



# PHARMACOLOGICAL ACTIVITY AND THERAPEUTIC USE WITH VARIOUS PLANT PARTS OF NYCTANTHES ARBOR-TRISTIS (HARSHRINGAR).

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**Abstract** - *Nyctanthes arbortristis* (Harshringar) has its own place in Ayurveda with its enormous medicinal values. Each parts of the plant has been used for different medical purposes. The plant's leaves offer a spectrum of therapeutic uses, including anti-inflammatory, and anti-helminthic, antipyretic, antibacterial properties. Ayurvedic works of literature are replete with explanations of environment, morphology, etymology, conventional pharmacology, medicinal application, etcetera. This actual study also includes descriptions of scientific classification, habitat, family and genus features, ethnobotanical use, vernacular names, chemical components, pharmacological activity, etcetera. The authors are optimistic as the article will assist researchers working in the domains of the field of Ayurveda and other biomedical sciences in their efforts to learn more details about the plant, for the betterment of society,

**Keywords** – Ayurveda, *Nyctanthes arbortristis*, Ethno pharmacology, Clinical study.

## INTRODUCTION

In the first several decades, medicinal herbs making an impression on both world commerce and world health have become a topic of worldwide importance. In the healthcare system, therapeutic plants importance has not changed and they continue to play a central role in large proportions of the world's population <sup>[1]</sup>. The earliest book in the collection of the library and the whole ancient literature, The Rig-Veda provides intriguing details about the themes.

<sup>[2]</sup> There are plenty of special chemicals originating from plants at present and used as medicines, insecticides, flavours, dyes, fragrances, etc. Despite the widespread usage of western pharmaceuticals, almost eighty percent of the world's population currently uses medicinal herbs as a basis for their main source of medication early on in the course of treatment. <sup>[3]</sup>.

The rise in popularity of plant-based remedies is mostly attributable to mounting evidence of the risks to one's health posed by the indiscriminate use of contemporary medications like steroids, antibiotics, and other synthetic pharmaceuticals. <sup>[4]</sup>.

The fact that research on natural products produced almost 3500 new chemical structures, of which more than 2600 were from higher plants, according to a WHO report, illustrates that there are more than enough untapped materials available. The diversity of medicinal plants shows the antimicrobial potential which has been investigated globally. <sup>[5]</sup>.

From the ancient times, the traditional medical care system of India and China, the therapeutic plants which has been used is now acknowledged by scientists all around the globe. Plants have a tendency to release certain chemicals which are generally lethal to bacteria <sup>[6]</sup> and a significant amount of plants have been surveyed for the advancement of peculiar drugs with therapeutic value and use <sup>[7]</sup>.

There can be no doubt that many species of plants from the plant kingdom contain certain chemicals with a medicinal value that have yet to be unveiled because there's a huge quantity with their quality of plants and the number of plants yet to be examined for their pharmacological worth as the problem arising with AMR situation, With the constant abuse of antibiotics, microorganisms resistivity is been increasing. <sup>[8]</sup>.

Since the beginning of human life on Earth, man has been dependent on nature for its natural resources to treat the majority of physical ailments. Different plant components were used to regulate suffering, eradicate pain, and neutralize diseases in ancient civilizations. In past, the drugs used in medieval medicine were acquired from plants, which was and still is in many countries specifically in Asia, the oldest and most pure source of medication. The drug-producing plants are decently non-poisonous and also comparably free from life-threatening effects or were so infectious that noxious effects were well known. To cure all infirmities of mankind nature has provided a repository

of remedies. Plants generally store useful chemical compounds which may work as drugs potentially and provide the newest leads and clues for innovative modern drug design by synthesis <sup>[9]</sup>.

## 1. CHARACTERIZATION OF PLANT

There are many completely distinct plant species that were informed in ethno botany awareness, *Nyctanthes arbortristis*, belonging to the *Oleaceae* family is generally a well-known acknowledged medicinal plant. *N. arbortristis* is popularly known as Night Jasmine or Harshringar. The meaning of *Nyctanthes* is, 'night flowering' whereas *arbortristis* is 'the sad tree' because during daytime it no longer has its brightness <sup>[10, 11]</sup>

**Table 1: The Medicinal Plant is Well-Known by Other Names in the Other Languages As Follows.**

Sr. no	Language	Name
1.	Sanskrit	Parijatha
2.	English	Night Jasmine
3.	Bengali	Sephalika
4.	Hindi	Harshringar
5.	Marathi	Parijathak
6.	Gujarathi	Jayaparvati
7.	Malayalam	Parijatakam
8.	Oriya	Gangasiuli
9.	Kannada	Parijatha
10.	Telugu	Pagadamalle
11.	Filipino	Coral jasmine
12.	Indonesian	Srigading (Sundanese)
13.	Konkani	Pardic, Parzonto, Parzot
14.	Malay	Seri Gading
15.	Lao (Tibetan)	Salikaa
16.	Thai	Karanikaa
17.	Vietnamese	Iai Tau
18.	Panjabi	Harsinghar
19.	Tamil	Manjhapu
20.	Urdu	Gulejafari, Harsingar

- Classification -**

Division - Angiosperm

Class - Eudicots

Order - Lamiales

Family - Oleaceae

Kingdom - Plantae

Genus - Nyctanthes

Species - Nyctanthes arbortristis

- **Geographical location & Habitat**

N. arbortristis is associated with India, thriving wild in sub range regions starting with the Chenab's to, Burma, Assam, Nepal, Bengal, and in Central India like Chota Nagpur, Madhya Pradesh, Rajasthan, and southwards to the Godavari. It is widely grown practically everywhere in several regions of India. The majority of people in India also plant harsingar trees in their gardens for showy or prettifying purposes owing to their highly scented flowers. This plant's flowers open in the evening between sunset and dawn. It blossoms graciously and also covers rocky gardens and dry deep hillsides in its natural habitat. [12-14].



**Fig: 1. plant leaves.**



**Fig: 2. plant seed**



**Fig: 3. plant flower.**

## 2. ETHNOPHARMACOLOGY

The tribal inhabitants of India specifically (Orissa and Bihar), and also in rural areas, use Individual parts of N. arbortristis as a primitive treatment for various diseases and disorders as it is recognized to possess various properties in addition to its application in Siddha, Unani, Ayurveda, systems of medicines. The plant also been researched for an assessment of pharmacological effects. The juice using the leaves as a source antidote for reptile poisons [12], diuretics [10, 12, 14], laxatives, diaphoretics, and digestives [11]. Additionally, leaves are employed in spleen enlargement [13]. The people of Balasor, Orissa, offer a mixture made from the leaves (one teaspoon twice a day) and honey to treat fever, malaria and hemorrhagic dysentery [15]. To prevent skin infections, the indigenous tribes of Orissa use the juice of 3-7 leaves. [15].

Rheumatism and fever can both be treated with 2 ounces of its infusion <sup>[11, 15]</sup>. From the Dhenkanal District of Orissa, a teaspoonful of the syrup made from leaves is administered twice daily for three days to alleviate bodily aches <sup>[11-15]</sup>. This remedy is very effective for stubborn sciatica. The tribal inhabitants of Orissa utilize the upper surface of leaves to scrape eczematous spots <sup>[15]</sup>. The tribal inhabitants of Bihar rub six or seven of the young leaves with water and a little fresh ginger and administer it to patients with stubborn fever of the intermittent kind <sup>[12-15]</sup>. The tribesmen of Balasor, Orissa, offer leaves with honey or sugar in combination with table salt against intestinal parasites, mainly larval roundworms and tapeworms for anthelmintic activity <sup>[12-16]</sup>.

Orissa people offer one scoop of leaf decoction and honey before night as a model drug and cholaretic to treat cough <sup>[14, 15]</sup>. The juice from the extracted leaves has cholaretic and laxative properties and has a pungent and bitter taste <sup>[12-15]</sup>. The leaves are often utilized as a remedy for ulcers and menorrhagia <sup>[16]</sup>.

The powdered seeds are used as a remedy for skin conditions including piles and scurvy affections of the scalp <sup>[12-15]</sup>. The stem bark in a powdered form is traditionally provided for rheumatoid joint discomfort, its oil is used for eye pain, and it's applied to the body along with the bark of Arjuna for interior injuries <sup>[13]</sup>. The plant's bark has expectorant properties <sup>[14]</sup>. To encourage the expectoration of thick phlegm, about 5 scraps of the barks are consumed with betel nut and the leaves <sup>[12-15]</sup>. Typically, a flower and bark decoction is administered to treat malaria <sup>[15]</sup>.

Before being cooked in water, *Piper longum* & *Zingiber officinale* were combined and mashed with stem bark. The Odisha tribal population consumes the resulting liquid for two days to treat malaria <sup>[15]</sup>. In the event of internal injury, the body is covered with the resulting paste after combining Arjuna's bark with it. Broken bones can also be joined using it <sup>[15]</sup>. Its flowers have ophthalmic uses and are bitter, astringent, stomachic, and carminative <sup>[10, 12]</sup>. The flower juice is applied topically to the hair to strengthen it and prevent greying and baldness <sup>[15]</sup>.

Its roots are utilized in a decoction to increase spleen size <sup>[13]</sup>. Its roots and bark are traditionally employed as anti-dysenteric and anthelmintic, respectively <sup>[15, 16]</sup>. The corolla tubes have been used in the past to dye silk <sup>[14]</sup>. The roofs' grass thatch or tile are supported by battens made of wood. Baskets are made from young branches. The tree's leaves and bark have the ability to polish wood and ivory, respectively <sup>[14]</sup>.

### 3. ANCIENT ORIGIN OF PARIJATA <sup>[17]</sup>



Considering mythology, Lord Krishna brought the holy tree Parijata to earth. The wives of Krishna, Satyabhama, and also, Rukmini, got into a fight over it. But when lord Krishna tried to plant the tree in Satyabhama's courtyard, he made sure that Rukmini's courtyard would receive the flowers.

#### 4. ETYMOLOGY<sup>[18]</sup>

Etymology of Parijata is“Paarinaha Samudrath jaatho va parijatah”:- It is named Parijata, because of its origin from Samudra (Ocean) as a result of (parinaha) extended looking.

#### 5. MORPHOLOGICAL DESCRIPTION OF A PLANT

A large shrub that can grow as high as 10 meters, *Nyctanthes arbor-tristis* features tough leaves, stiff white hair, and flaking grey bark. The flowers have a white corolla of 5 to 8 lobes with an orange-light red center, and they grow in groups of three to seven together. Individual blooms at dusk and immediately close and mostly fall at twilight. The ciliated calyx, which is 68 mm in length, is narrowly campanulate, hairy on the surface but glabrous on the inside. The corolla is over 13 mm long and glabrous. The tube is 6 to 8 mm extended and orange in colour, roughly equaling the length of the limbs. The leaves are simple, opposite, and bordered entirely. They are 2 to 6.5 cm broad and 6 to 12 cm long. The fruit of the plant is a brown, heart-to-round capsule, flat to shape with a diameter of 2 cm that contains two sections, each containing a single seed. These are compressed, two-celled, broad and lengthy, obcordate, or virtually orbicular, and compressed. Exalbuminous seeds, thick testa, and a vascularized top layer made up of big, translucent cells <sup>[19, 20]</sup>

#### 6. PHARMACOLOGICAL ACTIVITIES (REPORTED)

##### Pre-clinical study:

**Antibacterial:** The claimed traditional medical uses are scientifically proven through in vitro-vivo experiments. The main factor contributing to early mortality worldwide is infectious diseases. Antimicrobial agent resistance is increasing in a range of pathogens and multi-drug resistance is becoming more prevalent in a range of organisms, including *Salmonella typhi*, *Staphylococcus aureus*, and *Staphylococcus epidermis*. In a study, it was observed that,

NAT leaf methanolic extract had substantial antimicrobial defenses for *Salmonella typhi*, *Staphylococcus aureus*, and *Staphylococcus epidermis*, having MIC values between 1 and 8 mg/ml <sup>[40]</sup>. This information is summarised in **Table 2**. Ethanolic, aqueous, and hydroalcoholic extracts of leaves were evaluated for their ability to combat antibiotic-resistant and non-resistant *S. aureus* strains. <sup>[21]</sup>.

**Anti-arthritic activity:** A disease sign of arthritis is joint discomfort, which is followed by the breakdown of bones and joints. Cytokines play a crucial role in arthritis. In the earlier investigation, it was revealed that experimental mice had a significant arthritic flare-up as a

result of the tumor necrosis factor's (TNF-) erratic expression. In collagen-induced arthritis, the onset of arthritis was dramatically reduced in the absence of interleukin-1 (IL-1) (CIA). Mice with the interleukin-6 (IL-6) gene disrupted were immune to collagen and antigen-induced arthritis. These investigations demonstrated the participation of pro-inflammatory cytokines (TNF-, IL-1, and IL-6) in arthritis and their potential as therapeutic targets. <sup>[43]</sup>

The effectiveness of the plant fruit, leaf, and seed extract was examined using the adjuvant-induced arthritis model. The results indicated that FCA (Freud's Complete Adjuvant) was administered to mice twice: first on day 0 and again on day 12. TNF, IL-1, and IL-6 were lowered after 14 days of daily therapy with extracts of leaves and fruit, but it was discovered that the seed extract was appalling. In adjuvant-induced animals, there was a change in the ratio of from being inflammatory to being non-inflammatory cytokines, favoring inflammation. **Table 2** summarises the findings that the fruit and leaves extracts had anti-arthritic effects. <sup>[43]</sup>

**Immunostimulants activity:** 50% ethanol-fed mice were given extracts of this plant's seeds, flowers, and leaves showed strong activation of both antigen-specific and non-specific immunity, as demonstrated by an increase in humoral and delayed hypersensitivity reactions, red blood cells from sheep and the macrophage migration index. The greatest activity is found in seeds, where the active ingredients appear to be primarily lipid related <sup>[27]</sup>. By lowering the intensity of SGPT, SGOT, and serum bilirubin, Hukkeri et al. implanted that the aqueous and alcoholic extracts demonstrated considerable hepatoprotective action (total and direct). Histopathological analyses of liver tissues demonstrated that the extracts could regenerate hepatocytes, which confirmed the findings <sup>[28]</sup>. A 50% ethanol leaf extract from the plant & antitrypanosomal efficacy was evaluated and found to have significant activity <sup>[29]</sup>.

**Antihistaminic:** The water-soluble part is an alcohol-based leaf extract that was discovered to have antihistaminic activity by Saxena et al [22, 23]

**Antioxidant:** The extract showed a hypothermic effect and a significant laxative effect. Ratnasooriya et al. When hot oil of *Nyctanthes arbortristis* blossoms were injected into rats to test their sedative effects, the results revealed that the drowsiness in the rats was attributed to antioxidant and membrane-stabilizing actions.<sup>[25]</sup> Several in vitro tests, including DPPH, hydroxyl, and superoxide radicals, as well as H<sub>2</sub>O<sub>2</sub> scavenging assays, indicated remarkable antioxidant activity in the ethyl acetate's soluble fraction in acetone extract. Its ability to inhibit DNA damage from -rays and Fe (II)-induced liposome lipid peroxidation also supported this. The high flavonoid and phenolic levels, along with the strong reducing power, may be to blame for the antioxidant activity.<sup>[34]</sup>

**Anthelmintic activity:** It was noted in the earlier study that the anti-helmintic activities of dried leaves, stems, and bark of NAT as well as fresh flowers extracted using ethanol were examined using the piperazine citrate as a reference. By varying the dilutions of this extract, the contractile impact of acetylcholine was inhibited in order to study the anthelmintic efficacy. It was discovered that the anthelmintic properties of seeds and flowers were stronger than those of bark and leaves but less potent than those of piperazine citrate. **Table 2** summarises how these extracts enhanced the anti-helmintic effects of atropine and enhanced motility inhibition by relaxing and decreasing responsiveness to contractile action of acetylcholine<sup>[44]</sup>.

**Antipyretic:** The analgesic, ulcerogenic, and antipyretic effects of *N. arbortristis* leaf extract were studied by Saxena et.al. They found that the extract had considerable analgesic and antipyretic effects. Additionally, it was discovered that oral dosing for six straight days to rats caused stomach ulcers<sup>[25]</sup>.

**Antifungal:** Its leaves contain arbortristosides that alter mice peritoneal macrophages and intracellular death of *Candida albicans*, according to Gyanchandrani et al.<sup>[27]</sup>.

**Antiviral activity:** Rajbhandari et al.<sup>[30]</sup> claimed that the extract of the leaves in methanol has anti-influenza action. Thane et al.<sup>[31]</sup> found that the aqueous extract from leaves has antiedema efficacy. The Semliki forest virus and the encephalomyocarditis virus. The results demonstrated strong in vitro viral inhibitory efficacy for arbortristiside-A and arbortristiside-C as pure molecules, ethanolic extract, and n-butanol fraction. Semliki forest virus and the encephalomyocarditis virus. The results demonstrated strong in vitro viral inhibitory efficacy for



arbortristiside-A and arbortristiside-C as pure molecules, ethanolic extract, and n-butanol fraction. At a daily dose of 15 mg/kg body weight, extract (ethanol) and n-butanol fraction protected virus-infected mice <sup>[33]</sup>.

**Lung protective activity:** Tumour necrosis factor, was reported to be prevented from building up in Bronchoalveolar lavage fluid by an alcohol extract from the leaves. Additionally, it was an extract that was efficient in preventing early fibrinogenesis reactions brought on by silica, such as congestion, edema, nuclear cell infiltration in intestine alveolar gaps, and increased alveolar septal thickness in mice lungs. This led researchers to the conclusion that Leaf extract from *N. arbortristis*, aids in avoiding silica-induced fibrinogenesis in mouse lungs <sup>[32]</sup>.

According to the previous study, silica particles (5  $\mu$ ) were inhaled into Swiss mice using a Flow Past Nose Only Inhalation Chamber at a rate of -10 mg/m<sup>3</sup> respirable mass for 5 hours to cause pulmonary damage. Compared to a sham treatment, inhaling silica increased the tumor necrosis factor-alpha levels (TNF-alpha), the 63 & 66kDa peptides, and TNF-alpha in also the BAL fluid. TNF- buildin the BAL fluid was dramatically reduced in silica-exposed mice treated beforehand with the plant leaf extract, although the levels of the 66 & 63 kDa peptides were unaffected. Additionally, the extraction was discovered to be successful in stopping silica-induced early fibrogenic reactions as congestion, edema, and nucleated cell infiltration in the interstitial alveolar spaces, in mouse lungs, in addition to the thickening of the alveolar septa. <sup>[42]</sup>

**Anti-inflammatory:** Chronic inflammatory edoema brought on by various phlogistic agents, including carrageenan, formaline, histamine, 5-HT, and hyaluronidase, was prevented by the water-insoluble fraction of the plant's leaves. Additionally, it reduced the inflammatory swelling that turpentine oil-induced arthritis in rats' knee joints. It was discovered that, both cotton pellets and granuloma pouches, tests effectively inhibit the production of granulation tissue in subacute models. Significant suppression was observed in both stages of acute and chronic of formaldehyde-induced arthritis. In addition, it has been noticed to suppress inflammation induced by immunological procedures <sup>[34, 35]</sup>.

Significant and dose-dependent anti-inflammatory and antinociceptive efficacy was discovered for arbortristoside-A. It appears that arbortristoside-A decreased the edoema brought on by histamine, serotonin, and carrageenan, indicating that it has an inhibitory effect on demonstrating that its anti-inflammatory effects may be caused by the inhibitory effect of prostaglandin, histamine, and serotonin. Carrageenan, histamine, arachidonic acid, and

serotonin-induced edema. **Table 2** summarises the analgesic efficacy of arbortristoside-A, which may be caused by its suppression of prostaglandin function <sup>[41]</sup>.

**Table 2: THE NAT-REPORTED PORTIONS FOR A RANGE FOR PHARMACOLOGICAL ACTIVITIES.**

Sr.no	Reported activity	Part used	Extract	Conclusion
1.	Antibacterial	Leaves	Methanolic	Which shows, Antibacterial activity against Staphylococcus aureus, Staphylococcus epidermis, Salmonella typhi, Salmonella paratyphi A <sup>40</sup> .
2.	Anti-arthritis	whole plant Seeds, leaves and fruits	Ethanolic	Seed extract ineffective; Leaves and fruits extracts reduced TNF $\alpha$ , IL-1, IL-6. Extract of leaves and fruit possess anti-arthritis properties <sup>43</sup> .
3.	Anthelmintic	Dried leaves, fresh flowers, bark, stem	Ethanolic	Seeds and flowers possess more potent activity than bark and leaves. Also potentiated anthelmintic activity of atropine <sup>44</sup> .
4.	Anti-inflammatory	Leaves	Ethanolic	It Inhibits inflammation produced by Freund's adjuvant arthritis PPD-induced tuberculin reaction <sup>45</sup> .
		Ethanolic	Ethanolic	
		Ethanolic		It Inhibit acute inflammatory edema which is produced by carrageenan, formalin, histamine, 5-

				<p>hydroxytryptamine and hyalouronidase in hind paw of rats. Additionally, it lessened the turpentine oil-induced acute inflammatory swelling in the knee joint.</p> <p>Isolated arbortristoside-A subdued the histamine, serotonin and carrageenan-induced edema<sup>47</sup>.</p>
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**Clinical study:** An investigation was made on the possible effects of the *Nyctanthes arbor-tristis* (Parijat) on the clinical, metabolic, parasite, and immunological changes associated with malaria [48]. The study's results indicated that the leaf extracts from the NAT have the potential to combat plasmodium falciparum-caused malaria that is multidrug resistant. In a different trial, individuals with malaria were given fresh five NAT leaves orally twice daily for seven to ten days. The alleviation of malaria symptoms and symptoms of Visham Jwara were rated on a daily and weekly basis. Ninety-two (76.7%) of the 120 patients had complete clinical and parasite cures within 7 days. 20 additional patients who continued receiving the same medication were cured within 10 days. Patients who showed no clinical improvement or parasite elimination had standard antimalarial therapy. The frequency of early parasitemia and the rate of parasite clearance were directly correlated throughout time. There were no substantial issues or negative effects and the paste was well tolerated. Significant antimalarial efficacy and good tolerability were demonstrated by NAT at the dosage utilised. <sup>[49]</sup>

**Toxicological profile:** At doses ranging from 400 mg/kg to 2000 mg/kg i.p., The water-soluble component of ethanolic extract of different portions of NAT was tested on the herbal extract for acute toxicity. <sup>[41]</sup>

**Potential herbal-drug interaction:** NAT has a relation to number of pharmacological effects, including antispasmodic activity, which suggests that inhibiting acetylcholine's <sup>[44]</sup> contractile response may enhance the results of some medications, such as dicyclomine, atropine, hyoscine, propantheline, oxyphenonium, etc. Additionally, NAT is said to lower blood serotonin levels when combined with MDMA, mescaline, and amphetamine (also known as methylenedioxymethamphetamine or MDMA).

A recent study found that the NAT has a CNS depressive effect <sup>[50]</sup>, which means that it can enhance the outcomes of several medications like benzodiazepines, chlorpromazines, haloperidol, reserpine, and clozapine, among others.

Pre-clinical research also showed that NAT having a hypolipidemic effect, which, if combined with a hypolipidemic <sup>[51]</sup> agent like lovastatin, atorvastatin, clofibrate, or nicotinic acid, may cause nonalcoholic fatty liver, muscle weakness, irritability, nerve degeneration, or delayed nerve conduction due to low serum total cholesterol.

## 7. TRADITIONAL USES OF NYCTANTHES ARBOR-TRISTIS<sup>[19,36]</sup>

Traditionally, the blooms are harvested for coronal and also for religious offerings. The orange robes used by Buddhist priests were dyed with this flower gave rise to the practise of using the orange heart to colour silk and cotton. Hindu mythology considers the Parijata to be one of Devaloka's five wish-granting trees. <sup>[19]</sup>

Tribal tribes from the Indian subcontinent recognize several parts of *Nyctanthes arbor-tristis* as having specific ailments since it is used in the Unani, Siddha, and Ayurvedic medical systems. <sup>[19]</sup>

### Stems:

Traditional uses for the dried, ground stem bark include treating malaria, relieving arthritic joint pain, and acting as an expectorant. Snake bites and bronchitis are treated with the bark. Malaria is treated by pounding the bark with *Piper longum* and *Zingiber officinale*, then the mixture is cooked in water and consumed for two days. The resulting paste is mixed with the bark of *Arjuna* and administered to the body to treat internal wounds and broken bones in joints. <sup>[19]</sup>

**Leaves:**

In Ayurvedic medicine, *Nyctanthes arbor-tristis* leaves are frequently utilised to treat a selected ailments, including internal worm infections, rheumatism, chronic fever, and sciatica. They are also used as a diaphoretic, laxative, and diuretic. To lessen coughs, apply leaves. To treat a cough, leaf juice is combined with honey and administered three times a day. For the treatment of fever, high blood pressure, and diabetes, leaf paste is given with honey. The leaves' juice is used as a laxative, diaphoretic, diuretic, mildly bitter tonic, and antidote against reptile venoms. Additionally, leaves are employed in spleen enlargement.

Treatments utilizing the leaf juice with many other major issues like, piles, chronic fever, rheumatism, stubborn sciatica, biliary disorders, and reduced appetite, intestinal worms, liver disorders, and fever. The raw extraction of leaf has cholagogue, laxative, and mildly bitter tonic properties. Children are fed it with less sugar as a treatment for digestive problems. <sup>[19]</sup>

**Flowers:**

Uses for the flowers in ophthalmology, piles, skin disorders, expectorant, antibilious, hair tonic, and stomachic, carminative, astringent to the intestine, and antibilious reasons. The plant's bright *Nyctanthin* is present in orange corolla tubes, a colouring ingredient that is similar to the crocetin in saffron. The corolla tubes have occasionally been used to dye fabric with safflower or turmeric in the past. <sup>[19]</sup>

**Seeds:**

The use of seeds specifically for, alopecia and also as anthelmintic. It functions as both an expectorant and an antibilious, and it is effective for bilious fevers. The powdered seeds are used to treat skin conditions like piles and scurvy affections of the scalp. <sup>[19]</sup>

**Table 3: CHEMICAL CONSTITUENTS OF NYCTANTHES ARBOR-TRISTIS LINN.** <sup>[37-39]</sup>

Sr no.	Plant Part	Chemical Constituents.
1.	Leaves	D-mannitol, $\beta$ -sitosterole, Flavanol glycosides, Astragaline, Nicotiflorin, Oleanolic acid, Nyctanthic acid, Tannic acid, Ascorbic acid, Amorphous glycoside, Methyl salicylate, Trace of volatile oil, Carotene, Amorphous resin,



	Seed	Friedeline, Lupeol, Mannitol, Glucose, Fructose, Iridoid glycosides, Benzoic acid. <sup>[19]</sup> Glycerides of linoleic acid, lignoceric acid, oleic acid, Arbortristoside A&B, stearic acid, nyctanthic acid, 3-4 secotriterpene acid, a water-soluble polysaccharide composed of D-glucose and D mannose <sup>[19]</sup>
	Flower	Nyctanthin, d-mannitol, Tannin, Glucose, Glycosides, Carotenoid, $\beta$ monogentiobioside ester of $\alpha$ -crocin (or crocin-3), $\beta$ monogentiobioside, $\beta$ -D monoglucoside ester of $\alpha$ -crocin, Essential oil, $\beta$ -digentiobioside ester of $\alpha$ -crocin (or crocin-1) <sup>[19]</sup>
	Stem	Glycoside-naringenin-4-O- $\beta$ -glucapyranosyl- $\alpha$ xylopyranoside and $\beta$ -sitosterol. <sup>[19]</sup>
	Bark	Glycosides & alkaloids. <sup>[19]</sup>
	Flower oil	$\alpha$ -pinene, p-cymene, phenyl acetaldehyde, 1- hexanol methyl heptanone, 1-deconol and anisaldehyde. <sup>[19]</sup>

## CONCLUSION

The need for more clinical research is urgent since plants have a broad range of pharmacological functions that may be therapeutically advantageous for population health and wellness. The plant might be a better option to cure the diseases because it is readily available and doesn't need particular cultivation or collection conditions. In addition, it is crucial to properly evaluate a plant's safety in light of its interactions with numerous synthetic drugs, a completely uncharted territory that is critically required.

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None

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