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PHYTOCHEMICAL ANALYSIS AND ANTIOXIDANT ACTIVITY OF NELUBO NUCIFERA GAERTN

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ABSTRACT

The present investigation was carried out with the studies of important techniques for the identification of phytochemicals present in crude drugs of flower of *Nelambo nucifera* Gaertn. which can be helpful in authenticating the plant material and in characterization of the crude drug. Qualitative analysis of ethanolic extract of flowers of *Nelambo nucifera* Gaertn. showed that the appearance of various phytoconstituents. Quantitative analysis of flower extract of *Nelambo nucifera* Gaertn. exhibited that the presence of most important phytochemical constituents in various amounts. The greatest amount of phytochemical constituents such as tannins, flavanoids, saponins, phenols, alkaloids and their values were found out. In the flower extract of *Nelambo nucifera* Gaertn. ascorbic acid showed higher concentration. The antioxidant activity was found to be 76.19% at 100µg/ml concentration while ascorbic acid gave 84.92% at the same concentration. At 20 µg/ml, 40 µg/ml, 60 µg/ml and 80µg/ml concentrations the activity showed were 61.90%, 65.87%, 70.63% and 73.01% respectively. Above finding provided the scientific evidence for the medicinal use of this traditionally used flower.

KEYWORDS: *Nelumbo nucifera*, ethanol, ascorbic acid, phytochemicals.

INTRODUCTION

Medicinal plants are a rich source of bioactive phytochemicals. In daily life various medicinal plants has been used for years to treat multiple disease in all over the world. According to Hindu culture, Ayurveda is the foundation of medicinal science. An art of healing and various aspects of science of life include some specific properties of drugs.[1] The chemical

constituents of medicinal plants have own capacity of exercising a physiological action on the human body were the primary properties. Medicinal plants having bioactive compounds such as alkaloids, tannins, flavonoids and phenolic compounds were considered to be more significant.[2] Due to this property, many researchers have been performed to reveal the advantageous health effects of phytochemicals. *Nelambo nucifera* Gaertn. belongs to a mono generic family *Nymphaeaceae* with many medicinal uses, including pharyngopathy, pectoralgia, spermatorrhoea, leucoderma etc., and also as vegetables in various countries. *Nelambo nucifera* Gaertn. is commonly known as Indian lotus, Chinese water lily, and sacred lotus.[3] Lotus seeds and fruits are used to treat many ailments, such as digestion, enteritis, diarrhoea, insomnia, palpitations, spermatorrhoea, leucorrhoea and dermatopathy, and as an antiemetic, poisoning antidote, diuretic and refrigerant.[4] Keeping this view, *Nelambo nucifera* Gaertn. flowers are used to find out the phytochemicals and antioxidant activity from the ethanolic extarct.

MATERIALS AND METHODS

PLANT MATERIAL COLLECTION

The flowers of *Nelambo nucifera* Gaertn. were collected from Thanjavur District of Tamil Nadu. For analysis, the tepals of flower were picked off and dried under shade. Drying process was held for few days until the moisture deplete from the tepals. Tepals were ground and made into fine powder. Then the powder was used for the extraction.

PREPARATION OF FLOWER EXTRACT OF NELAMBO NUCIFERA GAERTN

The powder was kept in air-tight containers, in cool, dark and dry place for further study. 20g of sample powder was taken and the 40ml of ethanol was added and kept for 24 hours. Then the extract was obtained by hot percolation method. The extract of *Nelambo nucifera* Gaertn. was filtered through funnel and filter paper. Then the filtrate was taken in separate container and used for further analyses. The phytochemical analysis of the flower of *Nelambo nucifera* Gaertn. was based on the precipitation and coloration method.[5]

ANTIOXIDANT ACTIVITY USING DPPH ASSAY METHOD

The antioxidant activity of sample was examined by standard DPPH free radical activity. Ethanolic solution of DPPH (0.05mM) (500µl) was added to 1000µl of synthesized extract sample with the various concentrations (20-100µl) using micropipette. The freshly prepared DPPH solution was retain in the dark at 4℃. Then 96%of ethanol was added in the mixture and shake vigorously. The mixture was kept to stand for 5 minutes at 540nm, absorbance was

measured. Absorbance was set to zero by use of ethanol. A blank sample contains the same volume of ethanol and DPPH was prepared. They all performed in triplicate. The radical activity of the tested samples, expressed as percentage of inhibition were calculated.

$$\text{Percentage of inhibition of DPPH activity} = \frac{(A-B)}{A} \times 100$$

Where A and B- absorbance volume of blank and sample, respectively. A curve of concentration versus percentage of inhibition was plotted and concentration required for 50% inhibition was determined.[6]

RESULTS AND DISCUSSION

QUALITATIVE PHYTOCHEMICAL ANALYSIS OF ETHANOLIC EXTRACT OF NELAMBO NUCIFERA GAERTN

Qualitative analysis of ethanolic extract of flowers of *Nelambo nucifera* showed that the appearance of various constituents such as flavonoids, saponin, steroids, coumarins, anthocyanin, alkaloids, emodin, terpenoids, tannin, glycosides, phenol, anthraquinone, carbohydrates, phenol (Table-1) and the non- appearance of leucoanthocyanin in the flower extract of *Nelambo nucifera* Gaertn.

The ethanolic extract of flowers of *Alpinia calcarata* showed the presence of bioactive components such as glycosides, alkaloids, tannis, flavonoid and steroids.[7]

Similarly, the soxhlet extraction of flowers of *Alpinia calcarata* appeared that the presence of phytochemical constituents such as glycosides, phenols, polyphenols and alkaloids.[8]

Table 1: Phytochemical Constituents of Ethanolic Flower Extract of Nelambo Nucifera Gaertn.

S.NO	PHYTOCHEMICAL CONSTITUENTS	NELAMBO NUCIFERA (FLOWER)
1.	Terpenoids	+++
2.	Flavonoids	+++
3.	Saponin	+++
4.	Tannins	+++
5.	Alkaloids	+
6.	Steroids	+++
7.	Glycosides	++
8.	Phlobatannins	+++
9.	Proteins	+++

10.	Coumarin	+++
11.	Emodin	++
12.	Anthraquinone	+++
13.	Anthocyanin	+++
14.	Carbohydrate	+++
15.	Leucoanthocyanine	+
16.	Cardiac Glycoside	++
17.	Xanthoprotein	+++
18.	Phenol	+++

+++ Strongly present ++ Moderately present +slightly present

QUANTITATIVE ANALYSIS OF ETHANOLIC FLOWER EXTRACT OF NELAMBO NUCIFERA GAERTN

Quantitative analysis of flower extract of *Nelambo nucifera* Gaertn. exhibited that the presence of most important phytochemical constituents in various amounts. The greatest amount of phytochemical constituents present in this plant such as tannin, flavanoid, saponins, phenol, alkaloids and their values were showed in the table- 2.The quantity of the constituents in the flower extract were phenol (0.007mg/kg), tannin (0.065mg/kg), terpenoid (0.008g/kg), saponin (0.005mg/kg), flavonoids (0.011mg/kg) and alkaloids (0.012mg/kg).

The quantitative analysis of medicinal plants is most important. Secondary metabolites of medicinal plants are different in various organic extract (methanol, ethanol). From their results the percentage of yield of tannins was 0.065%.[9]

Alkaloids have been reported as powerful poison and many alkaloids derived from medicinal plants possess biological activities like anti-malarial, anti-inflammatory, anti-inflammatory, anti-microbial, cytotoxicity and pharmacological effects. According to the research tannins were known to have antiviral, anti-bacterial, anti-tumour activities.[10]

The quantitative screening of ethanol leaf extract of *Costus igneus* proved that secondary metabolites were present in that plant. The phytochemicals analysed were alkaloids, carbohydrate, phenol, reducing sugar, tannin and glycosides. These chemical components provided information about plant pharmacological activity.[11]

Table 2: Quantitative Analysis of Ethanolic Flower Extract of Nelambo Nucifera Gaertn.

S.No	Phytochemicals	*Nelambo Nucifera* Flower Extract(mg/g)
1.	Phenol	0.007
2.	Tannin	0.065
3.	Terpenoid	0.008
4.	Saponin	0.005
5.	Flavonoid	0.011
6.	Alkaloid	0.012

ANTIOXIDANT OF ACTIVITY OF FLOWER EXTRACT OF NELAMBO NUCIFERA BY DPPH METHOD GAERTN

In contrast with ascorbic acid the flower extract of *Nelambo nucifera* Gaertn. showed higher concentration and displayed as a result. The compound showed 76.19% activity at 100µg/ml concentration while ascorbic acid gave 84.92% at the same concentration (Table-3). At 20 µg/ml, 40 µg/ml, 60 µg/ml and 80µg/ml concentrations the activity showed were 61.90%, 65.87%, 70.63% and 73.01% respectively.

Table 3: Anti Oxidant Activity of Ethanolic Flower Extract of Nelambo Nucifera Gaertn. By Dpph Method.

S. No	Concentrations	Scavenging Effect (%)	
		Ascorbic Acid	Extract of *Nelambo nucifera*
1.	20(µg/ml)	71.42	61.90
2.	40(µg/ml)	74.60	65.87
3.	60(µg/ml)	80.15	70.63
4.	80(µg/ml)	82.00	73.01
5.	100(µg/ml)	84.92	76.19

Earlier studies stated that the lupeol has anti-oxidant properties by scavenging free radicals, decreasing lipid peroxidation and increasing the antioxidant enzymes level in endogenous blood. The methanolic extract of root of *Alpinia purpurata* showed that the antioxidant and anti-diabetic activities by using α-glucosidase inhibitory assay. The percentage of inhibition at 20-100µg/ml concentrations of extracts showed the varied inhibition from 59 to 78%.[12]

The active compounds present in *Centella asiatica* exhibit substantial activity against free radicals. This was broadly used for neuroprotective effect on rat based on age related issues. Other essential compounds like oils and different extract were commonly utilized as natural additives in food production industry.[13]

CONCLUSION

Medicinal plants are the richest bio resources of drugs of traditional system of medicine. Plant cells from those medicinal plants are highly enlightened in chemical factories where a large variety of chemical compounds are manufactured at normal temperature. The present study reveals that the presence of various bioactive compounds in the flower extract of *Nelambo nucifera* Gaertn. The extract showed considerable percentage of antioxidant activity at different concentrations. The above mentioned bioactive compounds might be responsible for the medicinal properties of the flower. However further researches are needed for isolating and purifying compounds for evolving neutraceuticals.

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