REVIEW ON NYCTANTHES ARBOR-TRISTIS (HARSINGHAR) - A HERBAL MEDICAMENT WITH SPECIAL REFERENCE TO UNANI MEDICINE

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Review Paper

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Nyctanthes arbor-tristis Linn is one of the important herbal drugs used for therapeutic purpose in India. It is described with the name 'Harsinghar' in Unani Medicine. Various parts of the plant are used medicinally to cure various diseases since centuries ago. These medicinal properties of the plant are due to the active phytochemicals present in the plant. Various chemicals have been isolated from this miracle plant having therapeutic potential possessing ethnomedical and pharmacological activities. It is a rich source of important phytochemicals like nycanthine, astringent principle, beta cortisol, coloring matter, tannins, flavonoids, cardiac glycosides, saponins and alkaloids etc. Pharmacological actions of Harsinghar include cholagogue, anthelmintic, laxative, antipyretic, diaphoretic, diuretic; for which the the plant is employed in the treatment of skin disorders, dandruff, malaria, different types of fever, hemorrhoids, palpitation, cough, excessive menstrual bleeding menstrual etc. Diverse pharmacological studies of the plant have been reported such as antimicrobial, anti-inflammatory, antidepressant, antipyretic, antioxidant activity proving the traditional claims scientifically. In this paper, an attempt has been made to summarize the information described in classical Unani texts and updated scientific research conducted on different parts of the N. arbor-tristis plant.

ABSTRACT

Nyctanthes arbor-tristis Linn is one of the important herbal drugs used for therapeutic purpose in India. It is described with the name 'Harsinghar' in Unani Medicine. Various parts of the plant are used medicinally to cure various diseases since centuries ago. These medicinal properties of the plant are due to the active phytochemicals present in the plant. Various chemicals have been isolated from this miracle plant having therapeutic potential possessing ethnomedical and pharmacological activities. It is a rich source of important phytochemicals like nycanthine, astringent principle, beta cortisol, coloring matter, tannins, flavonoids, cardiac glycosides, saponins and alkaloids etc. Pharmacological actions of Harsinghar include cholagogue, anthelmintic, laxative, antipyretic, diaphoretic, diuretic; for which the the plant is employed in the treatment of skin disorders, dandruff, malaria, different types of fever, hemorrhoids, palpitation, cough, excessive menstrual bleeding menstrual etc. Diverse pharmacological studies of the plant have been reported such as antimicrobial, anti-inflammatory, antidepressant, antipyretic, antioxidant activity proving the traditional claims scientifically. In this paper, an attempt has been made to summarize the information described in classical Unani texts and updated scientific research conducted on different parts of the N. arbor-tristis plant.

INTRODUCTION

Unani System of medicine is one of the ancient traditional system of medicine originated from Greece and based on the theoretical framework of Greek physician Hippocrates. It passed through many stages, countries, cultures and people. It is developed by Romans, Arab physicians and when it reached in India during Mughal period also enriched by Indian physicians. According to basic concepts of Unani medicine, there is a power of self-preservation and/or adjustment in an individual which is called defense constitution which gets affected in diseased conditions and needs restoration to normal by the use of various therapies prescribed in the system¹. In Unani literature, four types of therapies are described for maintaining health and treating diseases. These four therapies are Ilaj bil-Tadbeer (Regimental therapy), Ilaj bil-Ghiza, (Dietotherapy), Ilaj bil-Dawa (Pharmacotherapy) Ilaj bil-Yad (Surgery)². Pharmacotherapy involves administration of drugs to correct the disease. As per World Health Organization, 80% of the world population prefers or uses Herbal medicine for primary health care. In Unani medicine, the use of drugs employed are mainly derived from plants, for prevention and cure of

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ailments is based on the concept of holistic healing considering the individual’s psycho-physical wellbeing. Drug identification, action, uses of Mufradat (single drugs) and preparation of Murakkabat (compound drugs) are selected according to the temperament of the patient and nature of the disease. Single drugs or their combinations in raw form are preferred over compound drugs. Most of the naturally occurring drugs used in this system are safe for human use, while drugs that are toxic in crude form are first processed and purified in many ways before use to make them safer. In Unani system of medicine, numerous plant origin drugs are mentioned for medicinal purpose and it also has a unique feature of adding Musleh (corrective drug) to counter the Muzzirrat (harmful effect/toxicity) of main drugs. The plant Nyctanthes arbor-tristis Linn., commonly known as Harsinghar, is described in Unani medicine for its multi-potential pharmacological activities. It is also known for its traditional uses by the rural, mainly tribal people of India. The generic name Nyctanthes derived from two Greek words- 'Nyghta'-Night and ‘anthos’-flower, and specific name ‘arbor-tristis’ means sad tree is supposed to be derived from dull appearance of the plant during daytime. It is native to India and found abundant in outer Himalayan ranges from the Chenab to Nepal, Assam, Bengal, southwards to the Godavari and also found in Kanchanaburi province in Thailand. It is found wild in the forest of Central India and also commonly planted in the gardens for beautiful and fragrant flowers. Flower resemble with the jasmine flower. Nyctanthes arbor-tristis plant has multi-purpose uses. It is used for therapeutic purpose. An essential oil is present in the flower which is used in perfumery. Garland of flower is worn around the neck and pinned in hair as gajra by women to enhance for beautification so called Harsinghar. Juice is obtained from the flower and stalk, and preserved in a concentrated form as a purple dye. Besides, it has revealed strong prospective as a safe and natural coloring agent due to the manifestation of natural pigment ‘nyctanthin’ which can supplementary be applied in food and textile industries.

Description of the plant

N. arbor-tristis Linn. (NAT) is a small tree or shrub growing upto 15-20 feet tall with a grey flaky bark. It is a very popular flowering plant in warm, humid regions. It has somewhat round to oval, square shaped stem and shoots. Stem bark is brown, rough and white spots are found on it. Leaves are 4-sided, opposite, short petioled, quadrate or oblong, moderately thick, rough, pointed or coarsely serrate, scabrous, dark green in colour, can be easily broken, having abundant veins and lower surface is thicker than the upper surface; panicles terminal composed of small six-flowered terminal umbellets, calyx campanulate, slightly 5-notched, downy; corolla tube cylindric as long calyx, segment 5-7; involucel of four-cordate, opposite, sessile leaflets; Flowers are numerous, small, soft, fragrant, have 6-8 white petals resembling with jasmine flower, which are arranged on a reddish tubal stalk. This plant blooms during spring; and the plethora of bloom is so much that they are hardly ever without a flower during their blooming cycle and it should be grown in a bright sunny spot in warm temperatures to thrive. Flowers open towards the evening to night and fall in the morning. The fallen flowers look like a decorative carpet. Fruit/ is a dry, oblong, mucronate capsule, prominently veined, 1.25cm long and 1.25cm wide, unripe green colored, ripe in summer season and become brown, compressed, 2-celled, each of which contains a yellowish brown, thin, flat, elevated in the centre, foliaceous seed kernel of the seed is white, , bitter or tasteless and astringent.

Scientific classification:

Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Lamiales; Family: Oleaceae; Genus: Nyctanthes; Species: arbor-tristis, Binomial name: Nyctanthes arbor-tristis

Vernacular Names:

English: Weeping Nyctanthes, Night Jasmine, Coral Jasmine, Tree of Sorrow
Urdu/ Unani/Persian: Harsinghar, Harsinghar, Hadsinghar, Had jora
Sanskrit: Sephalika, Parijataka, Parijata, Rajanihassa (night smiling) and Atyuha (very sensitive)
Bengali: Sephalika, Seoli, Sheoli, Hindi: Siharu, Harsinghar;
Marathi: Kharbadi, Kharassi, Khurasli, Partaka;
Tamil: Manja-Pavelam;
Kannada: Harsin;
Telugu: Poghada, Pagadamalle, Parijat, Sepali, Punjabi: Pakura,
Oriya: Godokodiko, Gunjoseyoli, Singarabaro, Gujarati: Jayaparvati, Parijatak, Par Booti,
Oriya: Godokodiko, Gunjoseyoli, Singarabaro

Mustamul Juz (Part used):

Flowers, flower stalk and leaves. Flower, seeds, leaves, bark, fruit and gum.

Phytochemistry:

Phytochemistry of N. arbor-tristis has revealed the presence of diverse group of chemical constituents in different part of the plant. Flower yields steroids, carbohydrates, flavonoids and alkaloids apigenin, anthocyanin, D-mannitol, tannin, glucose, carotenoid, Essential Oil, Kaemferol, Nyctanthin, Glycosides, Quercetin, Rengylone, α-crocin (or crocin-3), β-monogentiobioside, βmonogentiobioside-β-D, β-digentiobioside. Oil extracted from flower contains alphapine, p-cymene, 1-hexanol methyl heptanone, phenyl acetaldehyde, 1-deanol and anisaldehyde. Alkaloids and glycosides contents are found in the bark. Leaves contain...
alkaloid nycanthine along with nannitol, β-Amyrin, β-
Sitosterol, hentriacontane, benzoic acid, mannitol, 
nycanthoside16, astragalin, nicotiflorin, oleanolic acid, 
nycanthic acid, friedelin, lupeol, astringent, resinosin 
substances, ascorbic acid, coloring matters, sugar, and traces 
of an oily substance, tannic acid, methyl salicylate, carotene, 
an amorphous resin and traces of volatile oil.20,21 Stem 
contains glycosides naringenin, 4-O-beta-glucopyranosyl-
alpha-xylopyranoside and sitosterol. Many alkaloids, tannins 
and glycosides, and beta-sitosterol and oleic acid have been 
isolated from the chloroform extract of the root. Seed contains 
Phytosterols, phenolic compounds, tannins, flavonoids, 
cardiac glycosides, saponins and alkaloids, arbor-tristisides A 
& B, nycanthic acid, nycanthoside36.

**Mizaj (Temperament)**

Gul (flower) - Barid- Yabis (Cold, Dry)12,13; Haar-2, Yabis 
(Hot-2, Dry)14

Qummah (flower stalk) - Haar-2, Yabis ((Hot-2, Dry)14

Barg (Leaf) - Haar, Yabis-1 (Hot, Dry-1)15; Barg (Leaf) and 
Chhal (Bark) - Barid (cold)14

**Muzir (Harmful effect)**

It may cause Sual (cough)19 but most of the physicians 
mentioned that it useful in cough and bronchitis/bronchial 
asthma16,18.

**Musleh (Correctives):**

Katira (Astragalus gummifer)19

**Badal (Substitute):**

Kutki (Picrorhiza kurroa)19

**Miqdar (Dose):** 1-2 gm11

**Murakkab (compound):** Habb-i Harsinghar4

**Afual (Pharmacological Actions):**

Flower and stalk are Mufarreh (exhilarant), Muqawwii-i 
Hawawas (tonic for senses), Muqawwii-i Qalb (heart 
tonic)12,13,18; Dafi-i Bukhar (antipyretic)11,16; Munaffi-i 
Balgham (expectorant), Mukhrij-i Safra wa Riyah16,18

Muqawwii-i Bah (aphrodisiac)11,12; leaf is Musaffi (blood 
purifier), Mudir-i Gaul (diuretic)14, Mushil-i Balgham 
(purgative of phlegm), Mushil-i Safra (cholagogue), 
Muqawwii-i Medi (stomachic)14, Kasir-i Riyah 
(carminative)16, Mulaiyin (laxative)12,14, Dafi-i Daad 
(antifungal)12,15; Qatil-i Deedan (Anthelmintic)14, Habis 
(astringent)14, Muwallid-i Araq (diaphoretic)12,14, Muhallil-i 
Waram (anti-inflammatory)16. Root and gum are Qawi 
Muqawwii-i Bah (strong Aphrodisiac)11,14.

**Istemaal (Therapeutic Uses):**

Quba (Ringworm)12,15, Bawaseer (haemorrhoids)11,13, Yarqan 
(jaundice)14,16, Khafaqan Haar (palpitation of hot type)18, 
Khafaqan (palpitation)19 and Fasad-i Dam (blood 
impurities)15, Humma Muzmin (chronic fever)13,19, Humma 
Murakkab (compound fever)12,14, Jhaeen (freckles), 
Chheep/Behaq (pyrosis), Waja al-Mafasil (arthritis)4, Sual 
Yabis (dry cough)14,16, Nigirs (gout)14, Khala (fracture)13,14,15,18

Deedan-i-Ama (intestinal worm)14. Amrza-i Halaq wa 
Tanaffus (diseases of throat and respiratory system)10, Iq al-
Nasa (scatica), Humma (fever) and Waja al-Mafasil 
rheumatism)11.12,14,16, malaria15, filarial fever16, cold and cough16, 
bronchitis16, and Amrza-i Ayn (eye diseases)14.

**Remedies prepared with different parts of Nychathes arbor- 
tristis for various diseases:**

Remedies prepared with different parts of Nychathes arbor-
tristis are used to cure various diseases. Naqoo (diffusion) 
of flower is beneficial for haemorrhoids11; Joshanda 
(decoction) of flowers is useful for the treatment of arthritis; 
Gul Qand (semi-solid preparation of petals and sugar) 12 gm 
is taken orally in the morning as heart tonic and to cure 
palpitation14,16. Flower oil is effective in fracture14. Seed 
are highly beneficial for dandruff12 and are also useful 
the treatment of piles and skin diseases15,16. seed kernel-12 gm 
are ground with 3 gm of black pepper, and gram sized piles are 
prepared, 3 gm along with cold water, is taken in the 
morning16,18 for 7 days14 in case of haemorrhoids; paste 
prepared with seeds and water, topically applied on scalp, is 
an effective remedy for dandruff13,14 and also used topically in 
case of pityriasis and freckles1. Leaf is Muqawwii-i Medi 
(stomachic) and is added in food recipes. Naqoo (diffusion) 
of leaf is diuretic15, Ras (leaf juice) is diuretic, laxative and 
anthelmintic14; it is used with Shehad (honey) for chronic 
fever and cough; with Misri (sugar crystal) for the treatment 
of bilious diseases; and with Namak (salt) for helminthiasis; 
fresh leaf juice is safe to use in infants as laxative12,14, 
Matbookh (decoction) of leaf is used as antipyretic and 
harmless laxative for children; leaf decoction with 
Maweez (Vitis vinifera) is beneficial for bilious fever; Joshanda 
(decoction) prepared with the leaves, young shoots of 
Neem (Azadirachta indica A. Juss)10, is beneficial for malaria 
when used in a dose of 5 ml twice daily, for 3 days12; oral 
administration of leaf decoction is useful for fever and 
scatica12; leaf extract is antihistaminic, tranquilizing and 
purgative15; for chronic fever, few new leaves are ground with 
water and used along with juice of Zanjabeel/ adrak (rhizome 
of Zingiber officinalis) avoiding the milk, fish and meat 
products during treatment12,14,18; fresh leaves are astringent 
and used with black pepper, to check the excessive menstrual 
bleeding14; moreover, paste prepared with leaves applied 
topically has been found effective for ringworm18 and is also 
beneficial for other skin diseases like freckles and pyratis12. 
Some amount of bark and 5 black peppers, are ground with
water and used orally, for bleeding and non-bleeding hemorrhoids; paste prepared with bark, Kanji (alcoholic preparation), oil, and Saindha Namak (rock salt) is beneficial in various ophthalmic disorders when applied externally over the eye; 5 grains of bark is eaten with betel-nut and leaf, for expectoration of thick phlegm. Fruit is useful for respiratory ailments; 3-4 fruits are ground and used orally with lukewarm water twice daily as full dose for cough and bronchitis for 5 days for 40 days respectively.

Scientific Studies

**Anti-inflammatory activity:**

Various studies reported that Nyctanthes arbor-tristis plant possesses anti-inflammatory activity. Saxena et al. reported anti-inflammatory activity of Nyctanthes arbor-tristis. In this study the water-soluble portion of the alcoholic extract of the leaves of Nyctanthes arbor-tristis (NAT) was screened for the presence of anti-inflammatory activity. NAT inhibited the acute inflammatory oedema produced by different agents, viz. carrageenin, formalin, histamine, 5-hydroxytryptamine and hyaluronidase in the hindpaw of rats. The acute inflammatory swelling in the knee joint of rats induced by turpentine oil was significantly reduced. In subacute models, NAT was found preventing granulation tissue formation in the granuloma pouch and cotton pellet test. Acute and chronic phases of formaldehyde induced arthritis were inhibited significantly. NAT was also found to inhibit the inflammation produced by immunological methods, viz. Freund's adjuvant arthritis and PPD induced tuberculin reaction. Another study conducted by Omkar et al. has reported potent anti-inflammatory activity of the plant. Analgesic and anti-inflammatory of β-sitosteryl isolated from Leaf of Nyctanthes arbor-tristis has been reported by Nirmal et al.

**Antioxidant activity:**

Amarite et al. reported the antioxidant activity of carotenoid obtained from the plant Nyctanthes arbor-tristis. Another study conducted on the root extracts to evaluate antioxidant activity by using different in vitro model and revealed that the Pet. Ether and hydroalcoholic extracts showed potent antioxidant activity by reducing power against the standard drug (Kaempferol). Ethanol and aqueous extract of shoot, seed and leaf of Nyctanthes arbor-tristis (Harsinghar) exhibited the antioxidant activity in DPPH scavenging antioxidant assays. Results revealed that all three aerial parts of Nyctanthes arbor-tristis possess antioxidant activity. Ethanol and aqueous extracts of shoot possessed more antioxidant activity than seed and leaf. The antioxidant activity of leaf extract of this plant has also been reported in another study. The hydroalcohol and chloroform extracts of whole plant of Nyctanthes arbor-tristis has also been reported to possess strong in-vitro and in-vivo antioxidant activity.

**Antibacterial activity:**

Harsinghar (N. arbor-tristis) is considered to have antimicrobial activities. Kumar et al., reported that ethanol leaf extract showed significant antibacterial activity on both Gram +ve and Gram -ve stains. But comparably the activity on B. subtilis was more than that of E. coli. The antibacterial activity obtained for the leaf extract was significant. The combined leaf extract of Nyctanthes arbor-tristis and Nerium oleander were also conducted in the same study which showed a synergistic effect i.e., antibacterial activity of the Nyctanthes arbor-tristis increased when used with Nerium oleander. Antimicrobial activity of seed and leaf extracts of Nyctanthes arbor-tristis against human pathogens was exhibited in a study using Muller Hinton agar. Seed extract prepared in ethyl acetate had shown positive result on Salmonella typhi and Klebsiella pneumoniae and was less effective on Streptococcus aureus. Ethanol seed extract found effective on E. coli and Streptococcus aureus; hexane seed extract showed promising result with only Klebsiella pneumonia; methanol seed extract was showed significant positive results against Escherichia coli while acetone seed extract was effective against Klebsiella pneumoniae, Streptococcus aureus and Escherichia coli. Diethyl ether seed extract showed positive result only with Streptococcus. 2- Butoxy ethanol seed extract showed positive results on Salmonella and Pseudomonas. Ethyl acetate leaf extract showed antimicrobial activity on Salmonella, Streptococcus and Pseudomonas but showed no effect on Klebsiella and E. coli. The methanol, ethanol, ethyl acetate and acetone extract of leaf showed good results. Leaf extracts showed better zone of inhibition when compared to seed extracts. Hexane leaf and seed extract were found to be least effective. Study concluded that the potent antibiotic property of leaf and seed extract of Nyctanthes arbor-tristis. The antifungal activity of extracts of different parts of (dried leaves, seeds, stem, bark and flowers) of N. arbor-tristis plant measured through ‘zone of inhibition’ of fungal growth was exhibited against three clinical fungal pathogens -Aspergillus niger, Penicillium, and Aspergillus flavus. Methanolic extracts from seed, stem, and bark part of the plant showed antifungal activity against all the three species. Distilled water extract of stem and bark showed antifungal activity against A. niger; and chloroform extract of leaves only found effective antifungal against A. flavus. In another study antifungal activity of nanoparticles of Zinc oxide synthesized on flower extract of N. arbor-tristis and zinc acetate has been reported by Jamdagni et al. The presence of phytochemicals with adequate antibacterial and antifungal efficacy can be used for the treatment of bacterial and fungal infections.
Antidepressant activity:
Tripathi et al. has reported that leaf extract of Nyctanthes arbor-tristis exhibited antidepressant activity. Another study was conducted by Tripathi et al. to evaluate the anxiolytic activity of leaf extract of N. arbor-tristis in animal model, and revealed promising results. Das et al. reported that leaf, seed and bark of the N. arbor-tristis are helpful in decreasing dopamine and increasing the serotonin level, depicting CNS depressant activity. In another study in which antidepressant effects of hydro alcoholic leaf extract (250 & 500 mg/kg) (NTL), flower extract (250 & 500 mg/kg) (NTF) and combination extract (leaf and flower extract in equal ratio) of Nyctanthes arbor-tristis (NAT) were evaluated viz. forced swim test in animal model. All extracts demonstrated a significant reduction of immobility time. Statistically remarkable differences in immobility time in groups treated with combination extract compared to groups treated with leaf and flower extract alone is observed and study concluded that the hydro alcoholic extracts showed remarkable antidepressant effect and may help in discovery of new intervention for anxiety and depression.

Antidiabetic activity:
A study was conducted to investigate the antidiabetic activity of ethanol extract of stem bark of Nyctanthes arbor-tristis L. in streptozotocin (STZ) - nicotinamide induced diabetes in rats and compared with controlled group. Ethanol extract of stem bark of Nyctanthes arbor-tristis was administered orally in diabetic rats. It was found that it significantly lowered the blood glucose level in a dose-dependent manner. In glucose tolerance test, the extracts at the doses of 250 and 500 markedly reduced the external glucose load. The antidiabetic activity of (EENA) was comparable to that of diabetic control drug. In another study, antidiabetic activity of ethanol extracts of aerial stem and leaves of N. arbor-tristis plant was studied subjected to the ethanol extraction using Soxhlet method in rats. The ethanol extract and glipizide provoked a significant fall in the blood sugar level in normoglycemic and glucose loaded rats.

Hypoglycemic and hypolipidemic activity:
In a study hypoglycemic and hypolipidemic activity of boiled aqueous extract of flowers (AEF) of Nyctanthes arbor-tristis has been reported in mice. Animals were orally administered with 500 mg/kg and 750 mg/kg of AEF, and glucose tolerance was performed before and after glucose challenge. In vitro alpha-amylase assay and glucose absorption from the gastrointestinal tract were also performed using 500 mg/kg of the extract. In addition, glycogen content in the liver and skeletal muscles, a complete lipid profile assay, and toxicological and biochemical parameters were conducted. It was observed that 500 mg/kg and 750 mg/kg of AEF significantly reduced fasting blood glucose levels (39%) respectively at 4 h post-treatment, while 500 mg/kg of AEF also decreased the random blood glucose level significantly by 32%. AEF significantly inhibited glucose absorption (85%) from the intestine and exhibited inhibition of alpha-amylase enzyme activity. It also decreased the level of total cholesterol (44.8%), triglyceride (53%) and increased (57%) the high-density lipoprotein cholesterol depicting its hypolipidemic activity.

Anti-proliferative activity:
In a study, antiproliferative potentials of different fractions (hexane, chloroform, ethyl acetate, methanol) of flower extract of N. abor-tristis was shown using 3T3-L1 cells, primary peripheral blood mononuclear cells (PBMC) isolated from healthy and adult acute myeloid (AML) and chronic lymphocytic leukemia (CLL) patients, recombinant Jurkat T cells, and MCF7 cell lines. Inhibition of the 3T3-L1 cells differentiation was observed in the ethyl acetate and chloroform fractions, followed by the hexane fraction. Antiproliferative analyses revealed that Nyctanthes exerted a high specific activity against anti-AML and anti-CLL PBMC cells, especially by the hexane and ethyl acetate fractions, demonstrating the feasibility of N. abor-tristis in developing new drug leads against leukemia. In another study phytochemical contents of the plant extracts were investigated for radical scavenging activity and total reducing power of a poly herbal formulation containing leaves of Nyctanthes arbor-tristis, unripe and ripe fruit pulp of Aegle marmelos, and the terminal meristem of Musa paradisiaca flower in the ratio 6:2:1:1 (Poly Herbal Formulation (PHF 1) and 1:1:1:1 (Poly Herbal Formulation (PHF 2). Results revealed that PHF1 exhibited more potent anti-elastase against fibroblasts cells that can be used in reducing the process of skin aging, and PHF 2 found more cytotoxic against malignant melanoma cells.

Anthelmintic activity:
Ansari et al., reported anthelmintic activity of aqueous, chloroform and acetate, extract of leaves of Nyctanthes arbor-tristis against Indian earth worm Phereria posthuma. The result revealed that all tested extract of Nyctanthes arbor-tristis showed anthelmintic activity in a dose dependant manner. Among the all extract, acetone extract at 0.5mg/ml concentration showed most promising anthelmintic activity.

Antipyretic Activity:
Harsinghar (N. arbor-tristis) is known for its antipyretic action since centuries ago. A study was carried out to reveal antipyretic activity of N. arbor-tristis in various dosage forms. Tablet, liquid oral and suspension dosage forms of dried leaves of Nyctanthes arbor-tristis and dried unripe fruits of Piper nigrum in combination, were tested in Brewer’s yeast-induced pyrexia in rabbits. For the purpose, significant values for protection against increasing rectal temperature were observed.
in animals. Study concluded that liquid oral and tablet dosage forms possess good antipyretic property as well as no significant signs of systemic toxicity and death was also noted in Wistar albino rats\(^9\). In another study, antipyretic activity of whole plant extract of *Nyctanthes arbor-tristis* has been reported in yeast-induced pyrexia in albino rats\(^9\). Saxena, *et al* reported the analgesic, antipyretic and ulcerogenic activity of Hydroalcoholic extract of leaves of *Nyctanthes arbor-tristis*\(^9\). Antipyretic activity and hepatoprotective effect of Petroleum ether and methanol extracts of bark of *N. arbor-tristis* has been reported against Brewer’s Yeast induced pyrexia and Carbon tetrachloride (CCl4) induced hepatotoxicity in mice model respectively\(^9\).

**Wound healing activity:**
Wound healing activity in methanolic extract of *Nyctanthes arbor-tristis* leaves was exhibited on tensile strength of the skin having incision wound in Wistar albino rats. The animals were divided into 3 groups i.e. control, standard and testing group. A full thickness of incision wound of circular area (approx. 500 mm\(^2\) and 2 mm depth was made on back of the anaesthetized rats. The control group was treated with simple ointment base B.P. The standard group was treated with Betadine 5% (w/w) ointment. The test group was treated with ointments with methanolic extract of *N. arbor-tristis* 2% (w/w) incorporated in simple ointment base, for 16 days. Development of granulation tissues in rats treated with ointment containing 2% (w/w) methanolic extract exhibiting wound healing activity of *N. arbor-tristis* extract\(^9\).

**CONCLUSION**
*Nyctanthes arbor-tristis* is a very important medicinal plant and has been used in Unani medicine and folklores for the treatment of number of diseases such as fever, palpitation, jaundice, bronchitis, haemorrhoids, malaria, ringworm, dandruff, etc. Many chemical compounds isolated from the plant and phytochemical analysis demonstrates that due to presence of mentioned phytochemical components the plant is useful in different health problems. It has been very much used for their health care and practices in rural part of India due to its easy accessibility. Botanical and physico-chemical standardization of *Habb-e-Harsingar* – A Unani formulation has been carried out by the researchers of Central Council for Research in Unani Medicine to set its standards for quality assurance for global marketing. However, *N. arbor-tristis* still remains a plant for further research studies. The plant needs to be researched on molecular basis to unmask its potential and more formulations can be proposed and used practically for treatment of several ailments.

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