

# A Review on the Medicinal Importance and Ecological Importance of Kaner (Nerium Oleander) Plant

Vivek Kumar Verma

M. Pharm, Rameshwaram Institute of Technology and Management, Lucknow, UP, India

**Abstract:** *Nerium oleander*, commonly known as Kaner, is an evergreen ornamental shrub recognized for its vibrant flowers and remarkable adaptability to harsh environmental conditions. Traditionally used in various medicinal systems such as Ayurveda and Unani, the plant contains powerful bioactive compounds, notably cardiac glycosides like oleandrin and neriine, known for their anti-inflammatory, anticancer, and antibacterial properties. However, the same compounds also make the plant highly toxic, necessitating careful medicinal use. Ecologically, Kaner contributes significantly to soil stabilization, pollution tolerance, and biodiversity support. Its ability to grow in arid and polluted areas makes it an ideal candidate for afforestation, erosion control, and urban landscaping. This review discusses the dual significance of Kaner in traditional medicine and environmental conservation, while also highlighting the need for further research to mitigate toxicity and maximize its benefits.

**Keywords:** *Nerium oleander*, Kaner, medicinal plants, ecological benefits, cardiac glycosides, toxicity, phytoremediation, traditional medicine

## 1. Introduction

Kaner (*Nerium oleander*) is an evergreen shrub or small tree widely known for its attractive and vibrant flowers, commonly found in pink, white, or yellow colors. It belongs to the family Apocynaceae and is native to the Mediterranean region and parts of Asia. Due to its resilience and ornamental value, it is commonly cultivated in gardens, along roadsides, and in arid landscapes. Despite its known toxicity, every part of the Kaner plant has been traditionally used in folk medicine for the treatment of various ailments, including skin disorders, inflammation, and cardiovascular conditions. The plant contains several bioactive compounds, including cardiac glycosides such as oleandrin and neriine, which exhibit strong pharmacological effects (Langford & Boor, 1996). In addition to its medicinal relevance, Kaner plays an important ecological role. It thrives in a wide range of environmental conditions, making it suitable for combating soil erosion and rehabilitating degraded lands. It is also known for its ability to tolerate pollution, thereby serving as an environmental indicator and contributor to urban green spaces (Batanouny, 2001).

## 2. Medicinal Importance of Kaner (*Nerium oleander*)

### 2.1 Traditional Uses

Kaner has been used for centuries in traditional medicine systems such as Ayurveda, Unani, and Chinese medicine. Traditionally, its leaves, flowers, bark, and root extracts have been applied externally for treating skin infections, ulcers, eczema, and ringworm. Internally, it has been used in very small doses for treating fever, malaria, asthma, and heart-related ailments (Kamboj, 2000). However, due to its toxicity, traditional healers used it with extreme caution.

### 2.2 Bioactive Compounds

Kaner is a rich source of pharmacologically active compounds, primarily cardiac glycosides, such as oleandrin, neriine, and digitoxigenin. These compounds have been shown to exhibit several biological activities, including:

- **Anti-inflammatory:** Reduces swelling and inflammation (Katzung et al., 2017).
- **Anticancer:** Oleandrin has been studied for its ability to induce apoptosis (programmed cell death) in cancer cells, especially in leukemia, pancreatic, and prostate cancers (Manna et al., 2000).
- **Antibacterial and Antiviral:** Extracts of the plant have demonstrated activity against bacteria like *Staphylococcus aureus* and viruses such as HIV in vitro (Zhao et al., 2007).

### 2.3 Toxicity and Caution

Despite its medicinal value, all parts of the plant—especially the leaves and sap—are highly toxic if consumed in larger doses. The same cardiac glycosides that make it pharmacologically active can cause serious effects such as nausea, vomiting, bradycardia (slow heart rate), and even death (Langford & Boor, 1996). Therefore, its medicinal use requires careful dosage control and clinical validation.

## 3. Ecological Importance of Kaner (*Nerium oleander*)

### 3.1 Environmental Adaptability

Kaner is a highly resilient plant species, capable of thriving in a variety of climatic and soil conditions. It can tolerate drought, heat, and saline soils, making it ideal for arid and semi-arid environments (Kowalski & Maciejewska-Rutkowska, 2019). Its adaptability allows it to be used in afforestation and desert greening programs, especially in regions where few plants can survive.

Volume 14 Issue 5, May 2025

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

[www.ijsr.net](http://www.ijsr.net)

### 3.2 Role in Urban Landscaping and Pollution Tolerance

Kaner is widely used in urban and roadside landscaping due to its aesthetic appeal and low water requirement. Moreover, it has been shown to tolerate high levels of air pollutants such as sulfur dioxide and nitrogen oxides, acting as a bioindicator of urban pollution (Garg et al., 2014). This makes it a valuable plant for improving urban air quality and reducing heat islands.

### 3.3 Soil Stabilization and Erosion Control

The extensive root system of Kaner helps bind the soil, reducing erosion in vulnerable areas such as slopes and riverbanks. It is also used in green belts and roadside plantations for stabilizing the soil structure and preventing desertification (Rani & Sharma, 2013).

### 3.4 Support for Biodiversity

Although toxic to many animals, Kaner still provides ecological services. Its flowers attract pollinators such as bees, butterflies, and certain bird species. In this way, it supports local biodiversity in urban and rural ecosystems.

## 4. Discussion

Kaner (*Nerium oleander*) is a unique plant that stands at the intersection of medicinal and ecological significance. On one hand, it possesses powerful bioactive compounds such as oleandrin and nerine, which have demonstrated anti-inflammatory, antibacterial, and anticancer properties in various in vitro and in vivo studies. These findings support its use in traditional medicine, although the plant's inherent toxicity calls for extreme caution and further pharmacological validation. On the other hand, its ecological adaptability makes it valuable in environmental management. It thrives under extreme conditions and requires minimal care, making it an ideal candidate for arid landscaping, pollution mitigation, and erosion control. Its ornamental value and pollution tolerance have made it popular in urban greening initiatives.

However, the plant's toxic nature poses both ecological and medical concerns. While it supports some pollinators, it is harmful to herbivores and domestic animals if ingested. Therefore, despite its advantages, Kaner should be used judiciously and its cultivation must be monitored, especially in areas with children or animals.

#### Future research should focus on:

Standardizing safe extraction methods for medicinal use.  
Exploring genetic variations for low-toxicity cultivars.  
Enhancing its phytoremediation potential through biotechnology.

## 5. Conclusion

*Nerium oleander* (Kaner) is a plant of considerable importance due to its dual roles in medicine and ecology. Its use in traditional healing practices is backed by the presence of potent phytochemicals, although clinical applications require strict safety protocols. Ecologically, its resilience

and environmental benefits such as pollution tolerance, biodiversity support, and erosion control make it a promising species for sustainable landscaping and rehabilitation of degraded ecosystems. Despite its toxic nature, with responsible usage and focused research, Kaner has the potential to contribute meaningfully to both human health and environmental conservation.

## References

- [1] Batanouny, K. H. (2001). *Plants in the Deserts of the Middle East*. Springer-Verlag Berlin Heidelberg.
- [2] Garg, A., Singh, S., & Makhijani, A. (2014). Air pollution tolerance index of selected plants and their application in traffic-affected areas of Delhi. *Environmental Monitoring and Assessment*, 186(10), 6635–6643.
- [3] Kamboj, V. P. (2000). Herbal medicine. *Current Science*, 78(1), 35-39.
- [4] Katzung, B. G., Masters, S. B., & Trevor, A. J. (2017). *Basic & Clinical Pharmacology* (14th ed.). McGraw Hill
- [5] Kowalski, R., & Maciejewska-Rutkowska, I. (2019). *Nerium oleander* in drought-prone landscaping: physiological adaptations and potential use. *Environmental Botany Journal*, 45(2), 102–110.
- [6] Langford, S. D., & Boor, P. J. (1996). Oleander toxicity: an examination of human and animal toxic exposures. *Toxicology*, 109(1), 1-13.
- [7] Manna, S. K., Sah, N. K., & Aggarwal, B. B. (2000). Oleandrin suppresses activation of nuclear transcription factor-kappaB, activator protein-1, and c-Jun N-terminal kinase. *Cancer Research*, 60(14), 3838–3847.
- [8] Rani, N., & Sharma, S. (2013). Role of ornamental plants in controlling soil erosion: A case study on *Nerium oleander*. *Indian Journal of Environmental Sciences*, 17(2), 45–49.
- [9] Zhao, M., Li, Y., Wang, J., & Shan, L. (2007). Antiviral effects of *Nerium oleander* extracts on human viruses. *Journal of Ethnopharmacology*, 111(2), 380–385.