

**PHYTOCONSTITUENTS AND THERAPEUTIC POTENTIAL OF *NYCTANTHES
ARBORTRISTIS* LINN**¹Dr. M. J. Patil, ²Vibhuti S. Shirsat, ³Akshay M. Nar, ^{*4}Dhaval Shivaji Patil¹M. Pharm, Ph.D., Principal, ASPM College of Pharmacy.²M. Pharm., Project Guide, ASPM College of Pharmacy.³M. Pharm., Co-Guide, ASPM College of Pharmacy.⁴Student, ASPM College of Pharmacy.***Corresponding Author: Dhaval Shivaji Patil**

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❖ ABSTRACT

Nyctanthes arbor-tristis (NAT) Linn, also known as Parijata or Harsinghar is an Indian traditional plant of great importance. It has been used in Ayurveda, Siddha and Unani system of medicine for treatment of various infectious and non-infectious diseases. Each part of the plant has some medicinal value and is used for various pharmacological actions such as anti-arthritic, antispasmodic, antibacterial, anti-inflammatory, immunostimulant, antidiabetic, hepatoprotective, antioxidant, antimicrobial, anthelmintic, antileishmanial, anti-pyretic, anti-allergic, antiviral and CNS depressant. The phytochemical analysis of plant revealed presence of flavonoids, tannins, saponins, glycosides, alkaloids, steroids and phenolic compounds which are responsible for these pharmacological actions of the plant. The chemical drugs being used for treating various ailments are costly and moreover have various side effects. These drugs can be replaced by the herbal plants which have no such side effects and are cost efficient, and one such alternative can be NAT.

KEYWORDS: *Nyctanthes arborescens* L., Pharmacology, Phytochemistry, *nyctanthes arbour, tristis*.**❖ INTRODUCTION**

The useful medicinal plant *Nyctanthes arborescens* (N. arborescens) is a member of the Oleaceae family. Tropical and subtropical regions are often where the plant grows. Night jasmine, Harsinghar, and Parijat are popular names for N. arborescens. After midnight, the blooms begin to fall, and by daybreak, the plant looks boring. The Greek terms "Nykhta" (night) and "anthos" (flower) are the source of the generic name "Nyctanthes."^[1, 2] Synthetic compounds are frequently utilized as medications to treat illnesses with a range of adverse effects. As a source of bioactive compounds for the treatment, various plants were investigated of diseases such as cancer. The existence of several chemical compounds that carry out numerous crucial physiological processes gives the plant enormous biological features. More than 50,000 of the 4,22,000 flowering plants known to exist worldwide are said to have pharmacological and therapeutic use. India is home to a wide variety of therapeutic plants.^[3] *Arborescens Nyctanthes* The Linn is "a nighttime flowering

flower" in India and its neighboring countries. The "sad tree," a member of the Oleaceae (Nyctaginaceae) family, is extensively grown in tropical and subtropical regions of the world and is regarded as one of the most versatile medicinal plants. It is a terrestrial woody perennial that can live for five to twenty years. It is mostly a little tree or shrub with exquisite, incredibly fragrant vegetation that blooms at night and fades before daylight, creating a magnificent contrast of red and white on the ground below. Other names for it include Coral Jasmine, Harsinghar, Parijat, Queen of the Night, and Night Flowering Jasmine. Another frequent name for it is a night jasmine. The world has become interested in aromatic and medicinal flowers because of their strong and safe energy principles. The locals of Tripura are able to forecast weather and rainfall patterns thanks to the night flowering jasmine's flowering phenology, which aids in their planning of agroforestry projects and disaster prevention. Every portion of the tree has been

used as a traditional medicine for home remedies for a variety of human illnesses since ancient times.^[4,5]

❖ **Plant Profile**

❖ **Biological Source**

Nyctanthes arbor-tristis Linn. Belonging to the Nyctanthaceae family and commonly referred as night jasmine.

❖ **Images^[6-10]**

❖ **Synonyms**

Parijat, Nightjasmine, Coraljasmine, Harsinghar(Hindi), Parijata(Sanskrit), Shephalika(Gujarati).



Whole Plant



[a] Leaves



[b]Seed



[c] Plant Stem



[d] Trunk



[e] Flower

❖ MORPHOLOGY

Arbor-tristis Nyctanthes is a shrub that can grow up to ten meters tall and is distinguished by its rough, grey bark and quadrangular branches. The leaves are thickly covered, robust, and hairy. They have smooth edges, a straightforward structure, and dimensions of 7–11 cm in length and 2–6 cm in breadth. They are positioned in opposition to one another. The stigma is somewhat divided, with two stamens located close to the apex of the corolla tube. The plant's foliage is found in the leaf axils or at the terminals of branches. Often utilized in religious occasions, the snow-white petals seem to have dewdrops on them. The fruits are round, flattened, brown pills that are either heart-shaped or have two pieces, each of which contains a free seed. The outer layer of large, translucent cells is heavily vascularized, the testa are thick, and the seeds are exalbuminous. The cotyledon is flat.^[11]

❖ Taxonomical Classification^[12,13]

- **Kingdom** : Plantae
- **Subkingdom** : Viridiplantae
- **Infrakingdom** : Streptophyta

- **Superdivision** : Embryophyta
- **Division** : Tracheophyta
- **Class** : Magnoliopsida
- **Order** : Lamiales
- **Genus** : *Nyctanthes*
- **Species** : *N.arbor-tristis*
- **Binomial name** : *Nyctanthes arbor-tristis*
- **Family** : Oleaceae

❖ Botanical and Geographical Distribution

Nyctanthes arbor-tristis is a species of *Nyctanthes* native to South Asia and Southeast Asia. It is commonly known as night –blooming jasmine, tree of sadness, tree of sorrow, hengra bubar, coral jasmine, as seri gading in Singapore and as shiuli in the Bengal region. Despite its common name, the species is not a “true jasmine” and not of the genus *Jasminum*.

❖ **Phytochemical Evaluation^[14]****Table no 1: comprehensive phytochemical analysis of leaf extracts from *Nyctanthes arbor-tristis* for the presence of various phytochemicals.**

Phytochemicals	Phytochemical tests	Extracts Ethyl acetate	Chloroform	Acetone	Methanol	Aqueous
Alkaloids	Hager's test	+	+	-	+	+
Flavonoids	Lead acetate test	+	+	+	+	-
Anthraquinones	-	-	-	-	-	-
Glycosides	Bromine water test	+	+	+	+	+
Tannins	Ferric chloride test	+	+	+	+	+
Steroids	Salkowski test	+	+	+	+	+
Saponins	Foam test	+	+	+	+	+
Phlobatannins	HCL test	-	-	-	-	-
Terpenoids	Salkowski test	+	+	+	+	+

❖ **Chemical Constituent**

D-mannitol, β -sitosterol, flavanol glycosides, astragalol, nicotiflorin, oleanolic acid, nyctanthic acid, and tannic acid are all found in the leaves. acid, ascorbic acid, methyl salicylate, an amorphous glycoside, an amorphous resin, carotene, friedeline, lupeol, mannitol, and a hint of volatile oil iridoid glycosides, glucose, carbohydrates, and benzoic acid. Flowers: The monoglucoside glycosides Carotenoids, - monogentiobioside—D of -crocetin and -digentiobioside ester of -crocetin, essential oils, nyctanthin, D-mannitol, tannins, glucose, and crocin-3 (or crocin-1) are examples of flowers. Bark The Bark mainly glycosides and alkaloids. β -sitosterol and stem.^[15,16]

❖ **Therapeutic Uses^[17]**

1. The Harsingar plant's leaves have been used to treat a variety of ailments, including arthritis, worm infestations, fevers, and coughing. The leaves' bitter juice has a tonic effect.
2. Flowers have ophthalmic, stomachic, carminative, and trichogenous properties. They can help with inflammation, ophthalmopathy, dyspepsia, splenomegaly, flatulence, colic, and grey hair.
3. Scurvy, balding, and scalp affection can all be effectively treated with seeds.
4. Bark are used as expectorant.

❖ **Advantages**

1. The leaves and flowers of *Nyctanthes arbor-tristis* contain bioactive compounds such as iridoid glycosides, flavonoids, and tannins, which exhibit significant anti-inflammatory properties.
2. The plant is rich in antioxidants that protect cells from oxidative stress, which is linked to various chronic diseases.
3. *Nyctanthes arbor-tristis* has been traditionally used to combat infections due to its antimicrobial effects.
4. The leaves of Parijat are known to improve insulin function.

❖ **Review of Literature****1. Hepatoprotective activity**

Nyctanthes arbor-tristis leaf extract in ethanol protects rats from carbon tetrachloride-induced hepatotoxicity. Before receiving a single dose of CC4 (1.0 ml/kg, s.c.) for this

study, rats were pretreated with extract (100 mg/kg body weight/day, p.o. for 7 days). Within research Both candidates are protected against (CC4)-induced increases in liver weight and volume, and the leaf extracts of *Nyctanthes arbor-tristis* and silymarin restored all serum and liver parameters that had been changed from the normal level. They also prevented weight loss. The antioxidant in the plant may act as a mediator for these effects.^[18,19]

2. ANTIVIRAL ACTIVITY

The encephalomyocarditis virus (EMCV) and the Semliki Forest virus (SFV) have been found to be strongly inhibited by the ethanolic extract, n-butanol fractions, and two pure compounds, arbortristiside A and arbortristiside C, which are derived from the *Nyctanthes arbor-tristis* plant. In tests conducted in the lab, *Nyctanthes arbor-tristis* Linn. *Culex quinquefasciatus*, a common floral vector, has also been tested against flower extract and its isolated component (dip). It has been demonstrated that daily dosages of 125 mg/kg weight of the n-butanol fraction and the in-vivo ethanolic extract protect EMCV-infected mice against SFV by 40% and 60%, respectively. The antiviral activity of the ethanolic extract, n-butanol fraction, and Arbortristiside A and C extracted from the plant's seed against the Semliki forest virus and Encephalomyocarditis virus, both in vitro and in animal, has only been reported twice. Additionally, it has been shown that arbortristisides B, D, and E did not exhibit antiviral activity.^[20]

3. Anti- histaminic and Anti- tryptaminergic activity

The aqueous soluble extract of *N. arbour-tristis* leaves (4.0 and 8.0g/kg oral) effectively protects guinea pigs from hypoxia caused by histamine aerosols (2 percent at 300 mm Hg). In *N. arbour-tristis*, it has been shown that arbortristisids A and C exhibit anti-allergic qualities.^[21]

4. Anti inflammatory Activity

Acute and subacute anti-inflammatory efficacy has been shown by the extract made from the complete *N. arbor-tristis* plant, the alcoholic extract of its stem and seeds, and the water-soluble portion of the alcoholic extract of its leaves. Rats' hind paws were used to test the acute anti-inflammatory activity of various phlogistic agents, including formalin, carrageenan, histamine, 5-

hydroxytryptamine, and hyaluronidase. It was discovered that *N. arbortristis* considerably decreased the production of granulation tissue in the granuloma pouch and cotton pellet tests in sub-acute mice. Furthermore, it was discovered that *N. arbortristis* inhibited inflammation caused by immunological techniques including the pure tuberculin reaction and Freund's adjuvant arthritis.^[22]

5. Anti-diabetic activity

Some researchers have demonstrated that the methanolic extract of *N. arbor tristis* root has anti-diabetic activity comparable to that of diabetic control mice. The extract had potent and consistent anti-diabetic effects. They employed 50g of root powder and 400ml of methanol in an 18-hour hot continuous extraction procedure. To get rid of impurities, the methanolic extract was filtered and separated using petroleum ether. The substance was dried in a vacuum after the solvent evaporated under extreme pressure. The dried extract of *N. arbor-tristis* was assessed for its hypoglycemic effectiveness. It lowers blood glucose levels in rats more successfully than standard medication after seven days of treatment at 500 mg/kg. A methanolic extract of *N. arbor-tristis* roots has been demonstrated to be more effective at lowering blood sugar levels than traditional therapy.^[23]

6. Wound healing activity

Matadeen et al. (2011) assessed NAT's capacity to repair wounds in Wistar albino rats. The rats were treated with a methanolic extract containing 2% NAT by weight for 16 days. It was shown that it takes about 16 days for both incision and excision wounds to completely epithelize before they heal. NAT extract was found to be an effective treatment for both types of wounds at a dose of 300 mg/kg.^[24]

7. Sedative activity

The Rat Hole-Board Test was used to assess the sedative potential of a hot infusion of the flowers (3.7, 7.5, 12.5, and 18.7 mg/kg, p.o.) in rats two hours after dose. Each rat in this test was positioned in the middle of the standard rat hole-board contraption and kept there for seven and a half minutes. Locomotory activity, the number of rears, the number of head dips, the total amount of time spent on head dips, and the amount of time spent on each head dip were all tracked. While female rats were unaffected, male rats showed dose-dependent conscious sedative activity (at 7.5 & 12.5 mg/kg, p.o.).^[25]

❖ CONCLUSION

The plant might be a better option to cure the illnesses because it is readily available and doesn't require any special growing or harvesting conditions. Concurrently, thorough safety assessments of plants and their interactions with different synthetic medications are necessary. This is a completely uncharted domain that is urgently needed. Since plants contain a certain pharmacological effects that might have positive therapeutic effects on population health, there is an

urgent need to undertake more clinical research on plants. Because the plant is widely available and doesn't require special growing or harvesting conditions, For certain health issues, it might be best course of action. All at once, extensive evaluations of the safety of plants and their potential interactions with various synthetic drugs are required. There is an immediate demand for this as it is a totally unexplored field. In many situations, the identification and characterization of the bioactive chemical or compounds responsible for the biological activity of plants, as well as the clarification of the mechanism of action, call for additional study and investigation.

Future Scope:- The current study on *Nyctanthes arbor-tristis* demonstrated its importance in traditional herbal and ayurvedic uses for the treatment of a variety of illnesses due to its high potential pharmacological activity. It is an easily accessible plant with a wealth of biologically active substances that will attract the attention of drug research teams to find new bioactive molecules to treat various ailments more safely and effectively. Its gathering and cultivation don't require any particular conditions. All things considered, *Nyctanthus arbostristis* exhibits promise as a medicinal plant; nonetheless, its potential for use in medicine will depend on thorough scientific investigation, clinical validation, and regulatory licensing procedures.

Working together, botanists, pharmacologists, medical professionals, traditional healers, and authorities is necessary to ensure its safe usage in healthcare and to realize its potential therapeutic benefits.

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