The present study highlights preliminary phytochemical analysis of the leaf extract of *Nyctanthes arbor-tristis*. Plants produce a wide range of bioactive molecules which make them a rich source of various types of medicines. *Nyctanthes arbor-tristis* is one of the well-known medicinal herbs of Indian origin belonging to family Oleaceae, commonly known as night Jasmine. The leaf extract is taken by percolation method. Various bioactive primary and secondary metabolites were tested using colour reactions with specific reagents. The study reveals that it contains some bioactive compounds which indicate that this plant might be used as anti-malarial, anti-viral and antidiabetic.

**Keywords:** Phytochemical analysis, *Nyctanthes arbor-tristis*, percolation, leaf extract

**INTRODUCTION**

*Nyctanthes arbor-tristis*, a medicinal plant belongs to family Oleaceae and commonly known as Night Jasmin (Vats et al., 2009; Meshram et al., 2012). It is a small tree with a grey or greenish, rough and peeling bark, growing up to 10 m in height. Leaves are opposite with an entire edging about 6 to 12 cm long and 2 to 6.5 cm wide. Flower has 5-8 lobed corolla and orange red centre. Petals are snowy white in colour. It has brown heart shaped to round capsule fruit about 2 cm in diameter having two sections and each section have a single seed (Bhalakiya and Modi, 2019; Saxena and Brahmam, 1995; Haines, 1924). It requires loamy soil with pH 5.6-7.5. It is a woody perennial having life span 5-20 years (Kiew and Baas, 1984). The plant has some traditional as well as medicinal values. The orange-white corolla is used for colorising the cloth and cotton. The whole flower is used to colour the orange robes of the Buddhist priest (Venkataraman et al., 2019). Over 50% of all modern clinical drugs are of natural product origin and natural product play a vital role in modern drugs development in the pharmaceutical industry (Baker et al., 1995). This plant also has some phytochemicals like flavanols, glycosides, D-mannitol, nicotiflorin etc. (Bordoloi & Lahkar, 2018). The whole plant exhibits pharmacological effects and the leaves show anti-fungal, anti-inflammatory and antibacterial effects (Gulsan et al., 2015).

**MATERIALS AND METHODS**

**Preparation of leaf extract**

The plant was collected from Bhubaneshwar, Odisha. Around 25 g of *Nyctanthes arbor-tristis* leaves were soaked overnight for 24 hours in 3 solvents (Aqueous, methanol-aqueous and acetone-aqueous solvents). The solvents dissolve the active biomolecules. The leaves remain as precipitate and the active biomolecules were present in the solvent. The respective supernatants were taken and the following phytochemical assays were conducted to test the presence of secondary metabolites.

**Phytochemical assays**

Phytochemical analysis was carried out on different extract of the whole plant using standard procedure to identify the bioactive compounds (Harborne, 1973; Trease and Tiwari et al., 2011).

**Test for Tannin**

5 ml of plant extract was added with 5 drops of 10% lead acetate. Formation of a light-yellow precipitate indicates the presence of tannin.

**Test for Saponin**

1 ml of the extract was boiled in 10 ml of distilled water and filtered with Whatman filter paper. 5 ml of filtrate was mixed with 2 ml of normal distilled water and shaken vigorously. Occurrence of stable persistent froth indicates the presence of saponins.

**Test for Flavonoids**

To 1 ml of the extract, few drops of dilute sodium hydroxide were added. Presence of flavonoids is indicated upon production of an intense yellow colour in the plant extract which became colourless on addition of 2-3 drops of 50% dilute acid.
Test for Terpenoid

0.5 gm of plant extract was mixed with 2 ml of chloroform and equal volume of concentrated sulphuric acid was added. Terpenoids presence is confirmed by a reddish-brown colouration of interface.

Test for Phenolic compounds

2 ml of plant extract was added with 5 drops of 1% ferric chloride and 1 ml of potassium ferro cyanide, a bluish-green solution showed the presence of phenolic compound.

Test for Reducing sugar

0.5 g of plant extract was dissolved with distilled water and filtered. The filtrate was boiled with 2 drops of Fehling’s solution A and B for 5 minutes. An orange-red precipitate obtained indicates the presence of reducing sugar.

Test for Steroid

2 ml of plant extract was dissolved in 5 ml chloroform and then 5 ml of concentrated sulphuric acid was added. Formation of 2 phases (upper red and lower yellow with green fluorescence) indicates the presence of steroid.

Test for Alkaloids

5ml of plant extract was mixed with 3 ml of aqueous HCl on water bath and then filtered. 1 ml of Dragendorff’s reagent was added in the filtrate. The occurrence of orange-red precipitate indicates the presence of alkaloids in the sample extract.

Test for Carbonyl

2 ml of plant extract was added with 2 drops of 2,4-dinitrophenyl hydrazine solution and thoroughly shaken, yellow crystal formation indicates presence of carbonyl compound.

RESULTS AND DISCUSSION

Phytochemical assays were done and the result reveals that saponin, tannin, flavonoids, phenolic compounds, reducing sugar and carbonyl were present in aqueous solution. In methanolic aqueous, saponin, tannin, terpenoids and phenolic compounds were present and in acetone aqueous, tannin, flavonoids, phenolic compound and reducing sugar were present (Table2) (Figure 1). Also, the literature studies were done (Table3). Hassan et al., in (2016) found that Flavonoids, Phenolic Compounds and Saponin were present which reveals that it can be act as antioxidant activity and Cough. Sah et al., (2012) reveals that due to presence of terpenoids in methanolic aqueous indicates it might use against viral fever. Gothai et al., in (2016) found Saponin, Flavonoids and Reducing Sugar which indicates it might be used as antidiabetic activity. Zhu et al., in (2014), and found Terpenoids which reveal the antimalarial activity. Due to presence of such bioactive compounds, it reveals the said medicinal properties. Literature study also done on the medicinal uses and the study reveals that tribal people of Odisha and Jharkhand used Nyctanthes arbor-tristis in the treatment of Pain full conditions, act as anti-helminthic, to cure sciatica and arthritis also act as anti-spermatogenic etc. (Table1).

Table 1: Medicinal values of Nyctanthes arbor-tristis

<table>
<thead>
<tr>
<th>Location</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odisha</td>
<td>The leaf extract is consumed against malaria.</td>
</tr>
<tr>
<td>Odisha</td>
<td>The decoction of leaf is used against severe cough</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>The leaf infusion is taken 3 times a day to cure viral fever</td>
</tr>
<tr>
<td>Odisha</td>
<td>The leaf paste with flowers is used to make pills. 2-3 pills are taken against diabetes and respiratory problems.</td>
</tr>
</tbody>
</table>

Table 2: Phyto-constituents present in leaf of Nyctanthes arbor-tristis

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Solvent</th>
<th>Bioactive compounds detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aqueous</td>
<td>Saponin, Tannin, Flavonoids, Phenolic compound, Reducing sugar and Carbonyl.</td>
</tr>
<tr>
<td>2</td>
<td>Methanolic aqueous</td>
<td>Saponin, Tannin, Terpenoids and Phenolic compound.</td>
</tr>
<tr>
<td>3</td>
<td>Acetone-aqueous</td>
<td>Tannin, Flavonoids, Phenolic compound and Reducing sugar.</td>
</tr>
</tbody>
</table>

CONCLUSION

The present study was done on the Phytochemical assay (Leaf extract of Nyctanthes arbor-tristis) and reveals that some bioactive compounds like flavonoids, terpenoids, phenolic compounds, tannin, saponin and reducing sugars for which it might be used as medicine and act as anti-diabetics, antiviral, anti-malarial etc. The literature study reveals the uses of the plant in Odisha and Jharkhand. As it has medicinal values, hence, more study needs to do to know more about its Medical properties and other uses.

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Phytochemical analysis of the leaf extracts of *Nyctanthes arbor-tristis*

**References**


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**Table 3:** Supporting literature on correlation of bioactive compounds detected in Phyto-chemical testing along with medicinal uses

<table>
<thead>
<tr>
<th>Medicinal use</th>
<th>Correlation with bioactive compounds</th>
<th>Supporting literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioxidant activity and against cough</td>
<td>Flavonoids, Phenolic compound, saponin were found in all solvents of leaf extract of the tested plant species which indicates that it might be used as antioxidant activity.</td>
<td>Hassan et al., (2016)</td>
</tr>
<tr>
<td>Viral fever</td>
<td>Terpenoids is present in methanolic aqueous which indicates that the tested plant might be used against viral fever.</td>
<td>Sah et al., (2012)</td>
</tr>
<tr>
<td>Antidiabetic activity</td>
<td>Presence of Saponin, Flavonoids and Reducing Sugar indicates that the tested plant species might be act as antidiabetics.</td>
<td>Gothai et al., (2016).</td>
</tr>
<tr>
<td>Antimalarial activity</td>
<td>Terpenoids is present in acetone aqueous extract so it might be responsible for anti-malarial activity of this plant species.</td>
<td>Zhu Y et al., (2014)</td>
</tr>
</tbody>
</table>

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**Figure 1:** A) Plant of *Nyctanthes arbor-tristis*; B) Leaf extracts; C) Methanol-aqueous solvent; D) Acetone-aqueous solvent.


