

RESEARCH ARTICLE

COMPREHENSIVE PHYTOCHEMICAL ANALYSIS AND QUANTIFICATION OF FLAVONOIDS AND PHENOLICS IN LEAVES OF *NYCTANTHES ARBOR-TRISTIS* LINN.

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ABSTRACT: This research work describes the traditional and phytochemical properties of *Nyctanthes arbor-tristis* Linn., a medicinal plant used for treatment of ailments of which it possesses antioxidant, anti-inflammatory and anti-urolithiatic effects. The research centers on identifying and measuring the flavonoid and phenolic contents of the leaves of the plant due to their recognized health impacts. In this study which employed soxhlet extraction with ethanol being the chief solvent, the extraction yields of phenolics and flavonoids were very high, in line with colorimetric assay results. Alkaloids, terpenoids, steroids were isolated through phytochemical screening further expanding the antioxidant capability and bio activity of the plant source. These results endorse the folk use of *N. arbor-tristis* and call for the more systematic study of the plant in the framework of a treatment on kidney-related disorders and oxidative stress.

Key Words: *Nyctanthes arbor-tristis*, phytochemicals, flavonoids, phenolics content

I. INTRODUCTION

Nyctanthes arbor-tristis: Night Jasmine is used extensively in Ayurvedic medicine and a comparative study shows that it possesses therapeutic values [1-3]. This work also seeks to quantify the flavonoid and phenolic contents with a view of ascertaining the pharmacological possibility of the plant in antioxidant studies and in the inhibition of calcium oxalate crystal formation [4, 5].

MATERIALS AND METHODS

Collection and Authentication of Plant Material

Leaves were collected from local park, and authenticated by a botanist.

Extraction Procedure

To aid this process, a Soxhlet apparatus was used to extract 500g of the harvested and dried leaf powder in ethanol resulting in the formation of a rich extract which was used for analysis [6]. The extractive yield was assessed using the extract values for cold, hot, and sequential extraction methods in which ethanol proved to be the best solvent for maximum extraction of bioactives (Table 1) [7].

Table 1: Extractive Values of *Nyctanthes arbor-tristis* Leaves

Solvent	Cold Extraction (%)	Hot Extraction (%)	Successive Extraction (%)
Ethanol	24.75±0.95	31.25±1.05	10.25±0.11
Aqueous	25.25±0.67	34.00±0.92	7.25±0.07

Phytochemical Screening

The extracts of the two tree species were tested for the contents of phenols, flavonoids, alkaloids, terpenoids and other secondary metabolites. Thin Layer Chromatography (TLC) identified six separate phytochemicals present in the extract prepared by ethanolic solvent. The R_f values obtained with a 60:40 They used few drops chloroform-benzene-formic acid mixture as illustrated the compound diversity of *N. arbor-tristis* in table 2 [8].

Quantitative Analysis of Phenolic and Flavonoid Content

The total phenolic content (TPC) was quantified using the Folin-Ciocalteu method, and the total flavonoid content (TFC) was determined by the aluminium chloride assay, with results shown in Tables 3 and 4: [9, 10]

- **Phenolics:** 158.66±0.05 mg GAE/g in ethanolic extract
- **Flavonoids:** 59.18±0.30 mg QE/g in ethanolic extract

RESULTS AND DISCUSSION

Phytochemical Profile

The present phytochemical screening showed considerable presence of Flavonoids and Terpenoids when analyzed by ethanolic extract. Consequently, the TLC profile revealed six different spots; therefore, there might be more than one

compound that gives the therapeutic activity to the plant *N. arbor-tristis* (Table 2).

Table 2: Phytochemical Screening and TLC Profile of *N. arbor-tristis* Extract

Compound	Test	Presence (+/-)
Anthocyanins	Ferric Chloride	-
Phenolics	Ferric Chloride	+
Flavonoids	Jone's Test	+
Alkaloids	Wagner's Test	+
Terpenoids	Salkowski Test	+
Steroids	Liebermann-Burchard	+

The Phenolic and Flavonoid Content

The higher phenolic and flavonoid concentration confirms its antioxidant activity in nitric oxide inhibition and reducing power assay. It literally actively prevents the formation of crystals, which is particularly beneficial to the development of the kidney stone prevention treatments. High levels of phenolics may increase the level of oxidative stress protection by donating electrons, as seen by the reducing power assay data in table 3 and 4.

Table 3: Total Phenolic Content in Different Solvents

Solvent	Phenolic Content (mg GAE/g)
Methanol	60.20±0.30
Ethanol	158.66±0.05
Aqueous	26.60±0.02

Table 4: Total Flavonoid Content in Different Solvents

Solvent	Flavonoid Content (mg QE/g)
Methanol	60.67±0.05
Ethanol	59.18±0.30
Aqueous	24.58±0.02

CONCLUSION

The current work offers a detailed examination of phytochemical content, antioxidant activity, and anti-crystalline properties of *Nyctanthes arbor-tristis* Linn. leaves. The analysis proves that the plant is endowed with a large number of bio-active compounds including flavonoids, phenolic compounds considered to possess antioxidative and therapeutic effects. A high phenolic Flavonoid content from the present Ethyl acetate extract ley on the result of the phytochemical screening, further confirmed by quantitative assays, reveals high antioxidant activity of the compounds present in the extract. This is consistent with traditional Ayurvedic usage of the plant in treating various inflammatory and oxidative stress diseases.

These standpoints of antioxidant effects demonstrated by nitric oxide radical scavenging and reducing power suggested that *N. arbor-tristis* useful for counteracting oxidative stress which is a root of a number of diseases. These antioxidant activities are of special importance in case of renal disease, where antioxidants are mainly involved in the process of formation of renal calculi and the peroxidation of membrane phospholipids. This is a clear implication that the extracts obtained from these leaves hold a lot of potential in case of possible prevention of nephrolithiasis but this can also be supported further by the calcium oxalate crystallization inhibition assay where it was clearly shown that

the extracts were equally effective in preventing further formation of the stones.

Due to the variation in these phytochemicals, alkaloids, terpenoids, steroids present in the plant and improve the pharmacological potential of *N. arbor-tristis* and thus is a plant of interest that will be subjected to screening of individual compound and their bioactivity. Furthermore, the results of the study support further investigations of standardized extracts or formulation that could elicit optimal therapeutic potency.

Therefore, *Nyctanthes arbor-tristis* Linn. seems to have potential as a natural resource for the production of drugs that treat oxidative stress and prevent kidney stones. It will endorse uses in traditional medicine and forms the basis for further research works to establish clinical research application. Thus, one should carry out more in vivo and clinical studies in order to confirm its efficiency, to determine precise doses, and to reveal the proper pathways through which currant seems to produce these positive effects on human health. Naturally, due to its high phytochemical content, *N. arbor-tristis* might go a long way in natural medicine and pharmacological frame with opening opportunities in curing or at least managing oxidative stress and kidney ailments with locally available plant material.

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CONFLICT OF INTEREST: Nil

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