



International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 9, Special Issue 1, April 2026



Study on Pharmacological Properties of a few species in Apocynaceae Family – An Overview

Bommegowdna A Mauna, Dr. Parameshwar Naik T

Research Scholar, Sahyadri Science College, Kuvempu University, Shivamogga, Karnataka, India¹

Professor, Department of Botany and Seed Technology, Sahyadri Science College, Shivamogga, Karnataka, India²

Corresponding Author: maunaashok@gmail.com

ABSTRACT: Plants play a major role in all aspects as nutritious source, wealth components, pharmaceuticals etc. Many members of the family Apocynaceae are toxic to life but still serve as antidotes and turn as therapeutic agents which cure deadly diseases in suggested use. This review study includes *Conemorpha fragrans* G. Don., *Catharanthus roseus* (L.) G. Don., *Ellertonia rheedii* Wight and *Nerium oleander* Linn. shows the best pharmacological activities in various pharmaceutical sections. Phytochemicals derived from these selected plants alkaloids, phenols, saponins, flavonoids, terpenoids provides the best phytotherapeutic sources for several diseases. They showed antifungal, antimicrobial, antioxidative, anticancer, antidiabetic, anti-inflammatory, antihypertensive, antinociceptive, antihelmintic, antipyretic, antiviral activities etc. due to their toxic metabolites have the severe defensive mechanism. Thus, the plants can be used as fencing against grazing animals. The flowers are highly valuable in Sanathan custom with great fragrance also cultivated in ornamental gardens.

KEYWORDS: Apocynaceae family, phytotherapeutic sources, toxic metabolites.

I. INTRODUCTION

The family apocynaceae is commonly termed dogbane family. The members of the family are huge toxic if ingested wrong. Though, they are rich source of therapeutic agents which have great capacity to resolve severe health issues. The species of different genera grows in different geographical conditions. The selected species belong to four different genera such as *Catharanthus*, *Nerium*, *Conemorpha* and *Ellertonia*. *Catharanthus roseus* prefers moist or can grow in well-drained soil condition where have high tolerance against hot temperature commonly seen in grasslands, scrubby dunes, occupied ornamental gardens. *Nerium oleander* is commonly seen in ornamental corridors for its bright flowrates and durability are commonly called rosebay found across river valleys of stream beds can tolerate long drought or flood rainfall. *Conemorpha fragrans* G. Don. commonly called as frangipani vine and naturally distributed from India, Myanmar, Sri Lanka to Thailand in riparian regions. *Ellertonia rheedii* Wight. simply called Nara balli is an indigenous plant endemic to Peninsular India also prefers riparian geographical extensions. All four species combined in the study serves immense source of phyto-therapeutic activities in various sections of pharma field. The flowers are highly valued in Sanathana culture where offered to worship to deserve wishes believed. The phytochemicals derived from the plants have the potential of life saving agencies are used as antidiabetic, antimicrobial, antifungal, anti-inflammation, antioxidative, anticancer, anti-helminthic, antipyretic, antiviral, antihypertensive, antinociceptive, anti-amoebic activities etc.

Morphological Description

Nerium oleander is a woody bushy shrub with leathery narrow linear lanceolate opposite dark green having prominent mid ribbed leaves. Flowers are aromatic funnel shaped variant shades bear pair of long pods. Madagascar periwinkle nomenclature as *Catharanthus roseus* is a flexible erect branched herb with milky sap has pale mid ribbed glossy dark green oval to oblong opposite leaves with tubular lobed flowers mature into pair of follicular fruits containing number of black seeds. *Conemorpha fragrans* is a stout climbing watery latex shrubby thick lenticels bearing liana. Leaves are opposite hirsute large shiny broad green colored bloom salver shaped corolla slightly expanded hairy throat and base



twisting fragrant flowers. *Ellertonia rheedii* simply termed Nara balli means a woody climber sprout acuminate elliptical leaves of three inches with White flowers and shows diverticated linear spotted 'whisker' follicles.

Bioactive Phytochemicals

The selected plants from the family Apocynaceae consist various forms of bioactive agents such as flavonoids, saponins, alkaloids, phenolics, terpenoids and their derivatives. The derivative compounds such as vinblastine, vincristine, catharoseumine, 17-deacetyoxycyclovinblastine, 14,15-didehydrocyclovinblastine, 17-deacetyoxycyclovinamide of *Catharanthus roseus* where as neriin, oleandrin, gentiosyl-nerigoside, gentiobiosyl-beaumontoside of *Nerium oleander*, *Conemorpha fragrans* constitutes japiindine, n-formylchonemorphin, n-methyl chonemorphin, funtamafrine etc. Phytochemicals such as tannins, phenolics, steroids and proteins are numerous extracted in *Ellertonia rheedii*.

Pharmacological Activities

The four members belonging to Apocynaceae family throws with best pharmacological activities to mankind. They are the vast sources of pharma properties with best ethnomedicinal and allopathic aspects. /ml in HL-60 and K562 cells A. V. Kulkarni *et.al.*, writes that the whole plant called *Conemorpha fragrans* was used in Kumaryasavam and Sudarsanasavam as tonic because of its rewarding medicinal properties. Its used in the treatment of fever, stomach diseases, inflammation and skin diseases. Investigation of in-vivo and in-vitro based phytochemicals revealed the total alkaloids were in high quantity in stem and bark rather than leaves. In-vivo callus showed rich amount of total alkaloids when compared to in-vitro at the period of TLC investigation. HPLC study on ethanolic extracts of stem and bark revealed the presence of a compound called Comptothecin which has anticancer property and the callus extract of ethanol provided good antimicrobial activity over gram positive organisms. The study on plant extract of *Conemorpha fragrans* estimated by Renuka Madhu *et.al.*, revealed that have different pharmacological activities like anti-parasitic, anticancer, antipyretic, antidiabetic anti-HIV. Methanolic extract of leaves showed the great inhibitory activity of leukemic cells on analysis with IC₅₀ along the concentration of 0.3 ± 0.02 and 0.29 ± 0.02 μg in HL-60 and K562 cells and in aqueous extract of leaves with IC₅₀ concentration of 4 ± 0.03 and 1.8 ± 0.04 μg in HL-60 and K562 cells. Results of analytical study revealed that both the leaves and callus methanolic extracts exhibited maximum activity when compared to aqueous extracts against cancer. Phytochemical estimation conducted by Pradnya Kedari and Nutan Malpathak revealed the presence of secondary metabolites such as flavonoid and phenolic content. Phenolic content presented high correlative activity with Phosphomolybdenum reduction potential and rich correlation was exhibited with Phosphomolybdenum as well as Hydrogen peroxide radical scavenging potential by flavonoid content. They even studied that the selected plant extract having DNA protection activity in *Conemorpha fragrans* liana. Chloroform extraction from callus revealed high anticancer potential by exhibiting Topo -I inhibitory activity and DNA pol inhibition activity which proved best anticancer activity against colon epithelium, lung carcinoma and epidermal carcinoma cell lines in humans.

S. R. Dhanya *et.al.*, isolated nine non-alkaloid and five alkaloid components from acetone extract of *Conemorpha fragrans*. Nine non-alkaloid constituents include sitostenone, β -sitosterol, naringenin, aromadendrin, matairesinol, vanillic acid, ferulic acid, protocathechinic acid, sitosterol-3-O- β -D-glucopyranoside. Other five alkaloids combines japiindine, sarcocurinine D, dictyophlebin, chonemorphin and N-formylchonemorphine. They were the first hands to achieve in reporting the isolation of sarcocurinine D from the selected plant and revealed the best antibacterial activity and less toxic up to 100 μM concentration in cytotoxicity activity. Phytochemical study conducted by Amrisha Chandra and Rekha Rajput revealed the presence of sterols in Petroleum ether, Chloroform showed result for triterpenoids and alcoholic as well as aqueous extracts showed positive results for glycosides. Different solvent extracts exhibited the presence of saponins, proteins, tannins, alkaloids, carbohydrates and flavonoids. According to the Ayurvedic pharmacological studies, organoleptic parameters showed that the color of root was yellowish after drying having a particular characterized odor concentration with sweet taste along fibrous texture. Quantitative analysis revealed best result in determining authenticity and purity of drug which helps in prevention of fungal and bacterial development.

The first report of hairy root culture of *Conemorpha fragrans* (Moon) Alston proved the presence of Cantotheicin (CPT) which is a most important anti-cancerous drug that works better in the treatment of several cancers after derivatization in root hairs. Kausar Fatima and Konde Abbula encountered the presence of secondary metabolites such as alkaloids, glycosides, carbohydrates, flavonoids, tannins, saponins, sterols, phenols and proteins during preliminary screening of



phytochemicals. Pharmacological investigation such as antihyperlipidemic and antidiabetic activities by combined herbal formulation in alloxan induced diabetes in wistar rats with 200 mg/Kg b.w. and 400 mg/Kg which was continued for 21 days. Increased blood glucose level due to the induction of alloxan was protected by treating with combined herbal formulation and the evaluated blood glucose, VLDL and LDL levels during comparison test was done with 5 mg/Kg b.w. glibenclamide as oral dose. Total cholesterol and total triglyceride levels were significantly decreased. Where showed increased result in HDL levels.

M. Duraisankar *et.al.*, undergone a comparative evaluation of antioxidant activity of roots with standard ascorbic acid revealed IC₅₀ values such as 198.7 ± 0.2 in DPPH, 275.7 ± 0.8 hydroxyl and 177.4 ± 0.4 µg/ml superoxide radical scavenging activities. Hepatotoxicity for 14 days induced liver injury orally by paracetamol (2 gm/Kg) and Isoniazid 100 mg/Kg toxic effect were prevented by two different set of experiments such as *Conemorpha fragrans* extract (200 and 400 mg/Kg) and Silymarin (25 mg/Kg). according to N.P. Ambujakshi *et.al.*, research, maximum biological mass of 100 mg/L Glycimelicited callus was achieved on Gamborg's medium augmented with 0.5 mg/L of 2,4-Dichlorophenoxy acetic acid and Benzylamino purine. Chitosan elicited callus showed the greater antioxidant and the presence of secondary metabolites.

Arundeeep M. undertook preliminary phytochemical analysis learnt the presence of tannins, proteins, phenolics, steroids also included ethnomedicinal uses of leaves as salads, tonics, spice constituting pharmacological activities providing source of Pradhana rasa and Madhura or Anurasa of leaf extract of *Ellertonia rheedii* Wight. Fluorides, sulphates, phosphates, chlorides were exhibited in ash analysis and no toxicity was observed at the study of acute dermal toxicity in leaf Kalka.

Biological activities conducted by Fatemeh Ebrahimi *et.al.*, on *Nerium oleander* Linn. revealed the various pharmacological activities include antidiabetic, antioxidant, anti-inflammatory, larvicidal, antiviral, diuretic immunomodulating pupocidal, anti-cancerous strategies along CNS antidepressant. Several secondary metabolites were studied in different solvents extraction and their derived compounds. 12 triterpene derivatives, polyphenols and majority of cinnamic acid were observed in leaves extraction. Fresh leaves led to isolate two new compounds coumaryl oxy-triterpenoids, neriucoumaric acid and two new forms heptacosane-3-enyl-5-hydroxyhexanoate, 4-oxoocetyl-2-hydroxyundecanoate from leaves extract.

The phytochemical in *Catharanthus roseus* derived were alkaloids shown extreme pharma properties which combines anticancer, antimicrobial, anti-inflammatory and antihypertensive active capacity. The derivative compounds in Nithyapushpa called Vinblastine and Vincristine proved magnificent power in curing wide range of cancers which holds Chinese traditional supportive proof as medicine. The plant also showed potential against lung diseases skin allergy, swelling bowels, excretion etc.

II. CONCLUSION

Our ancient people were well worse in ethnomedicines. A large number of derivatives were identified serves best sources for different dreadful diseases. World's oldest medicinal system Ayurveda gave real evidence to undertake other medicinal systems including allopathy. Though all four species of the study are toxic if consumed careless without proper suggestion, each species showed best pharmacological potential against the diseases. More and more analysis are necessary in future aspects for human and animal society.

REFERENCES

1. Amita Pandey *et.al.*, (2024). Phytochemical and Pharmacological Attributes of *Nerium oleander*: A Review. THE INTERNATIONAL MEDICINE AND BIOSCIENCES CONFERENCE, VOL. 20(5): 570-585.
2. Amrish Chandra and Rekha Rajput (2011). Standardization and phytochemical screening of *Conemorpha fragrans* root powder. Journal of Chemical and Pharmaceutical Research, 3(6): 759-765.
3. V. Kulkarni, Ankur Patwardhan *et.al.*, (2011). Pharmacognostic evaluation of *Chonemorpha grandiflora*, an endangered medicinal plant. IJPSR, vol. 2(10): 2690-2693.



4. Arundeeep. M (2021). EXPERIMENTAL STUDY ON *Ellertonia rheedii* Wight. LEAF FOR ITS DERMAL TOXICITY. International Ayurvedic Medical Journal,
5. Dr. Arundeeep. M (2019). Pharmacognostic and phytochemical essay of *Ellertoniarheedii* Wigh. International Ayurvedic Medicinal Journal, India.
6. Fatemeh Ebrahimi *et.al.*, (2021). Agronomic and pharmacological aspects of *Nerium oleander*: an important medicinal plant. MPSD. The first National Congress 2018.
7. Gajalakshmi S S and Devi Rajeswari (2013). Pharmacological activities of *Catharanthus roseus*: A perspective review. International Journal of Pharma and Bio Sciences, 4(2): 431-439.
8. Goraksh J. Hase *et.al.*, (2026). PHYTOMORPHOLOGY OF *NERIUM OLEANDER* L. – A REVIEW. International Journal of Phytopharmacology, 3(2), 63-67.
9. Kausar Fatima and Konde Abbulu (2017). Antidiabetic And Antihyperlipidemic Activity of *Conemorpha fragrans* And *Erythroxylum monogynum* Combined Ethanolic Leaf Extract in Alloxan Induced Diabetic Wistar Rats. Indo American Journal of Pharmaceutical Research, 7(01): 7428-7436.
10. Lakhmili Siham *et.al.*, (2014). CHEMICAL ANALYSIS AND ANTIOXIDANT ACTIVITY OF “*NERIUM OLEANDER*” LEAVES. Online Journal of Biological Sciences , 14(1): 1-7.
11. M. Duraisankar *et.al.*, (2015). Hepatoprotective activity of alcoholic extract of *Conemorpha fragrans* root in against Paracetamol and Isoniazid induced liver damage in rats. International Journal of Pharm Tech Research, vol. 8, No. 7, pp. 232-242.
12. N. P. Ambujakshi *et.al.*, (2022). Influence of elicitors on the enhancement of camptothecin accumulation and antioxidant potential in callus cultures of *Conemorpha fragrans*.
13. Pradnya Kedari and Nutan Malpathak (2014). Exploring Antioxidant Activity And DNA Protection Potential of *Conemorpha fragrans*. IJPSR, vol. 5, issue 12.
14. Pradnya Parakash Kedari and Nutan Padmavabh Malpathak (2016). Screening of *Conemorpha fragrans* Bioactive Extracts for Cytotoxicity Potential and Inhibition Studies of Key Enzymes Involved in Replication. National Liabrary of Medicine (NIH), Pharmacogn Mag; 12(Suppl 3): S297-S302.
15. Renuka Madhu *et.al.*, (2017). Established *Conemorpha fragrans* callus Exhibited Biological Activities As That of Plant Extract. International Journal of Current Research, vol. 9, issue 02, pp. 46545-46552.
16. Siddharth Goswami *et.al.*, (2024). Pharmacological significance of *Catharanthus roseus* in Cancer management: A review. Pharmacological Research – Modern Chinese Medicine, Vol. 11, 100444.
17. S. R. Dhanya *et.al.*, (2021). Chemical constituents from *Conemorpha fragrans* roots and antibacterial activity studies of sarcocurinine D. Natural Product Research, Vol. 36, Issue10.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com