

Review Article

A PHARMACOLOGICAL SCREENING OF *NERIUM OLEANDER* LINN: A REVIEW

Prashant Daware*

Nanded Pharmacy College, nanded, 431601, India.

*Corresponding author's E-mail: Prashantshubh@gmail.com

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ABSTRACT

Nerium oleander L. is an Indian folk medicine. It is a vegetatively propagated ornamental plant, valued for its evergreen and showy terminal flower clusters that are available in different colors. (White, Yellow, Red, Pink). Oleander is cultivated recently as a flowering pot plant and therefore abundant propagation of plant material for commercial use is of great importance. This species also produces secondary metabolites, some of which are pharmacological interests. The important pharmacological activities are anti-inflammatory, antibacterial, anticancer, antinociceptive, and CNS depressant activity, analgesic, antidiabetic activities. This paper explains the evidence-based information regarding all pharmacological activity of this plant.

Keywords: *Nerium oleander* L, pharmacological activities, medicinal plant.

INTRODUCTION

Nerium oleander L. is a small evergreen tree of 2–5 m in height with a wide geographical and ecological distribution, and its certain parts are used as medicinal materials in Chinese folk medicine. Oleanders are drought-tolerant evergreen plants of the Family *Apocynaceae* that originated from Mediterranean countries. All parts of the oleander plant are poisonous to humans, animals and certain insects. *Nerium oleander* L shows terminal flower clusters that are available in different colors. This species also produces secondary metabolites⁵, some of which are of pharmacological interest.

In Northern regions it may be grown as an indoor or patio plant. Oleander has flexible branches with green, smooth bark eventually turning to dark grey. Cut or broken branches exude a thick, white sap. The leaves are 5 to 20 cm long, narrow, acuminate or acute in the apex, shortly petiolate, with a coriaceous dark-green blade. Some cultivars have white or yellow variegated leaves. Flowers are produced in terminal heads and their colors vary from deep to pale pink, lilac, carmine, purple, salmon, apricot, copper, orange, yellow and white. Each flower is about 5 cm in diameter with five petals, although some cultivators have double flowers. The fruit consists of a narrow follicle 7.5 to 17.5 cm long which opens to disperse fluffy seeds. Oleander can be propagated by seed but, being allogamous and highly heterozygous, it shows great variability in seedling populations.

CHEMICAL COMPOSITION

Water extraction of *Nerium oleander* L. contains polysaccharides and monosaccharides. It is most effective because of presence of Glycosides. Neriin and alkaloids are also present, Oleandrine which have a cardio stimulatory action (Oleandrine is a cardiac glycoside). It

also contains the glycosides gentiobiosyloleandrin, gentiobiosyl-nerigoside and gentiobiosyl-beaumontoside.

In addition, its lymph is rich of minerals and α -tocopherol, an important antioxidant. Adyregenin is a compound with no cardiac effect. There are also weakly active cardenolides (heterosides of uzarigenine) and inactive cardenolides (heteroside of adynergenine, of digitalose), triterpenoids, a resin, tannins, glucose, paraffin, ursolic acid, vitamin C and an essential oil. The seeds contain glucosides (oleandrine, odorosides, and adigoside). The bark also contains glucosides (rosaginoside, nerioside, corteneroside). The roots contain steroids.

PHARMACOLOGICAL ACTIVITIES

➤ Anti-tumor activity

Essential Oil is extracted from the flowers of the oleander, and antitumor activity is effectively done on the cell lines, Ehrlich Ascites Carcinoma (EAC).¹

➤ Anti-convulsant Activity

Petroleum Ether extraction of the plant shows Anti-convulsant activity on Wistar rats and Male Swiss albino mice, up to the dose level of 2000 mg/ kg body weight of the animal.²

➤ Antimicrobial Activity

This activity is done on by the ethanolic extraction of the plant root and leaves that it shows effective action against gram-positive and gram-negative Bacteria and fungus.³ Anti-microbial activity of *Nerium oleander* stem extracts on wistar strain albino rats. Anti microbial activity against *Pseudomonas auregnosa* and *B. Subtilis*.⁹

➤ Analgesic activity

Methanolic extract is shown Analgesic activity against Swiss albino mice at about 250 mg/ kg dose.⁴



➤ Anti-diabetic activity

The experiment is done with the alloxane induced albino rats. A comparison was made between the action of *Nerium indicum* extracts and a known antidiabetic drug glibenclamide (600 µg/kg body wt.). *Nerium indicum* chloroform extract (500mg/kg) and ethanolic extract (300mg/kg) showed significant ($P < 0.001$) antidiabetic activity.⁵

➤ Anti-ulcer Activity

The methanol extract of *N. indicum* was investigated for its anti ulcer activity against plus pylorus ligation induced gastric ulcer and indomethacin induced ulcer in rats. The dose level is 500mg/kg showed maximum protection.⁶

➤ Anti-Bacterial Activity

Essential oil obtained from the flowers of the *Nerium oleander* L. plant. Which is shows In *Vitro* Antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* were used as test bacterial strains. The analyses for flower part resulted in the identification of 34 compounds, representing 93.21% of the total oil and the yields were 1.76%. The major component was neriine (22.56%), other predominant components were digitoxigenine (11.25%), Amorphane (8.11%), 1,8-cineole (6.58%), α -pinene (5.54%), calarene (5.12%), Limonene (5.01%), β - Phellandrene (4.84%), Terpinene-4-ol (3.98%), sabinene (3.22%), Isoledene (2.94%), 3- Carene (2.56%), Humulene (2.29%), β -Pinene (2.01 %) and Cymen-8-ol (1.67%). The chemical compositions revealed that this study had compositions relatively similar to those of other *Nerium oleander* essential oils analyzed in other countries. The bacterial strains tested were found to be sensitive to essential oils studied and showed a very effective bactericidal activity with minimum inhibitory concentrations (MIC) ranging from 1.45 to 5.10 mg/mL.⁷

➤ Hepatoprotective Activity

Methanolic flowers extract of *Nerium indicum* was evaluated for hepatoprotective in rats. The rats treated

with methanolic extract of *Nerium indicum* at a dose of 500 and 1000 mg/kg prevented carbon tetrachloride induced reduction in ascorbic acid.⁸

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