A Literature Review on Analgesic and Anti-Inflammatory Effect of Nyctanthes Arbor Trytis (Parijat)

Abhishek Maurya*, Prof. K.K. Pandey**

Abstract

Background: An Indian medicinal plant Parijat also known as Harsingar and its scientific name is Nyctanthes arbour tristis. Nyctanthes arbor-tristis is a mythological plant; has high medicinal values in Ayurveda.

Ethnopharmacological relevance: In order to pass on their knowledge of its therapeutic uses to future generations, the locals grow this plant in their backyard gardens. Its most common medicinal uses are anti-helminthic and anti-pyretic, in addition to its use as a laxative, in rheumatism, skin disorders, and as a sedative.

Aim of the review: The current review includes an ethnopharmacological assessment with an emphasis on data on chemical components, pharmacological effects, and toxicity to identify therapeutic potential and gaps for further study.

Materials and methods: The present review is based on searches in PubMed (National Library of Medicine), google scholar and various books published on the subject during the period 1950 to 2023.

Results: Nyctanthes arbor-tristis is most important in local and traditional medicines especially in India for treating intermittent fevers, arthritis and obstinate sciatica. Crude extracts and isolated compounds from the plant were shown to be pharmacologically active against inflammation, malaria, viral infection, leishmaniasis and as an immunostimulant.

Conclusion: Most often, in-vitro or, sometimes, in-vivo models offer some evidence, particularly for the treatment of inflammatory illnesses like arthritis, fevers associated with malaria, and protozoan infections, including leishmaniasis. For crude extracts or pure chemicals, more thorough safety data must also be collected about the cardiotoxicity, immunotoxicity, and acute and subacute toxicity.

Key words: Nyctanthes arbour-tristis L., anti-analgesic, Pharmacology, Phytochemistry, pain.

Introduction

Every human wants to live a happy and healthy life. They have been very careful and aware about preserving a civilization free of sickness for this reason. When people lived in the past, they lived according to the laws of nature and were stress-free. However, individuals today are too preoccupied with their daily tasks to think about maintaining their health. They are therefore more vulnerable to several types of lifestyle illnesses.

* Ph. D. Scholar, Department of Sangyaharan, Faculty of Ayurveda, Institute of Medical Science, Banaras Hindu University, Varanasi, UP (India), Email- abhi_shekhar@bhu.ac.in

** Head & Supervisor, Department of Sangyaharan, Faculty of Ayurveda, Institute of Medical Science, Banaras Hindu University, Varanasi, UP (India).

Nyctanthes arbortristis Linn, a herb used for healing in India. It is well recognised to belong to the Oleaceae family. It is frequently referred to as "parijat," "night jasmine," and "harsingar." Greek nyctanthes means "night flower," whereas arbortristis means "sad tree" since it loses its lustre during the day.

The Ayurvedic medical system frequently employs Nyctanthes arbour tristis Linn. as a decoction for the treatment of sciatica, arthritis, knee pain, low backache and other inflammatory problems. The water-soluble component of the alcoholic Nyctanthes arbour tristis leaf extract was examined in the investigation to determine if it has anti-inflammatory properties. subacute models, NAT was found to greatly inhibit the development of granulation tissue. Additionally, it was shown that NAT reduced the inflammatory response to Freund's adjuvant arthritis and the PPD-induced tuberculin reaction. As a result, advocates of the Ayurvedic medical system employ the leaves of Harsingar for a variety of inflammatory disorders due to its anti-inflammatory properties.

The main group of physiologically active substances are the iridoid glucosides, which include Arbortristoside A, B, and C from the seeds and are effective against cancer, leishmania, inflammation, allergies, and viruses. Other compounds from leaves have been shown to have anti-leishmanial, anti-inflammatory, and anti-cancer properties, including calceolarioside A, 4-hydroxyhexahydrobenzofuran-7one, and -sitosterol. While the isolated arbortristoside-A from the seeds was found to have an LD50 of 0.5g/kg, the crude extracts were found to have an LD50 of 16gm/kg.

Vernacular Name:

Language	Name
Sanskrit	Parijata, Sephalika
English	Coral/Night Jasmine.
Hindi	Harsinghar, Harsingur, Seoli, Sheoli
Gujarati	Jayaparvati, Parijatak
Bengali	Harsinghar, Sephalika, Seoli, Sheoli
Urdu	Gulejafari, Harsingar
Tamil	Manjhapu, Pavala- Malligai, Pavazha
Kannada	Goli, Harsing, Parijata
Konkani	Pardic, Parizatak
Malayalam	Pavizhamalli, Parijatakom
Marathi	Kharbadi, Kharassi, Khurasli, Parijatak.
Oriya	Singaraharo
Punjabi	Harsinghar
Malay	Seri Gading
Telugu	Kapilanagadustu, Pagadamalle, Parijat, Sepali
Lao (Sino-Tibetan)	Salikaa
Indonesian	Srigading (Sundanese, Javanese)
Filipino	Coral Jasmine

Taxonomical Classification:

Kingdom	Division	Class	Order
Plantae	Magnoliophyta	Magnoliopsida	Lamiales

Family	Genus	Species	Binomial name
Oleaceae	Nyctanthes	Arbortristis	Nyctanthes arbor-tristis

External Morphology and Distribution

A huge shrub or small tree that may grow up to 5 metres tall that grows wild in Madhya Pradesh, the sub-Himalayas, and the Godavari area. Gardens are where it is grown for its aromatic blossoms.

A huge shrub or small tree with young, sharply quadrangular, hairy branches that is rough and covered in stiff white hairs. Leaf - opposite, 5-10 by 2.5-6.3 cm, ovate, acute or acuminate, rough and scabrous above with short bulbous hairs, densely pubescent beneath with apprised hairs, entire or with a few large distant teeth, base rounded or slightly cuneate, main leaves few, conspicuous beneath, petioles 6 mm long hairy.

Flowers

Flowers delightfully fragrant, sessile in pedunculate bracteate fascicles of 3-5, peduncles 4 angled, slender, hairy, axillary and solitary and in terminal short trichotomous cymes, 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 glabrous, rather more than 13 mm long, tube 6-8 mm long orange coloured about equalling the limb, lobes white, unequally obcordate, cuneate. Capsule: capsule 2 cm long and broad, obcordate or nearly orbicular, compressed, 2 celled, separating into two flat one seeded carpels, reticulately veined, glabrous.

Parts used

Leaves, flowers, seeds and bark.

Properties

Rasa : Tikta

Guna : Laghu, rooksha

Veerya: Ushna

Vipaka: Katu

Classical Uses in Different Ayurvedic Literature

1. **Sciatica** - Decoction of Sephali leaves prepared on mild fire alleviates severe sciatica (CD. 22.43; also B.P. Ci: 24.142).
2. **Arthritis** – decoction of Sephali is efficacious in Arthritis. Dose-Juice 10-20 ml, Decoction 50-100 ml, Alkali 1-2 gm
3. **Pain in Eye** - Intake of the bark of Parijata with oil, Sour Guru and rock salt removes pain in eyes caused by Kapha.
4. **Ringworm**- Ring worm emerged due to indigestion is alleviated immediately by rubbing with leaves of Sephali and applying the juice of the same (G.N. 2.36/33).
5. **Enlarged Uvula Tonsillitis etc**. - Chewing the root of Sephali alleviates enlargement of uvula, tonsillitis etc. (DC. 56-58; also Rm. 5.11).
6. **Prameha** - For Udakameha decoction of Parijata is the specific remedy (Su. Chi. 11.9; also, Vm - 35-3-4).

The other uses are as follows-

The fresh juice of leaves is given with honey in fever. The decoction of the leaves is recommended as a specific remedy for Gridhrasi Roga (Chakradutta - 22/41).

The leaves are used in fever, rheumatism and as an antidote for reptile venous.

The powdered seeds are used as an application for dandruff and other conditions of sealing (Wealth of India, 1996; Chopra et al.; Nadkarni, 1954).

The bark in combination with Arjun bark is considered to be useful in internal injuries and healing of wound including fractured bones (Jain, 1965).

The plant is used by tribal people in snake bite, and bites of wild animal like Jackal and dog emoliation, cancer, sores, ulcers, dysentery and menorrhagia (Jain and Trarafdar, 1970).

Chemical Composition

The N. arbor-tristis Linn. leaves showed the presence of D-mannitol (Lal and Qutta, 1933) B-amyrin, B-sitosterol, hentriacontane, benzoic acid along with free glucose and fructose (Sen and Singh, 1964). The ethanolic extract of the leaves yielded two flavonol glycosides, astragelin (Kaempherol-3-glucoside) and nicotiflorin (Kaempherol-3-rhamnoglucoside, Singh et al., 1965) and an unidentified alkaloid. Preliminary chemical study showed the traces of an alkaloid and the absence of saponins and flavonoids in the leaves (Kapoor et al., 1971), while the whole plant excluding the roots was devoid of tannins (Atal et al., 1978).

The oil from the N. arbortristis flowers contained a pinene, p-cymene, L- hexanal, methyl-heptanone, phenylacetaldehyde, L-delanol and anisaldehyde (Chandra 1970). The acetone extract of the corolla tubes yielded the B- monogentiobioside ester of acrocetin as a major component and the B-digentiobiosides ester of a-acrocetin as minor components (Dhingra et al., 1976).

Pharmacological Studies

The ethanolic extract (50%) of N. arbortristis (whole plant) showed CNS Depresunt effect and hypothermia in mice. The extract had no anti-bacterial, antifungal, antiviral, anticancer, diuretic activities or effect on isolated guinea pig ileum. Similarly, it had no effect on the CVS in experimental animals. The LDs of the extract was reported to be >1000 mg/kg I.P. in albino mice (Bhakuni et al., 1969).

The alcoholic extract of the leaves showed hypotensive and respiratory stimulant action in dogs and also potentiated hexobarbitone induced hypnosis in mice while it inhibited the contractions induced by acetylcholine, carbacol, angiotensin, prostaglandins (E1 E2, F1-α F2-a), barium chloride and potassium chloride. The extract also produced paralysis in intact Ascaridia galli worms (Sabir et al., 1974).

An alkaloid (MP 163-65°C) isolated from the leaves of N. arbortristis showed a relaxant action and also a nonspecific antispasmodic action on isolated rabbit ileum. This alkaloid had marked hypotensive action in the anaesthetized dog (Majumdar and Agrawal. 1966).

A detailed pharmacological investigation undertaken on the alcoholic extract of the leaves of N. arbor-tristis showed significant tranquilizing as well as dose dependent antipyretic effect and histamine-antagonistic and purgative activities (Saxena, 1980; Singh et al., 1984). The water-soluble portion of alcoholic extract of the leaves showed significant anti-inflammatory activity against acute, sub-acute and chronic models of inflammation in rats.

It inhibited acute oedema induced by different phlogistic agents such as carrageenin, formalin, histamine, 5 HT, and hyaluronidase in the rat hind paw. It also reduced the inflammatory swelling in the knee joint of rats induced by the intrasynovial injection of turpentine oil.

The extractive significantly reduced the granulation tissue formation in the cotton pellet test. Decrease in the granuloma formation was reported. The formaldehyde induced in carrageenin induced granuloma pouch, a dose dependant arthritis was also significantly inhibited in acute as well as in chronic phase of inflammatory swelling. The extract also inhibited the inflammation produced by immunological methods viz., Freund's adjuvant arthritis and PPD induced tuberculin reaction.

The extract suppressed the secondary lesions of adjuvant arthritis less effectively than dexamethasone. The LD50 of the extract in rats was found to be 16 g/kg (Saxena et al., 1984).

The ethanolic extract (90%) of the aerial parts of N. arbor-tristis did not show any diuretic, anti-inflammatory, hypoglycaemic, antipyretic or anticoagulant actions and had no effect on the CVS, CNS as well as isolated tissues. The LD_{50} in rats was found to be 1000 mg/kg i.p. (Sarma et al., 1978) the 50% ethanolic extract of the aerial parts showed no insecticidal activity against the housefly and flotar beetle (Atal et al., 1978) the aqueous extract of the leaves on the

other hand showed strong insecticidal action against the painted bug (Pandey et al., 1982). It had no antifungal activity against *curvularia lanata* (Bhowmick and Vardhan 1981) the leaf extract of the plant had no anti-fungal action against Alternaria alternans, instead it stimulated its growth and sporulation (Bhowmick and Chaudhary, 1982).

Bark extract of Nyctanthes arbor-tristis yielded a glycoside and two alkaloids (water soluble and chloroform soluble respectively). The glycoside increased the amplitude of the frog's heart contraction in 1 mg/kg dose whereas at higher doses, it led to an atrioventricular block. The glycoside also depressed frog CNS and stimulated the ciliary movements of the oesophagus. The alkaloids and the glycoside had no effect on blood pressure or respiration of dog (Neogi and Ahujar, 1960-61) the bark extract showed inhibition against potato virus (Singh and Singh, 1972).

A previous work was done on Parijata by or Dr. G.S. Sah et al., 1998 (Section of Sangyaharan, Department of Shalya-Shalkya) to evaluate its anti-inflammatory and hypnotic action on albino rat experimentally and find significant and clinically evaluated its analgesic action post operatively on the patients undergoing under subarachnoid block and getting significant result.

Conclusion:

In *Ayurveda*, health means the state of *Doshasamya, Agnisamya, Dhatusamya* and *Samanya Malkriya* as well as wellness of *Atmendriya* and *Mana,* which according to *Acharya Charak* is necessary to achieve *Dharma, Artha, Kama* & *Moksha,* the ultimate aim of life. But it has become quite difficult due to the various health obstacles experienced by men during his routine life. The number of pain patients are increasing day by day. As far as the treatment of various pain as Gout, Arthritis etc. are concerned various research works conducted from time to time, which had shown encouraging result, but still there are many *Ayurvedic* medicine whose effect has to be established in the management of pain; based on latest scientific parameters. *There are many* Analgesic *and Anti-Inflammatory Effect of Nyctanthes Arbor Trytis (Parijaat)* have the uses of different pain relieving, swelling, stiffness, burning, itching and other external applications etc. so finally we conclude that it is a mythological plant; has high medicinal values in Ayurveda. The popular medicinal use of this plant are anti-helminthic and anti-pyretic besides its use as a laxative, in rheumatism, skin ailments and as a sedative.

References-

1. Gupta, D., Sachdev, K., & Garg, R. (2019). A clinical study to evaluate the efficacy of Patoladi Kwath (SU. CH.) with or without Rasnadi Pradeh (CH. SU.) in cases of Vatarakta (WSR to Gouty Arthritis). *Journal of Drug Delivery and Therapeutics*, *9*(2-s), 98-110.
2. Kirtikar KR, Basu BD, Singh B, Singh MP. Indian medicinal plants 1975; 1(2):2392-93.
3. Kannan P, Ganjewala D. Preliminary Characterization of Melanin Isolated from Fruits and Seeds of Nyctanthes arbor-tristis. J Sci. Res. 2009: 1(3):655-661.
4. Nirmal, S. A., Pal, S. C., Mandal, S. C., & Patil, A. N. (2012). Analgesic and anti-inflammatory activity of β-sitosterol isolated from Nyctanthes arbortristis leaves. *Inflammopharmacology*, *20*(4), 219-224.
5. Das, S., Sasmal, D., & Basu, S. P. (2008). Anti-inflammatory and antinociceptive activity of arbortristoside-A. *Journal of Ethnopharmacology*, *116*(1), 198-203.
6. Chattopadhyay, D. (2010). Ethnomedicine: a source of complementary therapeutics. *Research Signpost, Beliaghata, Kolkata*.

7. Saxena, R. S., Gupta, B., Saxena, K. K., Srivastava, V. K., & Prasad, D. N. (1987). Analgesic, antipyretic and ulcerogenic activity of Nyctanthes arbor tristis leaf extract. *Journal of Ethnopharmacology*, *19*(2), 193-200.
8. Bibhuti Bhusan Kakoti, Paresh Pradhan, Sudarshana Borah, Kabita Mahato, Mritunjay Kumar. Analgesic and Anti-Inflammatory Activities of the MethanolicStem Bark Extract of Nyctanthes arbor-tristis Linn. BioMed Res Int. 2013, 1-6.
9. Kakoti, B. B., Pradhan, P., Borah, S., Mahato, K., & Kumar, M. (2013). Analgesic and anti-inflammatory activities of the methanolic stem bark extract of Nyctanthes arbor-tristis linn. *BioMed research international*, *2013*.
10. Faridur, R., Masum, S., Prosenjit, C., Mufruhi, S., & Choudhuri, M. S. K. (2000). Acute metabolic and chronic toxicity study of Nyctanthes arbor-tristis L. *Hamdard Medicus*, *43*(2), 19-23.
11. Pawar, N., Gadgoli, C., Kamble, M., & Panchal, S. (2016). 28-days sub-acute toxicity profile of ethanolic extract of Nyctanthes arbor-tristis calyx in rats. *Pharmacologyonline*, *2*, 163-174.
12. Dvivedi, A. K., & Sharma, A. K. (2015). Clinical evaluation of the efficacy of a herbal preparation and kativasti in the management of Gridhrasirogawsr to sciatica. *Int Ayurvedic Med J*, *3*, 22-37.
13. Debnath, S., Hazarika, A., & Sarma, J. (2023). Anti-Inflammatory Activity of Ethanolic, Hydroethanolic, Aqueous and Chloroform Extracts of Nyctanthes Arbor-Tristis Leaves.
14. Kumar, S. B. Ethnobotanical, phytochemical, medicinal and clinical properties of Nyctanthes Arbor-tristis (nat) linn: A promising medicinal p for drug discovery.
15. DM, K., Dhakne, R. B., & Patil, R. R. (2022). REVIEW OF NYCTANTHES ARBORTRISTIS AS A MEDICINAL PLANT. *Ind. J. Res. Methods Pharm. Sci*, *1*(1), 21-26.
16. Paikara, D., Singh, S., & Pandey, B. (2015). Phytochemical analysis of leave extract of Nyctanthes arbortristis. *IOSR J Environ Sci Toxicol Food Technol*, *1*(3), 39-42.
17. Bhosale, A. V., Abhyankar, M. M., Pawar, S. J., Khan, S., & Patil, N. (2009). Nyctanthes Arbortristis: A Pharmacognostic Review. *Research Journal of Pharmacognosy and Phytochemistry*, *1*(2), 91-97.
18. Sigdel, B., Khanal, D. P., & Dhungana, B. R. (2006). Phytochemical and Biological study on leaves extract of Nyctanthes arbor-tristis L. *Asian Journal of Pharmacognosy*, *5*(3), 5-14.
19. Dubey, R., Pendharkar, T., Jana, U., Satpathy, M., Hait, M., & Panda, S. R. (2019). Phytochemical Screening and Anti-Inflammatory Activity of Hydro-Alcoholic Leaf Extract of Nyctanthes Arbortristis.
20. Chamoli, R. T., Minj, S., & Singh, V. (2019). Phytochemical chemical characters of Nyctanthes arbor-tristis Linn.: A promising medicinal plant. *Journal of Medicinal Plants*, *7*(6), 141-143.
21. Bhavana, S., Vijaya, B., Amit, K., Shubhangi, K., & Parijat, S. Formulation and Evaluation of A Topical Gel Containing Dapsone and Fexofenadine HCl. *International Journal of Health Sciences*, (II), 12033-12044.
22. Shubhangi, K., Amit, K., Bhavana, B. V., & Parijat, S. (2022). Formulation and evaluation of a dapsone and fexofenadine HCl immediate release combination tablet. *Int. J. Health Sci*, *6*(S3), 9191-9205.
23. Virshette, S. J., Patil, M. K., & Somkuwar, A. P. (2019). A review on medicinal plants used as anti-inflammatory agents. *Journal of Pharmacognosy and Phytochemistry*, *8*(4), 1641-1646.
24. Dhakad, G. G., Tambe, K. P., Shirsat, S. P., & Jaiswal, N. R. (2022). Review on Medicinal use of Nyctanthes arbortristis. *Research journal of Pharmacology and Pharmacodynamics*, *14*(3), 179-182.
25. Rathore, B., Mahdi, F., Mahdi, A. A., & Das, S. K. (2017). Crocus sativus and Nyctanthes arbortristis extract modulates anti-inflammatory cytokine in experimental arthritis. *International Journal of Pharmaceutical Sciences and Research*, *8*(2), 768.
26. Yashaswini, S., Hegde, R. V., & Venugopal, C. K. (2011). Health and nutrition from ornamentals. *International Journal of Research in Ayurveda & Pharmacy*, *2*(2), 375-382.

❐