

# ADELFA: A DIMINUTIVE REVIEW

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## ABSTRACT

Adelfa is one of the best pharmacognostic devices available in the present scenario. Its modern as well as traditional uses make this substance much more valuable. However, it should be taken into account the poisoning caused by it. There is the large scope of this drug in the national as well as international market but still its rationalization has to be considered.

**Keywords:** Adelfa, cancer, diabetes, pharmacognostic.

## INTRODUCTION

Adelfa is an evergreen shrub or small tree in the dogbane family Apocyanaceae.



Figure 1: Plant of Adelfa

It is known as oleander from its superficial resemblance to the unrelated plant Olive olea but has many other names like Nerium indicum mill. and Nerium odorum soland. The white and red flowered variety is equated with Nerium indicum. Oleander grows to 2–6 m (6.6–20 ft) tall, with erect stems that splay outward as they mature; first year stems have a glaucous bloom, while mature stems have a grayish bark. The leaves are in pairs or whorls of three, thick and leathery, dark-green, narrow lanceolate, 5–21 cm (2.0–8.3 in) long and 1–3.5 cm (0.39–1.4 in) broad, and with an entire margin. The flowers grow in clusters at the end of each branch; they are white, pink to red, 2.5–5 cm (0.98–2.0 in) diameter, with a deeply 5-lobed fringed corolla round the central corolla tube. They are often, but not always, sweet-scented. The fruit is a long narrow capsule 5–23 cm (2.0–9.1 in) long, which splits open at maturity to release numerous downy seeds. Adelfa is distributed in Mediterranean region and subtropical Asia, is indigenous to India–Pakistan subcontinent. Its various parts are reported to have cardiotoxic and antibacterial activities.

Table 1: Common Naming In Different Therapy System

S. No.	Category	Common Name
1	Ayurvedic	Karavira, Viraka, Ashvamarka, Hayamaara, Gauripushpa, Siddhapushpa, Raktapushpa, Raktaprasava, Ravipriya
2	Sidha	Alari, Arabivaya
3	Unani	Kaner, Diflaa, Samm-ul-maar, Khar-Zaharah
4	English	Indian Oleander

Table 2: Phytochemical Constituents

➤ Siddiqui <sup>1</sup>	➤ reported a pentacyclic triterpene, oleanderocinoic acid, flavonoid glycosides, quercetin-5-O-[ $\alpha$ -L-rhamnopyranosyl-(1→6)]- $\beta$ -D-glucopyranoside and kaempferol-5-O-[ $\alpha$ -L-rhamnopyranosyl-(1→6)]- $\beta$ -D-glucopyranoside and a cardenolide, oleandigaside from the leaves of Nerium oleander. The growth inhibitory and cytotoxic activities of compounds were studied against MCF-7, human breast cancer cell lines using sulforhodamine B assay.
➤ Sharma <sup>2</sup>	➤ reported two new compounds heptacosane-3-enyl-5-hydroxyhexanoate and 4-oxooctyl-2-hydroxyundecanoate from the stems of Nerium oleander.
➤ Luay <sup>3</sup>	➤ reported that monoglycosidic cardenolides from Nerium oleander possessing the $3\beta,14\beta$ -dihydroxy- $5\beta$ -card-20(22)-enolide structure with or without an acetoxy group at C-16 exhibited significant anticancer activity.
➤ Patel <sup>4</sup>	➤ collected the leaves and roots of Nerium oleander and treated with petroleum ether and methanol using Soxhlet apparatus. The preliminary studies reported the presence of alkaloids, glycosides, tannins and phenolic compounds for methanolic extract of N. indicum.
➤ Qun <sup>5</sup>	➤ reported a polysaccharide fraction from the hot water extract of flowers of N. indicum using ethanol precipitation, cetyltrimethylammoniumbromide (CTAB) complexing, anion exchange chromatography and gel permeation chromatography. It has been found to contain L-rhamnose, L-galactose and D-galacturonic acid.
➤ Hasan <sup>6</sup>	➤ reported two aristolochic acid derivatives and 3-aristolactam derivatives in addition to one methylparaben from the Nerium oleander plant and identified by spectral methods.
➤ Siddiqui <sup>7</sup>	➤ reported two novel cytotoxic pentacyclic triterpenoids cis-karenin (3- $\beta$ -hydroxyphenoxy-28-Z-p-coumaroyloxy-urs-12-en-27-oic acid) and trans-karenin (3- $\beta$ -hydroxy-28-E-p-coumaroyloxy-urs-12-en-27-oic acid) reported from the leaves of N. oleander.
➤ Abe <sup>8</sup>	➤ examined polar glycosides from the air dried leaves and gentiobiosyl nerigoside and G. beaumontoside reported along with major triosides gentiobiosyl-oleandrin. Minor triosides also includes glycosides of 8- $\beta$ -hydroxy and $\Delta$ -8- $\beta$ -hydroxydigitoxigenin and $\Delta$ -neriagenin along with glycosides of known cardenolides, oleandragenin, digitoxigenin, adynerigenin, neriagenin and their $\Delta$ derivatives.
➤ Siddiqui <sup>9</sup>	➤ reported two new triterpenes oleandrolidic acid and kanerodione from the fresh undried and uncrushed leaves of Nerium oleander and their structures established as 3- $\beta$ -p-hydroxyphenoxy-11 $\alpha$ -methoxy-12- $\alpha$ -hydroxy-20-ursene-28-oic acid and 28-hydroxy-

	20(29)-lupen-3, 7-dione respectively by means of chemical and spectral studies.
➤ Siddiqui <sup>10</sup>	➤ reported two new cardiac glycosides kaneroside and neriumoside from the fresh undried, winter leaves of N.Oleander and their structures established as 3β-O-(D-diginosyl)-2α-14β-dihydroxy-5β-carda-16:17, 20:22dienolide respectively through chemical and structural studies.
➤ Yamuchi <sup>11</sup>	➤ reported the β-D-digitaloside & β-D-glucosyl β-D-digitaloside from the root bark of N.odorum. Odoroside B obtained in high yield among the digitoxigenin and uzarigenin glycosides. With the help of Column Chromatography oleandrigenin β-gentiobiosyl-(1→4)-β-D-digitaloside was reported along with other oleanderigenin glycosides.

Table 3: Pharmacological Activity

➤ Singhal and Gupta <sup>12</sup>	➤ reported hepatoprotective and antioxidant activity of methanolic extract of flowers of Nerium oleander against CCl <sub>4</sub> induced liver injury in rats.
➤ Wong <sup>13</sup>	➤ carried out antiproliferative and phytochemical analysis of N.oleander leaf extract and Nerium reported positive growth inhibitory activity against three human cell lines.
➤ Sikarwar <sup>14</sup>	➤ studied the anti diabetic activity in alloxan induced diabetic albino rats and comparison was done with glibenclamide. The chloroform & ethanolic extract reported significant antidiabetic activity.
➤ Veronika <sup>15</sup>	➤ studied that Nerium oleander has a potentially lethal effect after ingestion. As in literature data from case reports review to identify the treatment by evidence for the management of poisoning by N.oleander.
➤ Nurgun <sup>16</sup>	➤ reported anti-inflammatory and antinociceptive activity in vivo from the dried and fresh flowers and leaves of N.oleander.
➤ Begum <sup>17</sup>	➤ carried out a bioactive directed isolation from the extract of fresh uncrushed leaves of N.oleander and reported a CNS depressant effect in mice. As a result CNS depressant cardenolides including a new cardenolide, neridiginoside and odoroside-H have been reported which exhibited CNS depressant activity in mice at a dose of 25mg/kg.
➤ Zia <sup>18</sup>	➤ studied two fractions with respect to their action on CNS & behavior pattern in mice. Both fractions have shown reduction in motor activity, rotarod performance and potentiation of hexobarbital sleeping time.

### TRADITIONAL AND MODERN USE

Charka prescribed the leaves of white flowered variety externally in chronic and obstinate skin diseases of serious nature including leprosy. Sushruta used karavira in medicinal paste for application in alopecia. Root powdered with water was applied to alleviate venereal diseases. The powder of leaves was used as a snuff for treating epilepsy. All parts of plant especially roots were known to be highly poisonous when taken internally. Medicinal uses of Adelfa include treating ulcers, hemorrhoids, and leprosy. In addition, oleander has been used to treat ringworm, herpes, and abscesses. Adelfa is native to northern Africa, Southeast Asia, and parts of the

Mediterranean. Although people have used this supplement for centuries to treat a variety of ailments, Adelfa oleander is very toxic and should not be ingested.

#### OLEANDER POISONING

Oleander poisoning can occur with uses of even small doses and can cause nausea, vomiting, bloody diarrhea, and dizziness. In addition, nerium oleander toxicity can cause loss of appetite and dilated pupils. The symptoms of toxicity typically occur within three hours of consumption and without emergency medical intervention, serious health consequences can occur. Serious effects of oleander toxicity can include seizures, heart irregularities, and hypotension. In addition, fatal cardiac complications and loss of consciousness can occur as well. Treatment for this medical emergency includes the administration of activated charcoal and intravenous fluids. In addition, gastric lavage, or stomach pumping, may be done to remove as much of the substance as possible from the stomach.

#### CONCLUSION

From the literature survey concluded that Adelfa has been used in the treatment of skin diseases, cancer, diabetes, inflammation and CNS depression. So there is need to explore its potential in the field of medicinal & pharmaceutical sciences for novel application. As Adelfa is a popular remedy among the various ethnic groups, Ayurvedic and traditional practitioners for the treatment of various ailments. So there is need to investigate the therapeutic potential of this plant. Moreover its poisoning aspect must be look into before its use.

#### REFERENCES

- [1] B.S. Siddiqui, N. Khatoon, S. Begum, et al. Flavonoid and cardenolide glycosides and a pentacyclic triterpene from the leaves of Nerium oleander and evaluation of cytotoxicity. *Phytochemistry*, 2012, 77: 238-244.
- [2] P. Sharma, Y. K. Gupta, M. C. Sharma, et al. Two new compounds from the stem of Nerium oleander. *Indian Journal of Chemistry*, 2012, 49B: 374-378.
- [3] J.R. Luay, F. Katrin, M.K. Myint, et al. Characterization of the anticancer properties of monoglycosidic cardenolides isolated from Nerium oleander and Streptocaulon tomentosum *Journal of Ethnopharmacology*, 2011, 134: 781-788.
- [4] G. Patel, S. Nayak, Shrivastavas, Physical evaluation and quantitative chemical evaluation of methanolic extract of Nerium indicum. *International Journal of Current Trends of Science and Technology*, 2010, 1 (2): 32-36.
- [5] D. Qun, L. Xuan, Y Tian, et al. Structural characterization of a pectin polysaccharide from Nerium indicum. *Phytochemistry*, 2010, 71: 1430-1437.
- [6] A.A. Hassan, E.K. Hassan, Chemical Examination of the leaves of Nerium oleander. *International Journal of Tropical Medicine*, 2006, 1(2):58-61.
- [7] B.S. Siddiqui, S. Begum, S. Siddiqui, et al. Two cytotoxic pentacyclic triterpenoids from Nerium oleander. *Phytochemistry*, 1995, 39(1): 171-174.
- [8] F. Abe, T. Yamuchi, Cardenolide triosides of Oleander leaves. *Phytochemistry*, 1992, 31(7): 2459-2463.
- [9] S. Siddiqui, F. Hafeez, S. Begum, et al. Two triterpenes from the leaves of Nerium oleander. *Phytochemistry*, 1989, 28(4): 1187-1191.
- [10] S. Siddiqui, F. Hafeez, S. Begum, et al. Isolation and structure of two cardiac glycosides from the leaves of Nerium oleander. *Phytochemistry*, 1987, 26(1): 237-241.
- [11] T. Yamuchi, M. Takahshi, F. Abe, Cardiac Glycosides of the root bark of Nerium oleander. *Phytochemistry*, 1976, 15: 1275-1278.
- [12] K.G. Singhal, G.D. Gupta, Hepatoprotective and antioxidant activity of methanolic extract of flowers of Nerium oleander against CCl<sub>4</sub> induced liver injury in rats. *Asian Pacific Journal of Tropical Medicine*, 2012, 5(9): 677-685.
- [13] S.K. Wong, Y.Y. Lim, N.R. Abdullah, et al. Antiproliferative and phytochemical analysis of leaf extracts of ten Apocyanaceae species. *Pharmacognosy Research*, 2011, 3(2): 100-106.
- [14] M.S. Sikarwar, M.B. Patil, C.K. Kokate, et al. Antidiabetic activity of Nerium indicum leaf extract in alloxan-induced rats. *Journal of Young Pharmacists*, 2009, 1(4): 330-335.
- [15] B. Veronika, A.W. Scott, W. Julean, et al. A review of the natural history, toxicology, diagnosis and clinical management of N.oleander (common oleander) and Thevetia peruviana (yellow oleander) poisoning. *Toxicon*, 2010, 56: 273-281.
- [16] E. Nurgun, K. Esru, Y. Erdem, Anti-inflammatory and Antinociceptive activity assessment of plants used as remedy in Turkish folk medicine. *Journal of Ethnopharmacology*, 2003, 89: 123-129.
- [17] S. Begum, B.S. Siddiqui, R. Sultana, et al. Bioactive Cardenolides from the leaves of Nerium oleander. *Phytochemistry*, 1999, 50: 435-438.
- [18] A. Zia, B.S. Siddiqui, S. Begum, et al. Studies on the constituents of the leaves of Nerium oleander on behavior pattern in mice. *Journal of Ethnopharmacology*, 1995, 49: 33-39.