

Phytochemical Screening & Anthelmintic Activity of Flower Extract of *Nyctanthes Arbor-Tristis*

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ABSTRACT

Nyctanthes arbor-tristis Linn (commonly known as Night-flowering Jasmine), belonging to the family Oleaceae, is known for its extensive traditional medicinal use by the rural, mainly tribal people of India along with its use in Ayurveda, Sidha, and Unani systems of medicines. Traditionally, whole plants and different parts have used as an herbal remedy for treating sciatica, arthritis, malaria, enlargement of spleen and as blood purifier. The beautiful white flowers are bitter in taste and are used as stomachic, carminative, astringent to bowel, anti-bilious, expectorant, hair tonic and in the treatment of piles and various skin diseases. Recent pharmacological studies showed anti-spasmodic, antioxidant, anthelmintic, cytoprotective, anti-diabetic, anti-leishmanial, CNS depressant activity of the flower extract. In the present study, the different parameters studied helps in the standardization of the leaves & the methanolic extract shows potent anthelmintic activity which may be due to presence of alkaloid in the extract. As a there is no evidence was found for the anthelmintic activity of flower.

KEYWORDS: *Nyctanthes arbor-tristis* L, anthelmintic activity, Phytochemical screening

INTRODUCTION

Nyctanthes arbor-tristis Linn (commonly known as Night-flowering Jasmine), belonging to the family Oleaceae, is known for its extensive traditional medicinal use by the rural, mainly tribal people of India along with its use in Ayurveda, Sidha, and Unani systems of medicines. Traditionally, whole plants and different parts have used as an herbal remedy for treating sciatica, arthritis, malaria, enlargement of spleen and as blood purifier. . *N. arbor-tristis* is a deciduous tree grows up to 10 m tall, with quadrangular branches and grey or greenish-white rough bark. The leaves are rough, hairy, decussately opposite, and simple. The flowers are arranged at the tips of branches. It grows well in loamy soils. The plant requires conditions varying from full sunlight to partial shade and needs to be watered regularly Flowering usually occurs from July to October. The whole plant is of medicinally useful

The beautiful white flowers are bitter in taste and are used as stomachic, carminative, astringent to bowel, anti-bilious, expectorant, hair tonic and in the treatment of piles and various skin diseases. Recent pharmacological studies showed anti-spasmodic, antioxidant, anthelmintic, cytoprotective, anti-diabetic, anti-leishmanial, CNS depressant activity of the flower extract. However, very few reports are available regarding antistress or stress scavenging activity or antioxidant activity of the flower extract of this plant. Therefore, the present study was aimed to assess the modulatory response of flower extract of *Nyctanthes arbor-tristis* on the cellular antioxidant status in lymphocytes exposed to oxidative stress induced by hydrogen peroxide (H₂O₂) and tried to correlate with oxidative stress induced membrane damage

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Anthelmintics or antihelminthics are drugs that expel parasitic worms (helminths) from the body, by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing). The ability of worms to survive treatments that are generally effective at the recommended dose rate is considered a major threat to the future control of worm parasites of small ruminants and horses. Helminthes infections are now being recognized as cause of many acute as well as chronic ill healths among the various human beings as well as cattle's. More than half of the population of the world. Infections with helminth are among the most widespread infections in humans and other domestic animals affecting a large number of world population.

The majority of these infections due to worms are generally restricted mainly to the tropical regions and the occurrence is accelerated due to unhygienic lifestyle and poverty also resulting in the development of symptoms like an aemia, eosinophilia and pneumonia. Parasitic diseases cause ruthless morbidity affecting principally population in endemic areas. The gastrointestinal helminthes becomes resistant to currently available anthelmintic drugs therefore there is a foremost problem in treatment of helminthes diseases. Therefore, the sensitive anthelmintics from plant resources must be developed.



Figure No:-1 Whole Plant of *N. arbortristis*

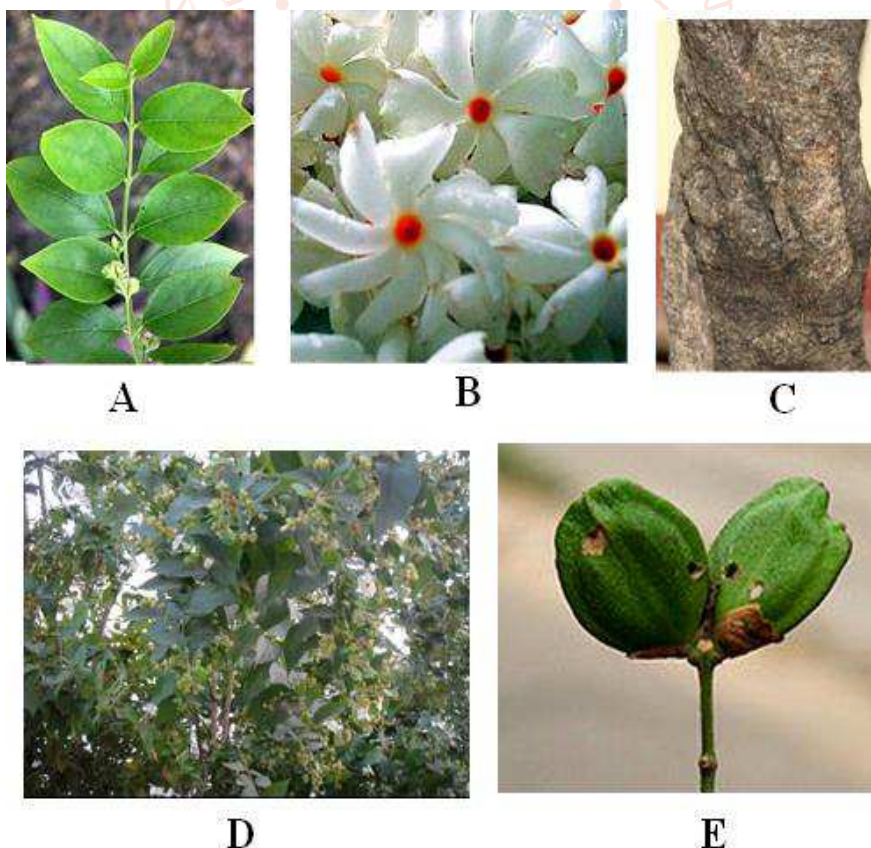


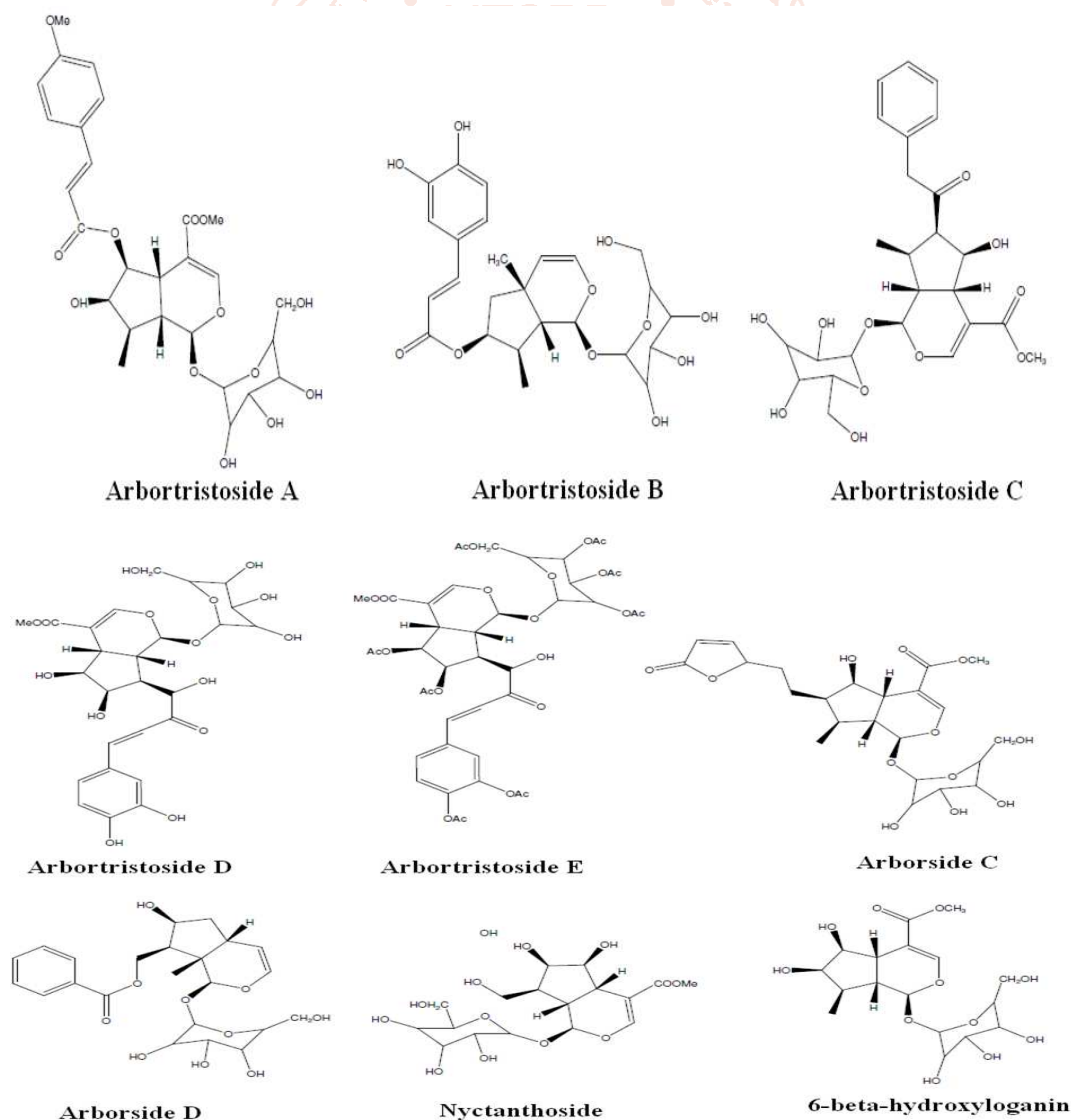
Figure No:-2 (A) Leaves, (B) Flower, (C) Bark, (D) Whole Plant, (E) Fruits & Seeds.

Chemical Constituents-

A variety of constituents belonging to different chemical classes such as terpenes, steroids, glycosides, flavonoids, alkaloids and aliphatic compounds have been isolated. characterized from different parts of *N. arbortristis*. The secondary metabolites such as glycosides and alkaloids are the largest groups of chemicals produced by this plant. The glycosides are iridoid glycosides and phenylpropanoid glycosides. Iridoid glucosides, arbortristoside A, B, D and E have been isolated from the seeds these possess immunomodulatory and anti-leishmanial activities.

| Plant Parts | Phyto-constituents |
|-------------------|--|
| Bark | Alkaloids, Glycosides. |
| Flower oil | Anisaldehyde, Phenyl acetaldehyde, p-cymene, 1-deconol, 1- hexanol methyl heptanone, α -pinene. |
| Flowers | Apigenin, Anthocyanin, D-Mannitol, Tanninm, Glucose, Carotenoid, Essential Oil, Kaemferol, Nyctanthin, Glycosides, Quercetin, Rengylone, α -croctin (or crocin-3), β monogentiobioside, β -monogentiobioside- β -D, β -digentiobioside. |
| Leaves | Ascorbic Acid, Benzoic Acid, Carotene, D-Mannitol, Flavanol Glycosides-Astragaline, Friedeline, Fructose, Glucose, Iridoid Glycosides, Lupeol, Mannitol, Methyl Salicylate, Nicotiflorin, Nyctanthic Acid, Oleanolic Acid, Tannic Acid, β -Sitosterole. |
| Seeds | 3-4 Secotriterpene Acid, a Pale Yellow Brown Oil (15%), Arbortristoside A & B, Glycerides of Linoleic Oleic, Lignoceric, Myristic Acids, Nyctanthic Acid, Palmitic, Stearic. |
| Stem | Glycoside-naringenin-4'-O- β -glucapyranosyl- α -Xylopyranoside, β -sitosterol. |

Table.No-1 Phyto-constituents present in various parts of plant.

Structure:

Physico-chemical properties of *Nyctanthes arbortristis* leaves -

Physico-chemical properties of arbortristis leaves fat were determined to be 2.10%. The leaves were of dark green colour. It is a viscous semi solid substance at room temperature. Acid value of *N. arbortristis* leaves were found to be 76.27. High acid value indicates that this oil is inedible. The iodine values of *N. arbortristis* leaves were found to be 134.44. The result indicates that *N. arbortristis* leaves are highly unsaturated. The *N. arbortristis* leaves contained (Table 2) moisture 50.01%, ash 13.98%, lignin 15.87%, crude fiber 9.41%, fat 2.10%, protein 15.02% and carbohydrate 9.48

| S. No | Chemical components | Result |
|-------|---------------------|------------------------------|
| 1 | Colour | Dark green |
| 2 | Appearance | Viscous semi solid substance |
| 3 | Moisture | 50.01% |
| 4 | Ash | 13.98% |
| 5 | Lignin | 15.87% |
| 6 | Crude fibre | 9.41% |
| 7 | Fat | 2.10% |
| 8 | Protein | 15.02% |
| 9 | Carbohydrate | 9.48% |
| 10 | Acid value | 76.27 |
| 11 | Iodine value | 134.44 |

Table.No-2 Physico-chemical properties of *Nyctanthes arbortristis* leaves.

Medicinal Uses of *Nyctanthes arbortristis*-

Some of the medicinal attributes of various parts of plant have been summarized in (Table.3). However apart from these uses, there are several reports on pharmacological actions of *Nyctanthes arbortristis*.

| Sr.no. | Part Used | Pharmacological Effect |
|--------|------------|--|
| a) | Bark | Anti-Microbial |
| b) | Flower Oil | Perfume |
| c) | Flower | Anti-Bilious, Anti-Filarial, Anti- Inflammatory, Antioxidant, Diuretic, Sedative Ophthalmic, Dyspepsia. |
| d) | Leaves | Anthelmintic, Antibacterial, Antifungal, Antioxidant, Anti-pyretic, Asthma, cough, Nausea, Ringworm. |
| e) | Seeds | Antibacterial, Antifungal, Alopecia, Antileishmanial, Hair Tonic, Piles. |
| f) | Stem | Antioxidant, Antipyretic, Bronchtis, Snakebite. |

Table.No-3 Pharmacological Activity shown by Different Parts of *Nyctanthes arbortristis*.

METHOD-**Preparation of extract-****Aqueous extract (Maceration method)**

The plant flowers were dried in shade, pulverized and then powdered material of (500gm) were kept for maceration with 1000 ml of double distilled water for 24 hours. The extract was double filtered by using muslin cloth and Whatmanno.1 filter paper and concentrated by evaporation on water bath. The extract was dried and used as a powder. The percentage yield of extract was found to be about 4%.

Methanol soluble extractive value:

5 grams of air-dried tuber powder of *Nyctanthes* flower was macerated with 50 ml of methanol in a closed flask, shaking frequently during the first 7 days, and allowed to stand separately. Thereafter, it was filtered rapidly taking precaution against loss of methanol. Evaporated 25 ml of filtrate to dryness in a tarred flat bottom shallow

dish dried at 105 °C and weighed. Percentage of alcohol soluble extractive was calculated with reference to the air dried drug.

ANTHELMINTIC ACTIVITY- PROCEDURE-

Experimental Model-

The anthelmintic activity was observed according to the method described by Kailashraj and Kurup (1962)15. Six earthworms, *Pheretimaposthuma* of nearly equal size (8±1cm) were placed in each petri dishes containing 15ml of normal saline and different dilutions (0.1%, 0.2%, and 0.5%) of the extracts and the standard piperazine citrate with normal saline. The time taken by the worms to become motionless, considered as paralysis was recorded.

The lethal time was recorded by observing the time taken to become motionless on repeated application of external stimuli by pricking a pin. In the similar manner the experiment was repeated with all the extracts at different dilutions along with 0.1 ml atropine and the time taken by the worms for paralysis and the lethal time were recorded.

Anthelmintic Activity-

Four groups of approximately equal size earthworms consisting of six earthworms in each group were used for the present study. Group first serve as control, receive only normal saline; Group second serve as standard, receive standard drug piperazine citrate of different concentration. Observations were made for the time taken to paralysis and death of individual worms. Paralysis was said to occur when the worms do not revive even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body color. The results were analysed for statistical significance.

RESULT AND DISCUSSION:

1. Preliminary Pharmacognostic Characteristics:

In present study, the wall flower plants were investigated for its macroscopic characteristics.

| Sr. No | Parameter | Observation of flower |
|--------|-----------|-----------------------|
| 1 | Colour | White |
| 2 | Odour | Characteristics |
| 3 | Taste | Characteristics |

Table.No-4 Preliminary Pharmacognostic Characteristics

| Sr.no | Physical Constants | Nyctanthes arbortristis |
|-------|---|-------------------------|
| 1 | <ul style="list-style-type: none"> Extractive Values (%w/w) Methanol soluble extractive | 1.70 |

Table.No-5 Physical Constants of Flower

For Paralysis-

| Nyctanthes Arbortristis of Flower | % Conc. | Without Atropine | With Atropine |
|-----------------------------------|---------|------------------|---------------|
| | 0.1 | 179.19(min) | 6.9(min) |
| | 0.2 | 125.26(min) | 5.5(min) |
| | 0.3 | 102.20(min) | 4.8(min) |
| | 0.4 | 97.60(min) | 3.5(min) |
| | 0.5 | 94.50(min) | 2.0(min) |

For Death-

| Nyctanthes Arbortristis of Flower | % Conc. | Without Atropine | With Atropine |
|-----------------------------------|---------|------------------|---------------|
| | 0.1 | - | 20.5(min) |
| | 0.2 | - | 12.75(min) |
| | 0.3 | - | 9.75(min) |
| | 0.4 | - | 7.65(min) |
| | 0.5 | - | 4.30(min) |

Table.No-6 Anthelmintic Activity of Nyctanthes Arbortristis of Flower

For Paralysis-

| Treatment | % Conc. | Without Atropine | With Atropine |
|---------------------------|---------|------------------|---------------|
| Piperazine Citrate | 0.1 | 78(min) | 11.5(min) |
| | 0.2 | 68.20(min) | 07(min) |
| | 0.3 | 54.17(min) | 05.17(min) |
| | 0.4 | 49.20(min) | 03.25(min) |
| | 0.5 | 38.50(min) | 01.50(min) |

For Death-

| Treatment | % Conc. | Without Atropine | With Atropine |
|---------------------------|---------|------------------|---------------|
| Piperazine Citrate | 0.1 | - | 24.25(min) |
| | 0.2 | 275.75(min) | 22.50(min) |
| | 0.3 | 250.50(min) | 20.25(min) |
| | 0.4 | 242.75(min) | 18.50(min) |
| | 0.5 | 232.50(min) | 16.00(min) |

Table.No-7 Anthelmintic Activity of Standard Drug



Figure No:-3 Concentration of normal saline solution of flower extract of Nyctanthes arbortristis showing Anthelmintic activity

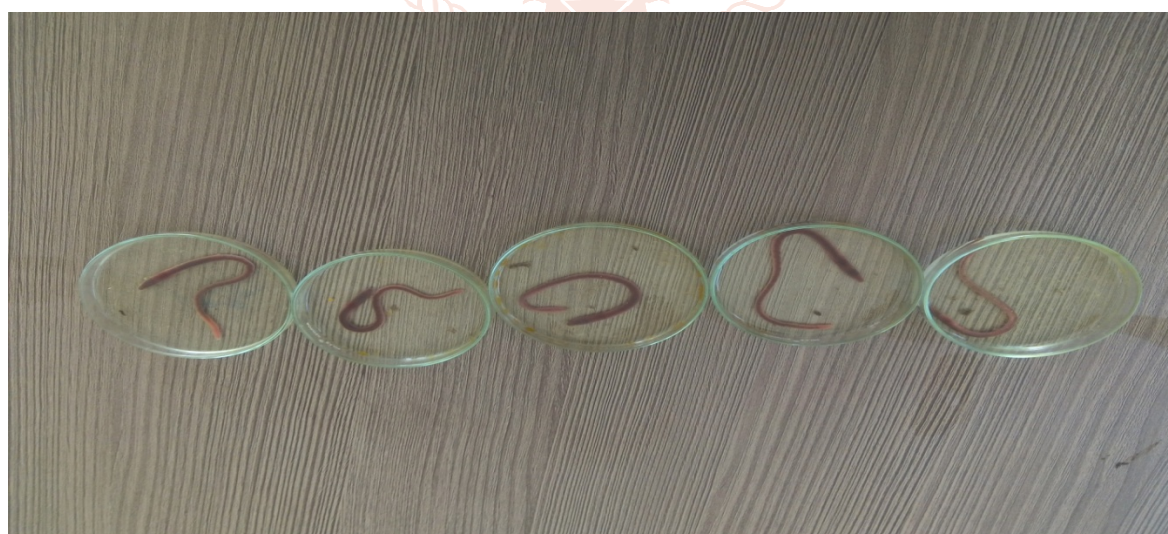


Figure No:-4 Standard drug Piperazine Citrate with normal saline solution.

DISCUSSION:

Flower of *Nyctanthes arbortristis* were obtained from local area and preliminary pharmacognostic study was carried out and mentioned in table no.1 Powder of flower were extracted by means of successive

extraction where, Methanol extracts were obtained and % yield of each extract were calculated & result were mentioned in table No.5. The present study was undertaken on the anthelmintic activity of the methanolic extracts of different plant parts of

Nyctanthes arbortristis Lin. The methanolic extracts of the seeds and flowers of *Nyctanthes arbortristis* L have more potent anthelmintic activity than that of the barks and leaves, but less than that of the standard drug piperazine citrate.

CONCLUSION:

The phytochemical analysis of the extract revealed the presence of alkaloids, flavonoid, carbohydrates, amino acid, sterol etc. Phytochemical and anthelmintic test result obtained in this work in combination with previously reported literature by different authors validate to some extent the use of *Nyctanthes arbortristis* of flower in traditional medicine in treating diseases of anthelmintic origin thus demonstrating potential of this plant.

In the present study, the different parameters studied helps in the standardization of the leaves & the methanolic extract shows potent anthelmintic activity which may be due to presence of alkaloid in the extract. As there is no evidence was found for the anthelmintic activity of flower. Hence, this study proved that the leaves of given plant show anthelmintic activity.

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