

# A Phytochemical Study of Root, Leaf and Stem Bark of *Nerium Indicum*: An Important Medicinal Plant

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**Abstract-** *Nerium indicum* is also known as oleander. The modern as well as ayurvedic medicinal uses make this plant much more valuable. In ayurvedic text *Nerium indicum* mentioned as *karaveera* which has highly medicinal properties. The screening of various phytochemical was conducted using a standard procedure using different solvents. Phytochemical screening led to detection of alkaloids, flavonoids, steroids. Which have pharmacological applications. The findings indicated that whole plant of *Nerium indicum* have various phytopharmacological activities and thus it would be useful for the treatment of various diseases in future.

**Keywords-** *Nerium indicum*, phytochemical,

**INTRODUCTION-** According to *Acharya Charka*, *Ayurveda* is the science which relates with *Aayu* and imparts knowledge about the drugs along with their properties and action<sup>(1)</sup>. Herbal medicines represent one of the most important fields of traditional medicine all over the world. Man's acquaintance with the medicinal properties of plants is of antiquity. India is known as the "Emporium of medicinal plants". The use of plants to treat various diseases in India dates back to the times of *Rig-Veda* even being practices more anterior to it as a folk medicine.

*Karaveera (Nerium indicum)* is important drug since *Vedic* period; it is described somewhere as toxic plant or somewhere as of medicinal use.

In *Samhita kala* which is core of the Ayurvedic medicine system described the therapeutic usage of thousand of plants, one such plant is *Karaveera i.e. Nerium indicum*.

*Nerium Indicum* is a large glabrous erect shrub with milky juice, about 5m height and cultivated as ornamental shrub in gardens throughout India. It is an evergreen shrub or small tree of Apocynaceae family. *Nerium Indicum* is exclusively native to India, Bangladesh, Nepal, Myanmar and China. It is very popular for ethno medicinal uses such as in cardiac disease, asthma, corns, cancer, epilepsy, wound healing and inflammation.<sup>(2)</sup>

The leaf, bark, root are majorly use for treatment of functional disorders and mainly skin disease. But it also have poisonous property, so it is mainly used externally or apply tropically Ethno medically and according to Ayurvedic text tropical use of *Nerium indicum* stem bark, root, and leaf are beneficial in skin disorder. Skin disease is one such common disorder effecting people worldwide. Common skin ailments include eczema, leucoderma, ringworm, itching, wound infection, nosocomial infections are caused by a variety of microorganism. Many allopathic drugs described for skin disease have adverse effect. To overcome the problem of skin infection, antibiotic resistance, medicinal plants have been extensively studied as alternative treatments for diseases.<sup>(3)</sup>

## . Botanical description

*Nerium indicum* Mill.

Kingdom : Plantae  
Phylum : Tracheophyte  
Class : Maghliopsida  
Order : Gentianales  
Family : Apocynaceae  
Genus : *Nerium*  
Species : *Indicum*

Ethno medically and according to Ayurvedic text tropical use of *Nerium indicum* stem bark, root, and leaf are beneficial in skin disorder. Skin disease is one such common disorder effecting people worldwide. Common skin ailments include eczema, leucoderma, ringworm, itching, wound infection, nosocomial infections are caused by a variety of microorganism. Many allopathic drugs described for skin disease have adverse effect. To overcome the problem of skin infection, antibiotic resistance, medicinal plants have been extensively studied as alternative treatments for diseases.<sup>(4)</sup>

Phytochemicals are protective and disease preventing metabolites produced by plants. They are chemical compound with a particular structure and chemical bonding, due to this phenomenon different plants possess different phytochemicals which are in turn responsible for medicinal and nutritive value. Phytochemicals are found in fruits, vegetables whole grains, nuts, beans, seeds, flowers and leaves. They are biologically active chemical compounds and gives herbs, vegetables and fruits their odor ,flavor and colour. They basically from the plants immune system and help to protect from fungus sun's ultra violet rays and many disease. Recent research demonstrates that they are also largely use to protect the humans against several disease.<sup>(5)</sup>

## Material and method

The leaf, stem bark, root of karaveera (*Nerium indicum*) were collected and cleaned thoroughly and dried at room temperature for 5-7 days in the shade. The plant samples were identified from BSI, DEHRADUN. As a *Nerium indicum* Mill = *Nerium oleander* L. Accession number is 116589. The dried samples were powdered using an electrical grinder. The powdered samples were stored in screw cap bottles until further analysis. Five hundred grams of powder of leaf , root and stem bark was taken, to which 50ml of different solvents (ethanol, acetone, aqueous,hexane ,ether) were added, mixed, and kept for four days. The contents were periodically shaken using an electric shaker. After four days, the contents were filtered through a Buchner funnel in a conical flask and it was further concentrated by evaporation by keeping the filtrate in a roundbottomed flask, till the solvent completely evaporated and the extract settled down to the bottom. . This crude extracts mix with dimethyl sulphoxide (DMSO) and preserved at 20°C in the freezer and was evaluated for qualitative Phytochemical analysis.

### ❖ Table-1-Chemical constituents test

S.NO	Chemical constituents	Test
1	Quinone	Hcl test
2	Protein	Ninhydrin test
3	Carbohydrate	Molish's test
4	phylobatannins	precipitate test
5	Cardiac glycoside	Keller kiliane test
6	Phenol	Ferric chloride test
7	Tannins	Fec13 solution test
8	Saponins	Foam test
9	Terpenoid	Salkowski test
10	Alkaloid	Wagner's test
11	Flavonoids	Alkaline reagent test

### 1 . Test of Alkaloids(wagners reagent)

2ml dilute extract was treated with Wagner's reagent for the presence of alkaloids,reddish brown precipitate for Wagner's reagent indicates the presence of alkaloids.

### 2. Test of Flavonoids(alkaline reagent test)

2ml extract of test extract ,few drops of NaOH were added and yellowish orangecolour was formed.

### 3.Test of Saponins(foam test)

2ml of extract was dilute with 20 ml of distilled water and shaken vigorously. It was observed for a stable persistent froth.

### 4.Test of Tannins(FeCl<sub>3</sub> solution test)

Take 2ml extract in a test tube and add 2 drops of 5% ferric chloride, brown colour was observed.

#### 5. Test of Terpenoids (Salkowaski test)

Take 2 ml aqueous extract and then add 1ml chloroform followed by the addition of few drops of conc. Sulphuric acid gives reddish brown precipitate.

#### 6. Test for Cardiac glycosides (Keller kiliani test)

Take 5ml extract was treat with 2ml glacial acetic acid in a test tube and 1 drop of ferric chloride solution was added to it. 1ml of conc.  $H_2SO_4$  was carefully added to form separate layer. A brown ring at the interface due to presence of deoxy-sugar characteristics of cardenolides and pale green colour in the upper layer indicated the presence of cardiac glycosides.

#### 7. Test for Phylobatannins (Precipitate test)

take 2ml extract in a test tube and add 10 ml deionized water and boiled at 100c with few drops of 1% HCL gives red precipitation.

#### 8. Test for Phenol (Ferric Chloride test)

Take 2m extract was dissolved in distilled water . to this solution 3ml of 10% lead acetate solution was added. A dark green colour indicated the presence of phenolic compounds.

#### 9. Test for Quinines

Take 2ml extrac in a test tube and add few drops of conc. HCL gives yellow precipitation.

#### 10. Test for Carbohydrate (molisch's test)

Few drop of molisch's reagent were added to 2ml extract and 2 ml conc.  $H_2SO_4$  was also added . allowed to stand for 2-3 min. the formation of red or dull violet colour at the interphase of the two layers indicated the positive result.

#### 11. Test for protein (Ninhydrin test)

Take 2ml of extract in attest tube and ad few ninhydrin molecules. Give deep blue or pale yellow colour. In present investigation ,different extract of *N.indicum* were subjected to different Phytochemical s and antimicrobial activity.

## RESULT AND DISCUSSION

Phytochemical are non-nutritive plant chemicals that have protective or disease preventive properties. These are more than thousand known phytochemicals. Some of the bioactive phytochemicals are phenolic compounds including phenolic acids and flavonoids. Phenolics compounds are the most ubiquitous group of plant secondary metabolites distributed in various dietary and medicinal plants.

- Phytochemical analysis of leaves of *N.indicum* extracted in different solvents

phytochemical	Aqu ext	Etl ext	Ace ext	Hx ext	Eth ext
Alkaloids	+	+	-	-	+
glycosides	+	+	+	+	+
Phenol	+	-	-	-	-
Saponins	+	+	-	-	-
Terpenoids	-	+	+	+	-
Quinones	+	-	-	-	+
Amino acid and protein	-	-	-	-	+
Tannins	+	+	+	-	-
Phylobatanins	-	-	+	-	-
Carbohydrates	-	+	+	+	+

flavanoids	-	-	-	-	-
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[Table 2]

• **Phytochemical analysis of stem bark of *N.indicum* extracted in different solvents**

phytochemical	Aqu ext	Etl ext	Ace ext	Hx ext	Eth ext
Alkaloids	+	+	-	-	+
Cardiac glycosides	+	+	+	+	+
Phenol	+	+	+	+	+
Saponins	+	+	-	-	-
Terpenoids	+	+	+	+	-
Quinones	+	-	+	-	-
Amino acid and protein	-	-	+	-	+
Tannins	-	+	+	-	-
Phylobatanins	-	-	-	-	+
Carbohydrates	+	+	+	+	+
flavanoids	-	-	+	+-	+

[Table 3]

**Phytochemical analysis of root of *N.indicum* extracted in different solvents**

phytochemical	Aqueous extract	Ethanol extract	Acetone extract	Hexane extract	Ether extract
Alkaloids	+	+	-	-	+
Cardiac glycosides	+	+	+	+	+
Phenol	+	-	-	-	-
Saponins	+	+	-	-	-
Terpenoids	+	+	+	+	-
Quinones	+		-		
Amino acid and protein	-	-	+	-	+
Tannins	+	+	+	-	-
Phylobatanins	-	-	+		+
Carbohydrates	-	+	+	+	+
flavanoids	+	+		-	-

[Table4]

- ❖ + = presence of compound
- ❖ - = absence of compound
- ❖ aqu ext = aqueous extract
- ❖ etl ext = ethanol extract
- ❖ hx ext = hexane extract
- ❖ ace ext = acetone extract
- ❖ eth ext = ether extract

In the study, the Phytochemical screening of aqueous, ethanolic, acetone, hexane and ether of *N.indicum* have been carried out to identify active constituent such as cardiac glycoside, phenol, tannins, alkaloid, terpenoids, carbohydrates, quinine were detected in leaf, stem bark, root extract.

The preliminary Phytochemical investigation showed presence of cardiac glycosides, carbohydrate, terpenoids, alkaloids, quinine and tannins compound in the acetone and ethanolic extract of *N.indicum* leaf, stem bark, root. We haven't detected result in flavanoids, phylobatannins and saponin in our screening system. But in our study we have observed that there is a positive test of cardiac glycosides in all extract.

### CONCLUSION

According to Ayurvedic text, *karaveera* is mainly used externally because it's all parts are poisonous to humans and animals. Now days, it is used internally also, many modern researches revealed various chemical compounds of *N. indicum* having high therapeutical values. Qualitative analysis of *Nerium Indicum* (karaveera) exhibited positive results for 11 medicinally important phytochemicals such as Flavonoids, Alkaloids, Tannins, Saponins, Terpenoids, Glycosides, Steroids and Phenol. These all compounds were found in leaves, stem-bark and roots of *Nerium Indicum*. Present work proves that leaves, stem bark and root of *N.indicum* are rich in flavonoids, saponins, and alkaloids and is a good source of bio-active compounds. Flavonoids have high antioxidant capacity and have protective role in inflammation, atherosclerosis, carcinogenesis and thrombosis. They also have anticancer, anti-viral, anti-inflammatory, antioxidant activity.

Phenolic acid is known as a wide range of therapeutic effect against disease like diabetics, cancer and cardiovascular disease. *N.indicum* also possesses tannin which helps to manage the glucose level in blood.

Saponin acts as anti-carcinogenic, immunostimulant and beneficial in chronic disorders. Terpenoids have anticancer, anti-inflammatory property and anti-fungal property.

These all properties had been mentioned in ayurvedic text. According to Priya nighantu, *karaveera* is described as *Hridhya* and usefull in skin diseases and shwasa roga.<sup>(6)</sup> According to *Nighantu adarsh*, therapeutical actions of *karveer* are kushtaghna and vranaroapan, It is used in indralupta, valeepaleeta, upadansha etc. It is also useful in pregnant women for kandu and kikvis roga<sup>(6)</sup>

The phytochemical screening and literature survey of *karaveera* indicate that this plant is rich in bioactive constituents.

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