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Phytochemical characters of Nyctanthes arbo-tristis Linn.: A promising medicinal plant

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Abstract
The importance of medicinal plant in drug development is known to us and humans have used them for different diseases from the beginning of human history. *Nyctanthes arbor-tristis* is a valuable medicinal plant which belongs to the family oleaceae. The plant generally grows in tropical and subtropical region. Plant parts were collected randomly from four states of India i.e. Chhattisgarh, Tripura, Uttarakhand, and Telangana. Phytochemical activity of leaves extract of *Nyctanthes arbortristis*. The crude powder extracts of the leaves of the above plants were taken for the study. Analysis of phytochemical of *Nyctanthes arbortristis* for the presence of flavonoids, terpenoids, carbohydrates and alkaloids, using standard methods. Phenolic compounds, carbohydrates, flavonoids proteins and alkaloids were present in *Nyctanthes arbortristis*.

Keywords: *Nyctanthes arbor-tristis*, phytochemical, terpenoids

Introduction
Medicinal plants contain some organic compounds which provide definite physiological action on the human body as well as their physiological activities due to the presence of bioactive substance include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids (Edigo *et al.*, 2005) [1]. *Nyctanthes arbor-tristis* Linn. Is a valuable medicinal plant which belongs to the family oleaceae. The plant generally grows in tropical and subtropical region. *Nyctanthes arbor-tristis* commonly known as night jasmine, Haarsinghar & Parijat. The flowers started falling after midnight and by the day break, the plant appears dull. The generic name 'Nyctanthes' has been coined from two greek words 'Nykhta'(Night) and 'anthos'(flower) (Vats *et al.*, 2009 & Meshram *et al.*, 2012) [2, 3]. It is usually a shrub or a small tree having brilliant, highly fragrant flower, which bloom at night and fall off before sunrise, giving the ground underneath a pleasing blend of white and red. Thus, during the day the plant loses all its brightness and hence is called "tree of sadness" (arbour-tristis). It is also known as Harsinghar coral jasmine, Parijat, queen of the night and night flowering jasmine (Kiew and Baas, 1984) [4]. In India, it grows in the outer Himalayas and is found in tracts of Jammu and Kashmir, Nepal to East of Assam, Bengal, Tripura extended through the Central region up to Godavari in the south. Flowering usually occurs from July to October. *Nycanthes arbor-tristis* prefers a secluded and semi-shady place to grow (Kritikar *et al.*, 1935) [5]. *Nycanthes arbor-tristis* is one of the wellknown medicinal plants. It is common wild hardy large shrub or small tree. Different parts of this plant are used in Indian systems of medicine for various pharmacological actions like as anti-leishmanis, anti-viral, anti-fungal, anti-pyretic, anti-histaminic, and anti-malarial, anti- oxidant (Amarite *et al.*, 2007) [6] anti-inflammatory (Omkar *et al.*, 2006) [7] and many more activities. *Nycanthes arbor-tristis* have been examined by various workers for medicinal properties in leaf, flower and fruit parts by different methods and treatments (Nagavani *et al.* 2010, Sindhe *et al.* 2014, Prabodh satya *et al.*, 2012, Hassarajani and Chattopadhyay 2007 and Divya paikara *et al.* 2015) [8, 13, 10, 9, 11]. Present study examined the leaf extracts of *Nycanthes arbor-tristis* from four different states of India i.e. Chhattisgarh, Tripura, Uttarakhand, and Telangana.

Methodology
Collection of plant samples:-Fresh plant parts were collected randomly from four states of India i.e. Chhattisgarh, Tripura, Uttarakhand and Telangana. The plants were identified and studied according to their families. Fresh plant materials were collected and washed under tap

Water shade dried and then homogenized to fine powder and stored in airtight Bottles/pouches.

Preparation of plant extract: Ten grams of air dried powder was taken in 100 ml of petroleum ether in a conical flask, plugged with cotton wool and then kept on a rotary shaker at 190-220 rpm for 24 hours. After 24h, the supernatant was discarded and petroleum ether was evaporated from the powder. This dry powder was then taken in 100 ml of solvent (methanol or acetone) in a conical flask, plugged with cotton wool and then kept on a rotary shaker at 190-220 rpm for 24 h. After 24 h, the extracts were centrifuged at 5000 g for 10 min, the supernatant was collected, solvents were evaporated and the dry extract was weighed and stored at 4 ^{0}C in airtight bottles.

Results

Phytochemical analysis of *Nyctanthes arbor-tristis* are presented in table 1. This study revealed the presence of Phytochemical considered as active medicinal chemical constituents. Important medicinal Phytochemical such as terpenoids, reducing sugar, flavonoids & alkaloids were present in the samples. The result of the phytochemical analysis shows that the samples are rich in at least one of alkaloids, flavonoids, terpenoids and reducing sugar.

Table 1: Phytochemical analysis of *Nyctanthes arbor-tristis*

Test	Observation
Test for alkaloid	
1.0ml of plant extract was taken and then add 1.0ml of saturated solution of picric acid was added.	Yellow colour appears
Test for terpenoids	
5ml of extract was mixed with 2ml of chloroform and 3ml of conc.H_2SO_4 was carefully added to form a layer.	A reddish brown colouration of the interface was formed.
Test for flavonoids	
5ml of dilute. Ammonia solution were added to a proportion of the crude extract followed by addition of conc.H_2SO_4.	Yellow colouration appears.
Test for reducing sugar(carbohydrates)	
Fehling test: to 1ml of the plant extract, add equal quantities of Fehling solution A and B, upon heating	Formation of a brick red precipitation indicated the presence of sugar.

Terpenoids are present in all samples of *Nyctanthes arbor-tristis*. Terpenoids are reported to have anti- inflammatory, anti-viral, anti-malarial, inhibition of cholesterol synthesis and anti-bacterial (Mayee *et al.*, 2010, Smitha *et al.*,2014, Pattanayak *et al*., 2013 and Bhadouria *et al.*, 2012) [12-15]. Alkaloids are also subjected in all samples. Plants having alkaloids are used in medicines for reducing headaches and fever. These are attributed for antibacterial and analgesic properties. Reducing sugar & flavonoids traces of alkaloids were found to be present in *Nyctanthes arbor-tristis*. Terpenoids and alkaloids were more concentrated as compare to flavonoids and reducing sugar.

Table 2: Phyto chemical evaluation of *Nyctanthes arbor-tristis*

Chemical test	Result 1	Result 2	Result 3	Result 4
	Chhattisgarh	**Tripura**	**Uttarakhand**	**Telangana**
Test for alkaloid	+++++	+++++	+++++	+++++
Test for terpenoids	+++++	+++++	+++++	+++++
Test for flavonoids	+++	+++	+++	+++
Test for reducing sugar	+++	+++	+++	+++
Overall result:-	Positive	Positive	Positive	Positive

+++ =shows moderate concentration.
++++++ = shows high concentration.

Discussion

Deshmukh *et al*. (2015) [16], was prepared Natural yellow colour from Corolla of *Nyctanthes arbor-tristis* Linn. For dyeing and painting on cotton and silk for value addition. Corolla of *Nyctanthes arbortristis* L. as a natural colour for dyeing and painting of cotton and silk with Kalamkari technique using bamboo stick. From the present work it can be concluded that cotton and silk painted and dyed with Corolla of *Nyctanthes arbor-tristis* Linn exhibited fair to excellent wash and sunlight fastness. Further four different dresses were designed and evaluated for fabric elements and colour which rated very good to excellent by the panel judges. Therefore the study suggest the use of *Nyctanthes arbor-tristis* Linn corolla extract as very good option for yellow, and yellow orange colour as a value addition to fashion fabric and ultimately in eco-friendly clothing. Bansal *et al*. (2013) [13] developed a protocol for callus induction from nodal explants of *Nyctanthes arbor-tristis*. Among various PGRs 2, 4-D shows maximum callus induction. Phytochemical analysis of natural and *in vitro* raised plants showed the presence of bioactive substances like flavonoids, alkaloids, terpenoids in different types of extracts.

Conclusion

Nyctanthes arbortristis is easily available plant and no special conditions are required for its collection and cultivation. It is a rich source of biologically active compounds, which would attract the attention of drug discovery groups to discover novel bioactive molecules for safer and effective treatment of various diseases. The selected plants samples are the source of the secondary metabolites i.e. alkaloids, flavonoids, terpenoids and reducing sugar. Medicinal plants play a vital role in preventing various diseases. The antiemetic, anti-inflammatory, anti-analgesic, anti- bacterial and anti-fungal activities of the medicinal plants are due to the presence of the above mentioned secondary metabolites.

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