

**A REVIEW ON NYCTANTHES ARBOR-TRISTIS LEAVES: A POTENTIAL MEDICINAL HERB****\*Amol K. Daund, Ravindra S. Jadhav and Dattaprasad N. Vikhe**

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**ABSTRACT**

The Indian medicinal herb *Nyctanthes arbor-tristis* Linn. (NAT) is well-known. *Nyctanthes arbor-tristis* Linn. is one of the most useful traditional medicinal plants in India. It is often referred to as "Parijat" and is a critically endangered species in India. Belongs to Family Oleaceae. *Nyctanthes* is Commonly grown as a Sacred Tree in Maharashtra. No detailed Pharmacognostic study has been done on *Nyctanthes arbor-tristis* Leaves. Generally, the leaves, roots, flowers, and seeds of Parijat are used in a variety of dosage forms, including juice, powder, to treat a variety of illnesses. It is particularly used to treat illnesses caused by vata and kapha vitiation. Such Study Is going to be useful. Present paper gives information about History and Introduction of *Nyctanthes arbor-tristis* plant. Also Contains Taxonomical Classification. Present Paper gives information about Plant Profile of *Nyctanthes arbor-tristis* Linn. It also Contains Phytochemical Screening of Extract of *Nyctanthes arbor-tristis* Leaves. The present paper gives physicochemical Parameters information. The Present Paper also gives information about the Procedure of Extraction and Pharmacological activities performed on *Nyctanthes arbor-tristis* Leaves.

**INTRODUCTION**

Herbs have been always the main principle form of medicine since traditions and now a days it becoming more popular form of medicine throughout the world. Herbal medicines are not only providing traditional and ethnic medicine but also promising for highly efficient novel bioactive molecules. Medicinal plants are a reservoir of various chemical compounds which serve as drugs and the potential source for newer lead molecule and clues for modern drug design by synthesis. *Nyctanthes arbor-tristis* popularly known as Parijata or Night jasmine. Belongs to family Oleaceae. Latin name *Nyctanthes* has been coined from two Greek words Nykhta (Night), and anthos (flower). It is known as Parijata in Sanskrit, har-singhar in Hindi and night jasmine in English. During the day the plant loses all its brightness and hence is called Tree of sadness or arbor-tristis. *Nyctanthes arbor-tristis* is commonly grown as a sacred tree in Maharashtra. It is also known for its medicinal cure by the aboriginals residing in this region. Leaves and bark are said to be antibilious and expectorant. Bark in combination with arjuna sadada is considered to be useful in internal injuries and healing of wounds including fractured bones. The decoction of bark is recommended for periodic fever. *Nyctanthes arbor-tristis* is one of the most useful traditional medicinal plants in India. Each part of the plant has some 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. Every part of *Nyctanthes arbor-tristis* is used for medicinal purposes due to health benefitting properties. The present review includes comprehensive information on the chemical constituents, biological activities of important compounds, pharmacological actions, medicinal applications of Night jasmine and emphasizes the need for further exploring available information.

**History**

It is distributed widely in sub-Himalayan regions and Southwards to Godavari. is native to southern Asia and is also found in Nepal, Pakistan, India and Thailand. This is mostly found in the tropical and subtropical regions of the world. The flower of this plant is the official flower of the state of West Bengal, India and Kanchanaburi province of Thailand. Parijat is a small deciduous tree with dropping 4-angled branchlets. The leaves shed in February or March and renewed in June-July. Flowering occurs in August with peaking in September-October. Fruit ripens in April-May.

**Taxonomy**

Taxonomical Classification  
Kingdom: Plantae  
Division: Magnoliophyta  
Class: Magnoliopsida  
Order: Lamiales  
Family: Oleaceae  
Genus: *Nyctanthes*

Species: arbor-tristis

Name: *Nyctanthes arbor-tristis*

### Uses

The leaves are bitter and pungent in taste. It is used to treat fever, fungal skin, infection also used as antibacterial, anti-inflammatory and antihelminthic. Bitter leaves extract is given to children for the expulsion of roundworms and threadworms. Leaf juice is used in rheumatism and fever, as an antidote for reptile venoms

and snake bite. The flowers are bitter and astringent it is used in ophthalmic diseases and as carminative. It is used in obstinate remittent fever, sciatica, and rheumatism. Because of mild purgative in nature it is very useful in constipation of children. It is used in treatment of bronchitis and also as an antidote to snake bite. The bark of this tree is used in eye diseases, ulcers and as a decoction is used for bleeding gums. The fresh leaves are also used for the preparation of homoeopathic medicines.

### Plant Profile



(a-*Nyctanthes arbor-tristis* plant, b- Leaves, c- Stem and Bark, d- Flowers, e- seeds)

**Name Of Plant:** *Nyctanthes arbor-tristis*.

**Synonym** : Night Jasmine.

**Family** : Oleaceae.

**Kingdom** : Plantae.

**Order** : Lamiales.

**Genus** : *Nyctanthes*.

**Species** : *N. arbor-tristis*.

### Phyto-constituents

#### Leaves

Leaves contain D-mannitol,  $\beta$ -sitosterole, Flavanol glycosides, Astragaline, Nicotiflorin, Oleanolic acid, Nyctanthic acid, Tannic acid, Ascorbic acid, Methyl salicylate, resinous substances, Amorphous glycoside, Amorphous resin, Trace of volatile oil, Carotene, Friedelene, Lupeol, Mannitol, Glucose, Fructose, Iridoid glycosides, Benzoic acid. All the important phytoconstituents are being used in Ayurvedic medication and reported for sciatica, arthritis, fevers, and various painful conditions and as a laxative.

### Extraction

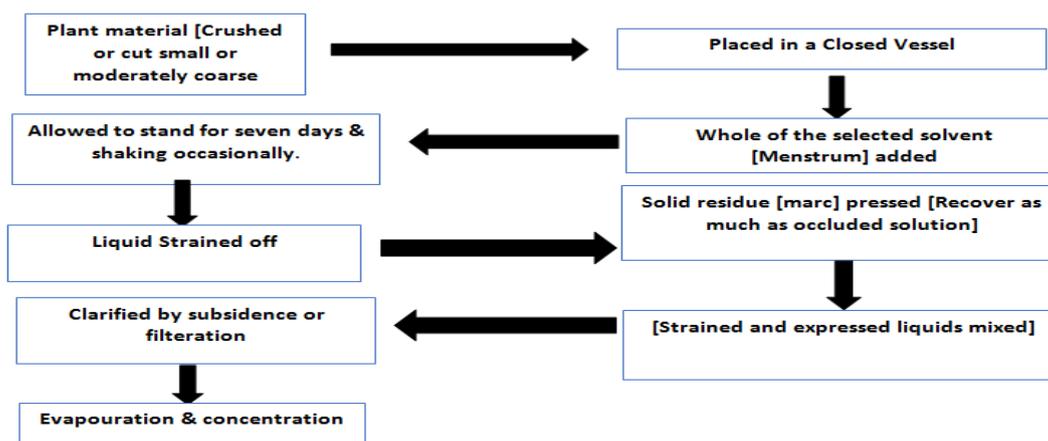
Extraction is the method of removing active constituents from a solid or liquid by means of liquid solvent.

**Extracts** can be defined as preparations of crude drugs which contain all the constituents which are soluble in the solvent.

### Extraction type – Cold Maceration.

**Procedure** :- In this process coarsely powdered drug are placed in a stoppered container with the whole of the solvent and allowed to stand for a period of at least 3 days (3 - 7 days) with frequent agitation, until soluble matter is dissolved.

The mixture is then strained through filter paper, the marc pressed and the combined liquids clarified (cleaned by filtration) or by decantation, after standing.



### Preliminary Phytochemical Screening

#### Carbohydrates

Molisch's Test: Take 2-3 ml extract, Add Few drops Of alpha-Naphthol Solution, Add Conc. H<sub>2</sub>SO<sub>4</sub> From Sides Of the test Tube.

Violet ring is Formed at the junction of two liquids.

#### Legal's Test

Take 2-3 ml extract, Add 1 ml Pyridine and 1 ml Sodium Nitroprusside.

Red colour appears.

#### Tannin

Take 2-3 ml extract and Add few drops of 5% fecl<sub>3</sub> Solution.

Black colour appears.

#### Phenol

Take 2-3 ml extract and Add few drops of dil. HNO<sub>3</sub>.

Yellow Colour appears.

#### Alkaloids

##### Hager's Test

Take 2-3 ml extract and Add Hages's Reagent gives Yellow Colour.

#### Flavonoids

Take Powder Extract Add 5 ml 95% ethanol, Few Drops of Conc. Hcl and 0.5 gm. Magnesium turnings.

Pink Colour Observed.

#### Saponin

Shake the drug extract vigorously with Water.

Persistent foam observed.

Phytochemicals Test	Result
Test For Carbohydrates	+
Test For Cardiac Glycosides	+
Test For Tannin	+
Test For Phenol	+
Test For Alkaloids	+
Test For Flavonoids	+
Test For Saponin	+

### Evaluation Of Physicochemical Test

#### A) Loss on drying

- The % of LOD was determined by using gravimetric method.
- Weigh about 1.5 gm of crude drug into a weighed porcelain dish.
- And dry in the oven at 100 0 C until two consecutive weighings do not differ by more than 0.5 mg.
- Cool in desicator & weigh. The loss in weight is usually recorded as a moisture.

% of loss on drying =

$$\frac{\text{Weight of sample} - \text{weight of dried sample}}{\text{Weight of sample}} \times 100$$

#### B) Determination of Ash values

Ash value is used to determine quality & purity of drug .Ash value contains inorganic radicals like phosphates carbonates, & silicates of sodium, potassium ,magnesium, calcium etc. Sometimes inorganic variables like calcium oxalate, silica ,carbonate content of the crude drug affects 'total ash value'.Such variables are then removed by treating with acid & then acid insoluble ash value is determine.

##### i] Determination of total ash

- Accurately weigh about 2 gm of the powdered drug taken into a tared porcelain dish & incinerated on a Bunsen burner.
- Heat till the vapours almost cease to be evolved. Heat more strongly until the carbon is burnt off.
- Cool in a desiccator. The percentage of ash was calculated by using formula.

$$\text{Percentage of total ash:- } \frac{\text{(Weight of ash)}}{\text{Weight of drug taken}} \times 100$$

##### ii] Determination of acid- insoluble ash value

- The total ash obtained above was used for determining acid -insoluble ash & boiled for 5 min with 25 ml dil. HCL.
- The content was filtered by using filter paper .Residue was washed twice with hot water.

- Then cooled & weighed. Then the residue transferred into porcelain dish & ignite until the vapours cease to be evolved & then more strongly until all the carbon has been removed.
- Cool & weigh the residue & calculate the percentage of acid –insoluble ash.

$$\text{Percentage of Acid-Insoluble ash:-} \\ \frac{100 \times \text{Weight of residue after incineration}}{\text{Weight of sample taken}}$$

#### iii] Determination Water –Soluble Ash Value

- The total ash obtained after above was used for determining acid-insoluble ash & boiled for 5 min with 25 ml dist.water. Then filter by using whatmann filter paper.
- Residue was washed twice with hot water. Then the residue transferred into porcelain dish & ignite until the vapours cease to be evolved & then more strongly until all the carbon has been removed.
- Cool & weigh the residue & calculate the percentage of water –soluble ash value.

$$\text{Percentage OF water Soluble ash:-} \\ \frac{100 \times \text{Weight of residue after incineration}}{\text{Weight of sample taken}}$$

#### iv] Determination of Sulphated Ash

- A silica crucible was heated to redness for 10 minutes, allowed to cool in a desiccator and weighed. 2 g of the substance was accurately weighed and taken into the crucible, ignited gently at first, until the substance was thoroughly charred.
- Subsequently, the residue was cooled and moistened with 1 ml of sulphuric acid and heated gently till no more white fumes evolved and again ignited to 800° C until all black particles have been disappeared. The crucible was allowed to cool and weighed.
- The entire process was repeated until two successive weighs do not differ by more than 0.5 mg.
- The percentage of the sulphated ash was calculated by using the following formula:

$$\text{Percentage of Sulphated ash =} \\ \frac{\text{Weight of sulphated ash residue} \times 100}{\text{Weight of sample}}$$

Physicochemical Test	Result
Total Ash	8.69± %
Water Soluble Ash	3.92± %
Acid insoluble Ash	0.21±%

### Pharmacological Activities on *Nyctanthes arbor-tristis* leaves

#### Hepatoprotective activity

Ethanollic leaf extract of *Nyctanthes arbor-tristis* protects 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 CCl<sub>4</sub>

(1.0ml/kg, s.c.). The samples of blood were collected at 48 h after CCl<sub>4</sub> administration (9 day) from the abdominal aorta under pentobarbitone anesthetized (350mg/kg i.p.). Silymarin (70mg/kg body weight/day, p.o. For 7 days) were used as a reference standard. In this study the leaf extract of *Nyctanthes arbor-tristis* and silymarin restored all serum and liver parameters which were altered by (CCl<sub>4</sub>) from the normal level, also prevent loss of body weight; both candidates are also protected against (CCl<sub>4</sub>) induced increase in liver weight and volume. The mechanism involves the blockade of deactivation of (CCl<sub>4</sub>) through inhibition of P 450 2E1 activity and or to accelerate the detoxification of (CCl<sub>4</sub>). These effects may be mediated by the antioxidant present in the plant. In another investigation, the ethanolic and aqueous extract of the leaf of *Nyctanthes arbor-tristis* (500mg/kg oral route for 10days) reversed the rise in serum AST and total bilirubin in (CCl<sub>4</sub>) induced hepatotoxicity in animal models.

#### Anti-Histamine Activity

The aqueous solubility of the alcoholic extract of *N. arbortristis* leaves (4.0 and 8.0g/kg oral) significantly protect against histamine aerosol - induced asphyxia (2% at 300 mm Hg) in guinea pigs. arbortristosid A and arbortristosid C present in *N. arbortristis* was reported to be anti-allergic.

#### Antipyretic activity

The extract exhibited the antipyretic effect against brewer's yeast-induced proxies in rats. When administered orally for six successive days in rats, it produced dose-dependent gastric ulcers. The aqueous soluble fraction of ethanolic extract of the leaves exhibited significant aspirin-like 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 tailclip method.

#### Anti-Anemic Activity

A research was performed as a hematological study on the ethanolic extracts of the flowers, barks, seeds and leaves of the plant and noticed the dose dependent rise in hemoglobin content and red blood cells count in rats. The extracts also protect the decline of hemogram profile in anemic rats.

#### CNS depressant activity

It was reported that the leaves, flowers, seeds and barks (600 mg/kg) of *N. arbortristis* exhibited significant and dose dependent prolongation of onset and duration of sleep and found to cause a decrease in dopamine and increase serotonin level from which it can be resolved that the CNS depressant activity of the ethanol extracts of seeds, leaves and flowers may be due to the decreases.

#### Anti-Bacterial Activity

In a study, it was reported that methanolic extract of leaves of *N. arbortristis* exhibited significant antibacterial

activity against *Staphylococcus aureus*, *Staphylococcus epidermis*, *Salmonella typhi*, *Salmonella paratyphi A* with MIC value ranging between 1-8 mg/ml. The zone of inhibition and the Minimum Inhibitory Concentration (MIC) of the extracts were determined and compared with the standard drugs ciprofloxacin and fluconazole. The chloroform extract was found to have both antibacterial and antifungal activities, whereas the petroleum ether and ethanol extracts hold only antibacterial activity.

#### Anticancer activity

Fruit, leaf and stem methanol extracts of *N. arbor-tristis* were tested for in vitro anticancer activities. Moderate activity was observed at 30mg/ml cans. With 71% inhibition of dried *N. arbor-tristis* leaf methanol extract and least inhibitory activity was observed at 10mg/ml cans. With 86% inhibition of breast cancer cell lines free of pathogens. A high degree of against human breast cancer cell lines (MDA-MB 231) was observed with *N. arbor-tristis* dried fruit methanol and the IC50 values were calculated to be 9.72mg and 13.8mg. The phytochemicals isolated from *N. arbor-tristis* dried fruit methanol are glycosides, tannins, phenols and steroids and are predicted to be responsible for this anticancer activity.

#### Antimalarial activity

Clinical study on 120 patients of malaria. Administration of fresh paste of medium sized 5 leaves of *N. arbor-tristis* thrice a day for 7-10 days has cured the disease in 92 (76.7%) patients within 7 days. Another 20 patients were cured by 10 days while the remaining 8 patients did not respond to the treatment. The paste was well tolerated and no severe side effects were reported. Screening of methanol and chloroform extract of leaves for mosquito larvicidal activity against 3 major mosquito vectors- *aedes aegypti*, *Culex quinquefasciatus* and *Anopheles stephensi* found the two extracts to kill larvae of *A. Stephens* with LC50 values of 244.4 and 747.7 ppm, respectively.

#### CONCLUSION

In the present article we have reviewed Phytochemical Screening. *N. arbor-tristis* has tremendous Potential Pharmacological Activities. Pharmacological Activities Are Widely Distributed in medicinal Plants as and it is revealed as Important herbal and Ayurvedic Pathway for effective treatment of Various Diseases.. The Process of Extraction also Studied. The Preliminary Phytochemicals like Carbohydrate, Alkaloid, Cardiac Glycosides, Phenol, Flavanoids also Studied And also Physicochemical Parameters also Studied. It Have been helpful in pointing out the correlation between the Biological Activity and nature of the Chemical Constituent with toxicity in some instances parallel to above observation Studies related to Malaria, and many activities are more pronounced in crude extracts rather than pure Molecules with fairly Positive toxicological information.

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