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# ANTIMICROBIAL ACTIVITY OF *NYCTANTHES ARBOR-TRISTIS LINN* FLOWER AGAINST BACILLUS CEREUS AND ESCHERICHIA COLI

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## ABSTRACT

This study explores the medicinal properties of *Nyctanthes arbor-tristis linn* (Night Jasmine), focusing on its pharmacognostic, phytochemical, and pharmacological aspects. The plant, widely used in traditional medicine, contains bioactive compounds such as flavonoids, tannins, alkaloids, glycosides, and saponins, which contribute to its antimicrobial, anti-inflammatory, antioxidant, sedative, CNS depressant, and anti-spasmodic properties. Physio-chemical analysis was conducted to determine moisture content, ash values, and extractive values. The antimicrobial activity of ethanol extracts was tested against bacterial strains like Escherichia coli and Bacillus cereus using the disc diffusion method, demonstrating significant antibacterial potential. The study reinforces the therapeutic value of *Nyctanthes arbor-tristis linn* and its potential for future drug development.

**Keywords:** *Nyctanthes arbor tristis linn* flower, Ethanol extraction, Antimicrobial activity, Disc diffusion method.

## INTRODUCTION

Medicinal plant life has diverse antimicrobial marketers, which can be powerful towards a wide variety of microbes, that's why maximum medicinal plant life is broadly used for ailment control as an entire and, on occasion, the special components of the plant.

Sometimes extracts of various solvents are organized to test the antimicrobial activity (anti-bacterial activity). Such medicinal plant life displays their significance due to the fact because of non-stop use of selective antimicrobial marketers, the microbes will be inclined to expand resistance residences of their unique due to the R-gene gift because the more chromosomal DNA of Bacteria and different microbes, in this case, maximum of the medical groups are searching out special medicinal plant life to collect special lively compounds and unique residences to create new composition and goal the diverse, unique components of microbes, mainly microorganism to kill and inhibit the boom of microorganism to manipulate bacterial ailment. Nyct*anthes arbor-tristis linn*, additionally known as Harsingar and Parijat, belongs to the own circle of relatives Oleaceae. Various preceding investigations have proven that

*Nyctanthes arbor-tristis linn* has anti-bacterial, antifungal, antiviral, analgesic, and antipyretic residences. These plant life additionally have antimalarial, antihelminthes, and antiallergic residences. Several latest researches display that this plant additionally has anti-oxidant and liver protecting residences. In this study work, the leaves of those plants that lives from special geographical places are accrued and examined for antimicrobial activity, mainly anti-bacterial residences towards Staphylococcus aureus, Streptococcus pyrogens, Pseudomonas aeruginosa, and Salmonella typhi.

**Nyctanthes arbor-tristis:** *Nyctanthes arbor-tristis* linn is likewise known as night flowering jasmine, parijat, and shiuli. It belongs to the own circle of relatives of Oleaceae. This plant is observed in South Asia and Southeast Asia. This is a small tree that grows 10-30 ft lengthy. It is also used for blood purified, phytochemical analysis of plants revealed presence of flavonoids, tannins, saponins, glycoside, alkaloids, steroids and phenolic compounds which are responsible for these pharmacological action of the plants. It present investigation aims to evaluate the pharmacognostical studies such as morphology, transverse section (TS) of flower Arbor-Tristis.


**Plant of Nyctanthes arbor-tristis**

## MATERIALS AND METHODS

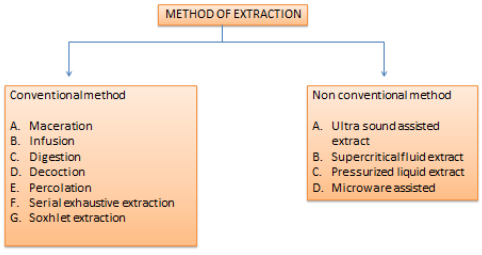
## COLLECTION OF SAMPLES OF NYCTANTHES ARBORTRISTIS FLOWER

The sample *Nyctanthes arbor-tristis linn* flower was collected by the near sandhapettai Street area santhur krishnagiri district.

## EXTRACTION

It is a Isolation process which involves the separation of medicinally active portions of plant from the Extraction inactive or inert components by using selective solvents in standard extraction procedures. In this method the wanted components are dissolved by the use of selective solvents known as menstrum & undissolved part is a mare. After the extraction unwanted matter is removed. Extracts are prepared by using suitable solvent.

## METHOD OF EXTRACTION




In this study, maceration extraction is used for ethanol extract of flower of *Nyctanthes arbor-tristis linn.*

**Maceration extraction**

In this process, the whole or coarsely powdered crude drug is placed in a stoppered container with the solvent and allowed to stand at room temperature for a period of at least 7 days with frequent agitation until the soluble matter has dissolved. The mixture then is strained, the marc (the damp solid material) is pressed, and the combined liquids are clarified by filtration or decantation after standing.

**Procedure**

25grams of air dried tuber powder of Nyctanthes flower was macerated with 50ml of ethanol 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 material evaporated 25ml of filtrated to dryness in a tarred flat bottom shallow dish dried at 105°C and weighted Percentage of alcohol soluble extractive was calculated with refer air dried drug.

**Maceration extraction**

## RESULT AND DISCUSSION

## PHARMACOGNOSTICAL EVALUATION STUDIES

The pharmacognostical study is the major and reliable criteria for identification of plant drugs. The pharmacognostical parameters are necessary for confirmation of the identity and determination of quality and purity of the crude drug. The detailed and systematic pharmacognostical evaluation would give valuable information for future studies.

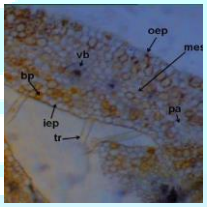
**Macroscopic Evaluation**

The macroscopic characteristics of flower were observed (appearance, fracture, color, odor, scale, shape, texture, taste). The technique described by Trease and Evans was used to perform quantitative microscopy.

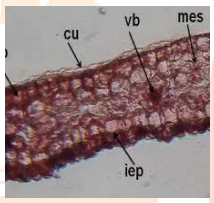
- **Part** : Flower
- **Color** : Orange-white flowers
- **Odour** : Sweet aromatic
- **Taste** : Bitter
- **Size** : 6-11 cm long by 2-6 cm wide
- **Texture** : Smooth
- **Shape** : 5-8lobed corolla
- **Apex** : Shefali
- **Venation** : Unicostate and reticulate

## Microscopical evaluation

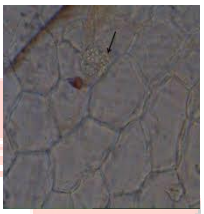
Microscopy of petals and corolla tube as per the folklore uses the corolla of the flower was only studied for the current investigation. The corolla consist of petals (Limb) and the corolla tube. The Corolla tube is It is tangentially elongated (15 – 22.5 µm in length and 45 – 48 µm in breadth) compactly arranged covered with thick cuticle and is papillose. Few cells are larger than the others. The outer epidermis is interrupted by anomocytic stomata. The frequency of stomata is more on outer epidermis than the inner epidermis. Mesophyll region It is thin layer and consists of three layers of parenchymatous cells, (30 - 45 µm in diameter) with intercellular space and poorly developed vascular bundles at intervals. The cells are filled with abundant oil globules. Inner epidermis It is warty, with compactly arranged cells covered with cuticle (30µm in length and 30 - 45 µm in breadth). The inner epidermis also shows presence of anomocytic stomata. (Figure 3) T.S. of flower passing through corolla tube Outer epidermis It is single layered compactly arranged (15 – 22.5 µm in length and 30 µm in breadth) and covered with thick cuticle. Few of the cells are pigmented. Mesophyll region It is made up of polygonal to polyhedral parenchymatous cells arranged (15 – 30 µm in diameter). Many of the cells are filled with amber coloured granular deposits. It also possesses prismatic calcium oxalate crystals, tannins and oil globules. Vascular bundles are present at intervals with xylem and phloem. Inner epidermis The cells of inner epidermis is compactly arranged and covered with cuticle. The corolla tube on the outer side is smooth walled but the tube at the inner side is rough due to the presence of unicellular trichomes. Few cells enlarge and form a parenchymatous appendage with vascular bundle




T.S. of flower passing through petals, oep-outer epidermis, cu-cuticle, mes-mesophyll tissue, vb-vascular bundle.



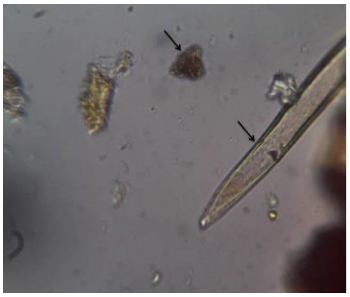

Anomocytic stomata.



T.S. of flower passing through corolla tube, oep – outer epidermis, cu-cuticle, mes-mesophyll tissue, vb - vascular bundle, bp – brown pigment, pa – parenchyma cell.

## Powder microscopy

The flower powder is orange red in colour, with bitter taste and aromatic odour. In microscopic study, it shows non-glandular unicellular trichomes, tannin filled cells, anomocytic stomata, oil globules, pollen grains and amber coloured pigments.



Powder microscopy showing trichome and brown pigment.

## Physiochemical evaluation studies

The quantitative determination of some pharmacognostical parameters is useful for setting standards for crude drugs. The physical constant evaluation of the drugs is an important parameter in detecting adulteration or improper handling of drugs. The moisture content of the drug is not too high; thus, it could

discourage bacterial, fungi or yeast growth. Equally important in the evaluation of crude drugs, is the ash value and acid-inoluble ash value determination. The total ash is particularly important in the evaluation of purity of drugs and the presence or absence of foreign inorganic matter such as metallic salts and/or silica. The results of physicochemical parameter analysis of crode powder are *Nyctanthes arbor- tristis linn* shown in.

**Physiochemical Analysis *of Nyctanthes arbor- tristis linn.***

| S.NO | PARAMETERS | (%) w/w |
|---|---|---|
| 1. | Total ash | 7.14% |
| 2. | Acid insoluble ash | 24.16% |
| 3. | Water soluble ash | 30.30% |
| 4. | Sulphated ash | 58.33% |
| 5. | Loss on drying | 10.10% |

**Preliminary Phytochemical screening**

Phytochemical analysis was done in *Nyctanthes arbor-tritis linn* extracts to access various phyto-constituents present Carbohydrates, Alkaloids, Glycosides, Tannins, Flavonoids, Saponins and Starch.

| S.NO | Phytoconstituents | Results (Presence/Absence) |
|---|---|---|
| 1. | **Carbohydrates** | + |
| 2. | **Flavonoids** | + |
| 3. | **Alkaloid** | + |
| 4. | **Tannins** | + |
| 5. | **Glycosides** | + |
| 6. | **Starch** | + |
| 7. | **Saponins** | + |

**Result : + Present**

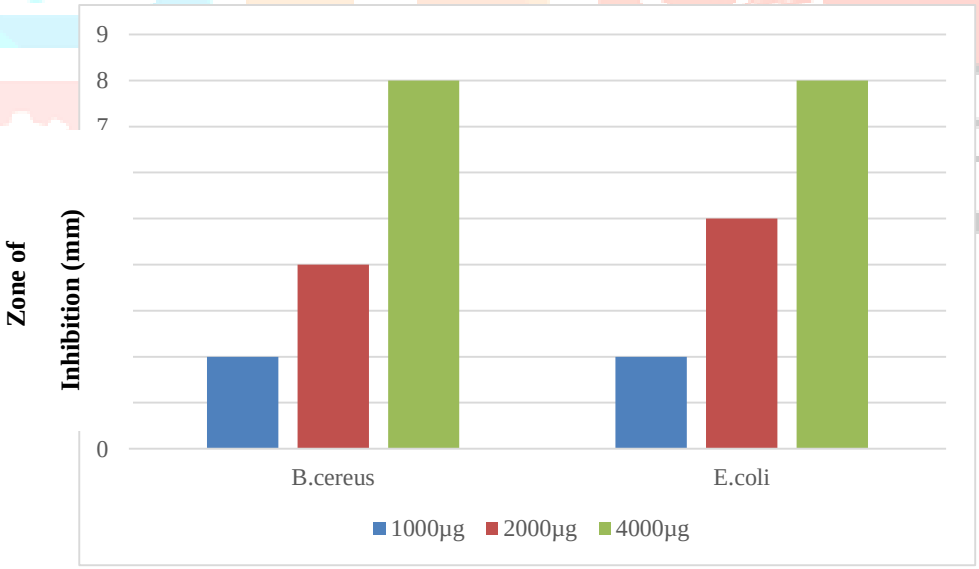
## ANTIMICROBIAL SENSITIVITY TEST

### Disc diffusion method

The antibacterial activity of the test samples was carried out by disc diffusion method. The targeted microorganisms were cultured in Mueller-Hinton broth and incubated for 24 h. The petri dishes containing Mueller Hinton agar (MHA) medium were cultured with diluted bacterial strain. The prepared discs were placed on the culture medium. Test samples (1000, 2000 and 4000 µg) were injected to the sterile disc. Then the inoculated plates were incubated at 37 °C for 24 h. The diameter of the clear zone around the disc was measured and expressed in millimeters as its antibacterial activity.

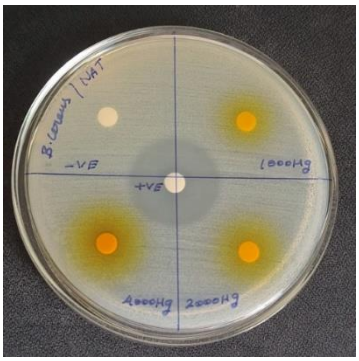
| Sample | Zone of Inhibition (mm) | | | | | |
|---|---|---|---|---|---|---|
| | Microorganisms | | | | | |
| | B.cereus | | | E.coli | | |
| Concentration | 1000µg | 2000µg | 4000 µg | 1000µg | 2000µg | 4000µg |
| NAT | 2 | 4 | 8 | 2 | 5 | 8 |
| Streptomycin (20µg) | 24 | | | 20 | | |

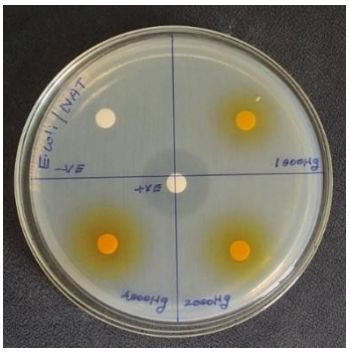
**GRAPH: Antimicrobial activity of ethanolic extract of flower**




**Concentration in µl**

**Bacillus cereus** **Escherichia coli**




## CONCLUSION

The study confirms that *Nyctanthes arbor-tristis linn* (Night Jasmine) possesses significant medicinal properties, including antimicrobial, anti-inflammatory, antioxidant, sedative, and CNS depressant effects. The phytochemical analysis identified key bioactive compounds such as flavonoids, tannins, alkaloids, glycosides, and saponins, which contribute to its pharmacological activities. The antimicrobial activity tested against bacterial strains like Escherichia coli and Bacillus cereus demonstrated its effectiveness. These findings highlight the plant's potential for therapeutic applications and support its traditional use in herbal medicine. Further research and clinical validation could enhance its role in modern drug development.

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