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**AN EXTENSIVE REVIEW ON FRAGRANCE MEDICINAL PLANT- *NYCTANTHES
ARBOR-TRISTIS* LINN**

Asha Roshan^{*1} and Navneet Kumar Verma²

¹R.K Pharmacy College, Azamgarh, Uttar Pradesh, India.

²Buddha Institute of Pharmacy, GIDA, Gorakhpur, Uttar Pradesh, India.

ABSTRACT

In Indian traditional medicine *Nyctanthes arbor-tristis* Linn. (Oleaceae) is commonly employed. It's also called Night Jasmine, Parijat, or Harsingar. The shrub may be found in the world's tropical and subtropical regions. *Nyctanthes arbor-tristis* Linn is a little sacred Oranamental tree famed for its lovely scent and white orange blossoms all across the nation. Because each portion of this plant has a unique medical effect and value, it may be profitably exploited. It is employed in the Ayurveda, Siddha and Unani medical systems. Antioxidant Activity, Antimicrobial Activity, Hepatoprotective Activity, Anti-allergy Activity, Anti-Leishmanial Activity, Antidiabetic Activity, Immuno-Stimulant Activity, Anti-viral Activity, Sedative Activity, Anti-Inflammatory, anti-pyretic, and antinociceptive activities of *Nyctanthes arbor-tristis* Linn according to Ayurveda and Modern Science.

KEYWORDS

Nyctanthes arbor-tristis, Traditional medicine, Phytochemical constituents and Pharmacological action.

Author for Correspondence:

Asha Roshan,
R.K Pharmacy College,
Azamgarh, Uttar Pradesh, India.

Email: asha.roshan@rediffmail.com

INTRODUCTION

Medicinal plants have been used as unique sources of medicine all throughout the world since prehistoric times. Because of their safe and effective active principles, interest in medicinal and aromatic herbs has grown in recent years. *Nyctanthus arbor-tristis* Linn. (Oleaceae) is commonly referred to as 'Night Jasmine' or 'Harsinghar' (Hindi) because its blossoms exude a strong and pleasant aroma throughout the night^{1,2}. The name *Nyctanthes* comes from the Greek words "Nykhta" (night) and "anthos" (flower)^{3,4}. The shrub reaches a maximum height of ten metres. The plant lives for 5-20 years

and has simple leaves with an entire border approximately 6-12cm long and 2-6.5cm wide with a full edge. The fragrant blooms have a five to eight lobed corolla with an orange-red centre and are grouped in groups of two to seven. Dew drops cling to the powder white petals. The fruit is a flat, brown, heart-shaped to spherical capsule separated into two sections, each with a solitary seed and a diameter of around 2cm⁵.

Botanical description

Kingdom: Plantae
Class: Eudicots
Division: Angiosperm
Order: Lamiales
Family: Oleaceae
Genus: *Nyctanthes*
Species: *arbor-tritis*

Name of the plant in different languages as below⁶

English: Night jasmine
Hindi: Harsingar
Bangali: Sephalika
Sanskrit: Parijatha
Kannada: Parijatha
Malayalam: Parijatakam
Marathi: Parijathak
Gujarathi: Javaparvati
Oriya: Gangasiuli

Antioxidant

Nyctanthes arbor-tritis has been utilised in traditional medicine from prehistoric times. Flavonoids, tannins, saponins, glycosides, alkaloids, steroids and phenolic substances were found in the ethanolic extract of *Nyctanthes arbor-tritis* Linn leaves 's and stems. Phenolic substances have long been known as antioxidants and free radical suppressors^{15,22-25}. Free radicals are formed as a result of the body's regular metabolic activity in a live organism. Antioxidants fight pathological disorders like ischemia, anaemia, asthma, rheumatoid arthritis, inflammation, neurodegeneration, Parkinson's disease, mongolism, the ageing process, and maybe dementias by acting as free radical scavengers^{5,24}. The antioxidant activity of *Nyctanthes arbor-tritis* Linn. was

assessed using the DPPH test, free radical scavenging activity, reducing power assay, and total antioxidant capacity in a previous work. As an auspicious plant derived from natural plant sources, *Nyctanthes arbor-tritis* Linn has a high level of antioxidant activity^{24,26,27}.

Antimicrobial Activities

People nowadays rely on allopathic treatments more often, however microorganisms are developing resistant to these drugs. As a result, natural ingredients are increasingly being used as antibacterial agents. The oil extracted from the leaves, seeds, and bark has a broad spectrum of antibacterial activity against both gramme negative and gramme positive bacteria. The antibacterial activity of oil containing eugenol and its derivatives was tested using the disc plate technique against *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* and the agar well diffusion method against *Fusarium oxysporum*. The essential oil has the greatest antibacterial activity against *K. pneumoniae* and *P. aeruginosa*, with inhibition zones of 23.8 and 26.3mm at 1000g/ml, respectively. At 2500g/ml, 5-allyl-2-hydroxy-3-methoxybenzenesulfonic acid (3) was the most efficient against *F. oxysporum*, with a maximal inhibition zone diameter of 29.5mm. Harsingar essential oil, eugenol, and its derivatives may be useful antibacterial agents, assisting in the creation of natural antimicrobials to replace synthetic counterparts^{3,27}.

Hepatoprotective Activity

Hepatic problems have become important roadblocks for medicine in the twenty-first century. Hepatic tissue has a high capacity for regeneration, and damage is generally significant before it becomes apparent. Hepatic disorders present itself when hepatocyte regeneration does not keep up with damage, resulting in hepatocellular failure. In a previous study, alcoholic and aqueous extracts of *Nyctanthes arbor-tritis* leaves were found to protect the liver from the toxic effects of carbontetrachloride by lowering serum glutamate pyruvate transaminase, glutamate oxaloacetate transaminase, alkaline phosphatase, and serum

bilirubin levels. At a dosage of 200mg/kg body weight, both the alcoholic and aqueous extracts demonstrated considerable hepatoprotective effect by lowering high levels of biochemical markers. The findings were backed up by histological analyses of liver samples, which revealed that the extracts regenerated hepatocytes. A methanolic extract of *Nyctanthes arbor-tristis* leaves revealed remarkable hepatoregenerative capacity in acetaminophen-induced liver damage, according to another study. It worked by protecting against membrane fragility and prevented glutathione levels from dropping^{8-10,28,29}.

Anti-allergy activity

The use of a water soluble component of the alcoholic extract of *Nyctanthes arbor-tristis* leaves as a pretreatment for guinea pigs exposed to histamine aerosol provided significant protection against the onset of hypoxia³⁰. *Nyctanthes arbor-tristis* contains anti-allergic compounds arbortristoside A and arbortristoside C¹⁵.

Anti-Leishmanial Activity

Iridoid glucosides, arbortristosides A, B, and C, as well as 6-b-hydroxyloganin, have been linked to *N. arbor-tristis*' anti-leishmanial action. In macrophage cultures and hamster test systems, arbortristosides A, B, C, and 6-betahydroxy-loganin were proven to be anti-leishmanial *in vitro* and *in vivo*, respectively^{31,7}.

Anti-Diabetic Activity

Oral administration of chloroform and ethanolic leaf and flower extracts significantly increased superoxide dismutase (SOD) and catalase (CAT) levels, as well as a significant reduction in liver lacto peroxidase (LPO), serum SGPT, SGOT, and alkaline phosphatase, cholesterol, and triglyceride levels, when compared to diabetic controls, according to a study. When diabetic rats were administered an ethanol extract of the stem bark after being fed streptozotocin-nicotinamide, it showed considerable anti-diabetic efficacy. Blood glucose levels are reduced in a dose-dependent manner by the extract³¹⁻³³.

Immuno-Stimulant Activity

Plant extracts have been intensively researched for their putative immunomodulatory capabilities, according to a study. NA's aqueous leaf extract has been discovered to be an effective immunomodulator, as indicated by humoral and cell-mediated reactions. When challenged with SRCs and heat-killed *Salmonella* antigens, oral administration of ethanolic extract of NAT at doses of 50, 100, 150 and 200mg/kg substantially increased circulating antibody titre. Chronic treatment increased total WBC count and potentiated DTH response substantially. The extract was discovered to have 21 immune-bioactive compounds^{34,35}.

Anti-viral Activity

The ethanolic extracts, n-butanol division, and two pure chemicals arbortristoside A and arbortristoside C isolated from *N. arbor-tristis* were shown to have potent inhibitory effect against encephalomyocarditis virus (EMCV) and Semliki forest virus, respectively (SFV). At daily dosages of 125mg/kg weight, the *in-vivo* ethanolic extract and the n-butanol fraction protected EMCV-infected mice against SFV by 40% and 60%, respectively³⁶.

Sedative Activity

The hot infusion of the flowers of *Nyctanthes arbor-tristis* produces a sedative effect. A range of hot floral infusion strengths were produced and supplied orally. The sedative potential was tested two hours after treatment. Female rats did not experience a dose-dependent conscious sedation effect, however male rats did. The infusion was well tolerated even after subchronic therapy in terms of overt toxic effects, liver or kidney function, and no overt signs of reliance^{37,38}.

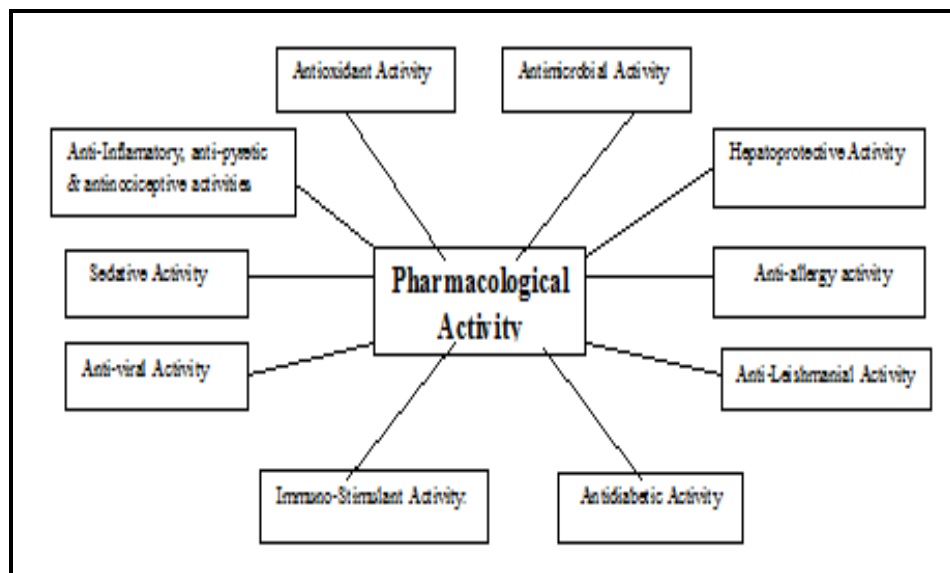
Anti-Inflammatory, anti-pyretic and antinociceptive activities

When compared to the standard medicine (Diclofenac sodium) and the untreated control, the ethanolic extract of the orange tubular calyx of *Nyctanthes arbor-tristis* and the isolated carotenoid (200mg/kg) demonstrated considerable reduction of carragenan-induced rat paw edoema. When evaluated for analgesic, antipyretic, and ulcerogenic

action, the water-soluble part of an ethanol extract of the leaves showed considerable aspirin-like antinociceptive activity but failed to induce morphine-like analgesia. The extract had an antipyretic effect in rats against brewer's yeast-induced pyrexia, and it caused dose-dependent stomach ulcers when given orally for six days³⁹⁻⁴¹.



Figure No.1: *Nyctanthes arbor-tristis*



Pharmacological activity

Phytochemical constituents

S.No	Plant part	Chemical Constituents	References
1	Leaves	D-mannitol, beta-amyrin, beta-sitosterol, hentriacontane, benzoic acid, astragalin, nicotiflorin, oleanolic acid, nyctanthic acid, friedelin and lupeol, Arborside-A, Arborside-B, C and D, Tannic acid, Glucose and fructose.	6, 7, 8, 9, 10, 11
2	Seeds	Arbortristoside A and B, Glycerides of linoleic oleic, lignoceric, stearic, palmitic and myristic acids, nyctanthic acid, 3-4 secotriterpene acid.	4, 12, 13, 14
3	Flowers	Essential oil, Carotenoids, glycosides viz β -monogentiobioside ester of α -crocetin (or crocin-3), β -monogentiobioside- β -D monoglucoside ester of α -crocetin, β -digentiobioside ester of α -crocetin flavonoids including quercetin, kaempferol, apigenin. Cardiac glucoside, nymphalin.	15, 16, 4
4	Stem	Glycoside-naringenin-4'-O- β -glucapyranosyl- α -xylopyranoside and β -sitosterol.	5, 6, 17
5	Bark	Glycosides and alkaloids	3, 4, 5
6	Stem	Glycoside-naringenin-4'-O- β -glucapyranosyl- α -xylopyranoside and β -sitosterol	5, 16, 18
7	Roots	alkaloids, tannins, glycosides, beta-sitosterol and oleanolic acid	4, 19, 20
8	Flower oil	α -pinene, p-cymene, 1- hexanol methyl heptanone, phenyl acetaldehyde, 1-deconol and anisaldehyde.	16, 21

CONCLUSION

The current study focused on the *Nyctanthes arbor-tristis* plant. It's a fragrant and beautiful plant with a variety of medicinal properties. Pharmacological effects may be found in every section of the plant. *Nyctanthes arbor-tristis* is widely available, and its collection and cultivation do not necessitate any specific circumstances. The plant *Nyctanthes arbor-tristis* has long been in high demand due to its efficacy in treating a variety of chronic and acute disorders. This study aims to highlight *Nyctanthes arbor-tristis* and its components' therapeutic potential in the prevention and treatment of illness. We may infer from this study that the reviewed studies are intended to pique the interest of researchers looking for novel medications derived from *Nyctanthes arbor-tristis* and its chemical components. The extracted chemicals will likely be examined in the future for further clinical studies and possible use as a supplement to present treatments.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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