 pedanculate 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 compunulate 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 anticlinical 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 dippled 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.,
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<td>Leaves</td>
<td>D-mannitol, β-sitosteroles, flavanol, glycosides-astragaline, nicotiflorinoleanoic acid, methylsalicylate, ascorbic acid, lupeol, glucose and fructose, benzoic acid</td>
<td>Antibacterial, antileishmanial, Antifungal, Immunomodulatory.</td>
</tr>
<tr>
<td>Stem</td>
<td>Glycoside-naringenin-4-0-β-glucapyranosyl-α-xylopyranoside and β-sitosterol</td>
<td>Antipyretic, Antioxidant</td>
</tr>
<tr>
<td>Bark</td>
<td>Glycosides and alkaloids</td>
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<tr>
<td>Flower</td>
<td>Essential oil, nyctanthen, d-</td>
<td>Diuretics, Antioxidants</td>
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Pharmacological activities and Medicinal use of Nyctanthesarbortristis

a. Hepatoprotective activity
Ethanolic leaf extract of Nyctanthesarbortristis protect against carbon tetrachloride – induced hepatotoxicity in rat. For this investigation rats were pretreated with extract (1000mg/kg body weight/day, p.o. for 7 days) prior to the administration of a single dose of CC4 (1.0ml/kg, s.c.). In study the 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 protected 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-gic activity
The aqueous soluble of the alcoholic extract of Nyctanthesarbortristis leaves (4.0 and 8.0g/kg oral) significantly protect against histamine aerosol – induced asphyxia (2% at 300 mm Hg) in guinea pigs. Arbor-tristoside A and arbortristosid C present in Nyctanthesarbortristis was reported to be Antiallergic.[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 aeruginosa by disk diffusion method. Both extracts were active against the bacteria except for Pseudomonas aeruginosa which was resistant to the aqueous extract. An earlier study tested the in-vitro antimicrobial and antifungal activity of stem bark chloroform, petro- leum ether, and ethanolic extract of Nyctanthesarbortristis linn.[16] By cup plate method against Staphylococcus aureus, Micrococcus luteus, Bacillus Subtilis, E. coli, Pseudomonas aeruginosa, Candida albicans and Aspergillus niger using
ciprofloxacin and flucanazole 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 The Nyctanthesarbor-tristis possess pro- Nounced inhibitory activity against ence- Phalomyocarditis virus (EMCV) and Sem- Liki Forest Virus (SFV). The in-vivo etha- Nolic extract and the n-butanol fraction at Daily doses of 125 mgkg weight protected EMCV infected mice against SFV by 40 and 60% respectively.[17]

d. **Antifilarial activity**
The chloroform extract of the flowers and a pure compound isolated from Nyctanthesarbor-tristis plant exhibit larvi-Cidal activity against Culex quinquefasciatus Say, a common filarial vector. The free radical scavenging potential Of the different extracts of leaves of Nyc- Tanthesarbor-tristis was evaluated in-vitro[18,37]

f. **Anti-Oxidant activity**
By employing diphenyl-picryl-hydrazy(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 -1, 2- picryl, hydrazine 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 differentExtract of Nyctanthesarbor-tristisleavespossess concentration dependant free radicals 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 aceticacid-induced writhing in albino mice but fails to elicit morphine-like analgesia which was tested via the rat tailflick andmouse tail-clip methods.

h. **Anticholinesterase activity**
The aqueous extract of Nyctanthesarbor-tristis stimulated the activity of acetyl- cholinesterase in mice, it antagonize the inhibition of this enzyme by malathion.

i. **Immunopotentiator activity**
The anti-immunosuppressive effectof an aqueous extract of Nyctanthesarbor-tristis was determined in three to four weeksold Swiss albino mice (20-25g) which wereexposed to the extract, malathion.Nyctanthesarbortristis leaf aqueous extract reverted humeral, non-specific and cell - mediated immunological parameters to normalcy as the values of antibody titres of the nonspecific 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-cell 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 arbortristis* 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, 18.7Mg/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 was monitored and the time spent per head dip was 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-inflammator activity against acute inflammatory oedema produced in rats by different phlogistic agents, namely carrageenin, for-malin, 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-plantar 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 ethanol 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 arbortristis* 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 if the Chemical constituents[26]
References:


