

## EFFECTS, PHARMACOLOGICAL ACTIONS, PHYTOCHEMICAL COMPONENTS AND THERAPEUTIC APPLICATIONS OF *ADENIUM OBESUM*

Sunayana Vikhe\*, Ganesh Gunjal and Manish Ahire

India.

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\*Corresponding Author

Sunayana Vikhe

India.

[ajaynannar@gmail.com](mailto:ajaynannar@gmail.com),

[sunainavikhe@gmail.com](mailto:sunainavikhe@gmail.com),

[ganeshgunjal9191@gmail.com](mailto:ganeshgunjal9191@gmail.com)

### ABSTRACT

Since ancient times, medicinal plants have been essential to the advancement of humankind and the treatment of a wide range of illnesses. The only secure sources of novel medications to treat both curable and incurable illnesses are medicinal plants. Approximately 25% of prescription medications on the market today come from natural resources. One of the few native medicinal plants, *Adenium obesum* (AO), is a member of the Apocynaceae family. *Adenium obesum* is significant from an aesthetic and ecological standpoint. Its caudex acts as a water store, allowing it to survive dry spells, and its blooms draw pollinators that are essential to the biodiversity of the ecosystem. The plant's cultivation demands specific attention, including proper lighting, well-draining soil, and appropriate, irrigation techniques. *Adenium obesum*'s potential as a medicine has also been

piqued by early studies that indicates it may have anti-inflammatory, antioxidant, and anti-diabetic effects. Notwithstanding its widespread appeal, issues including habitat degradation and overfishing pose a threat to its continued survival.

**KEYWORDS:** *Adenium Obesum*, Apocynaceae, Antiinflammatory, Antidiabetic.



## INTRODUCTION

Since ancient times, the use of plants and plant-based products in conventional medical systems such as homeopathy, acupuncture, aromatherapy, ayurvedic medicine, etc., has grown dramatically.<sup>[1]</sup> Naturally derived medicines are known to be used by many individuals in traditional systems to treat a variety of disorders since they are less expensive and have less negative effects. Generally speaking, plants continue to be the greatest biological source of secondary metabolic compounds that can be used to cure a range of illnesses. Over 80% of people on the planet currently use these natural remedies for illness treatment and prevention. Plants continue to be the greatest natural source of secondary metabolic chemicals, which are useful in the treatment of a variety of illnesses.<sup>[3]</sup> The plant included various other small chemical components in addition to carbohydrates, cardiac glycosides, flavonides, prenylated flavonoids, and terpenoides, according to the biochemical analysis of the chosen plant species. For a very long time, there have been a lot of naturally occurring compounds that are biologically active, show biological activity for human health, and have a big potential for creating new drugs. In plant chemotherapy, the use of naturally occurring antimicrobial compounds is becoming more significant and vital. Medicinal plant use is essential to preserving people's individual and societal health. Due to a multitude of chemical compounds that have physiological effects on humans, many plants offer substantial medical promise. *Adenium obesum*, also referred to as the Desert Rose or Sabi Star, is a fascinating and hardy plant that has drawn interest from horticulturists, botanists, and researchers all over the world. This succulent species, which is native to the arid parts of Africa and the Arabian Peninsula, has become well-known due to its eye-catching look as well as its potential ecological relevance, therapeutic qualities, and versatility in a variety of growing settings. The amazing example of how nature has adapted to survive in harsh environments is provided by *Adenium obesum*.<sup>[6]</sup>

Approximately 80% of people worldwide use Ayurvedic and other herbal-based alternative medicine systems. *Adenium obesum*, also referred to as desert rose, is a succulent plant that belongs to the dogbane family. Native to Africa, Apocyanacea is found growing wild in Yemen, Oman, Saudi Arabia, Senegal, Somalia, and Ethiopia. Many different diseases are treated with parts of a particular species.

Because of their potential medical benefits, a number of plant species have been selected for commercial cultivation.<sup>[3]</sup> The phytochemical analysis revealed the presence of

carbohydrates, terpenoids, cardiac glycosides, flavonoids, and pregnanes in the chosen plant. *Adenium obesum* is a gorgeous pachycaul shrub that is deciduous. Its thick, smooth, greyish-green to brown branches are arranged unevenly, making it a great choice for bonsai. It bears beautiful, multicolored, star-shaped flowers, but no scent. The plants possess antiviral, antibacterial, anticancer, piscicidal, trypanocidal, and molluscicidal qualities. The plant thrives on sandy and stony soils. This species ranges in height from two to four meters. The bark is light yellow at first, but it eventually turns brown and grey. The oval-shaped leaves are grouped at the tips of branches in a spiral pattern. The chosen species' fruits and flowers are a unique variety that are dependent on the surrounding environment.

The flowers are typically multicolored. The fruit is a follicle that splits along one side to release seeds when it reaches maturity.<sup>[5]</sup>



### Botanical Characteristics of *Adenium obesum*

*Adenium obesum*, often called Sabi Star or Desert Rose, is a plant with a distinctive look and survival tactics due to a variety of unusual botanical traits.

**Caudex:** The swelling, water-storing stem known as a caudex is the most noticeable and identifiable characteristic of *Adenium obesum*. The caudex is usually located above ground and can be bulbous or cylindrical in shape. This unique structure functions as a water reservoir, storing moisture that the plant can use to withstand extended droughts.<sup>[1]</sup>

**Leaves:** Succulent and leathery, *Adenium obesum* leaves are usually grouped near the terminals of branches. Their elliptical or obovate shape and varying sizes are caused by the age and growth conditions of the plant. Because the leaves are succulent, less water is lost through transpiration, which aids in water conservation for the plant during dry spells.<sup>[2]</sup>

**Flowers:** One of *Adenium obesum*'s most distinctive features is its trumpet-shaped blossoms. These blooms are multicolored and can be seen in shades of pink, red, white, and occasionally bicolor combinations. They grow in clusters at the terminals of branches. The blooms draw pollinators by acting as both useful structures and decorative elements.<sup>[3]</sup>

### Plant Profile

Kingdom- Plantae Subkingdom- Tracheobionta Division- Magnoliophyta Class- Magnoliopsida Order- Gentianales Family- Apocynaceae Genus- *Adenium* Species- *Obesum*.

### Phytoconstituents

various chemical types that are progressively expanded in number according to the age of the locally grown complete AO plant. The results of the phytochemical analysis indicated that the chosen plant included various chemical groups, including terpenoids, cardiac glycosides, carbohydrates, prenylated flavonoids, and pegenene. The majority of the distinct chemical components that were separated from the chosen plant had biological activity. Previous research on the chosen plant conducted by several authors revealed the isolation and identification of 53 distinct chemicals. Certain substances possess various biological properties such as antiviral, anticancer, and cytotoxic properties, and some of them are toxic.<sup>[2]</sup>

| Stem-bark | Betulin Rosmarinic Acid                                           |
|-----------|-------------------------------------------------------------------|
| Steam     | 3,5,7,3',4',5'-Hexahydroxy flavone 5,7,3',4'-Tetrahydroxy flavone |
| Leaves    | Honghelin<br>Obeside B.<br>Obeside C.                             |

### Pharmacological Activities

**Antioxidant Activity:** It is thought that *Adenium obesum* has chemicals with antioxidant qualities in some of its parts, such as its leaves and stems. Antioxidants protect the organism from oxidative stress by scavenging dangerous free radicals. These characteristics imply that plant extracts may be able to improve general health and lower the risk of chronic illnesses brought on by oxidative damage.<sup>[1]</sup>

**Wound Healing:** *Adenium obesum* has been applied topically to aid with wound healing in traditional medicine. Certain plant chemicals are thought to possess wound-closing and antimicrobial qualities. Even while historic knowledge is fascinating, in order to verify these

assertions and identify the best application techniques, contemporary scientific study is required.<sup>[1]</sup>

### Antimicrobial Activities

The antibacterial activity of all polarity crude extracts from the chosen indigenous plant species was tested against strains of Gram (+ and –) bacteria. Amoxicillin, dimethyl sulfoxide solvent (DMSO), and antibiotics were utilized as positive and negative controls. Every bacterial strain was obtained from the nearby hospital and clinically isolated. When tested against bacterial strains that were Gram (+ and –), all of the crude extracts shown maybe moderate activity. Butanol extract exhibited the highest level of antimicrobial inhibition among the produced extracts.<sup>[4]</sup>

### Medicinal Uses

The native *Adenium obesum* species is significant in all sections and has long been utilized in medicine to treat a variety of illnesses. The lotion that is extracted from the bark and root is used to treat various skin conditions and eradicate lice. This plant's white latex is an excellent medication for treating infected wounds and tooth rot. Kenyans use the powdered stem to kill skin parasites on cattle and camels.<sup>[3]</sup> and white latex to fight lice. Many cultures have utilized *adenium obesum* in traditional medicine to treat maladies like skin diseases, digestive problems, and respiratory infections. Studies on ethnopharmacology seek to investigate the customary applications of plants and evaluate their possible applicability in contemporary medicine.<sup>[1]</sup>

### CONCLUSION

*Adenium obesum*, commonly referred to as the Desert Rose or Sabi Star, is an amazing plant that fascinates botanists and scientists alike. This species' many qualities are highlighted by its unusual blend of botanical traits, ecological value, cultivation capability, and potential medical benefits. *Adenium obesum* is proof of the adaptability and resiliency of nature. Its crucial role within ecosystems is highlighted by its significance in stabilizing habitats, supplying food for pollinators, and serving as an indicator species.<sup>[3]</sup> The review of the literature revealed that the isolated chemicals and crude extracts from plants have a variety of biological actions, including those that are potentially immunomodulatory and cardiogenic as well as anticancer, antimicrobial, anti-influenza, molluscicidal, and locusticidal. There hasn't been any research done on plant parts' essential oils yet.<sup>[2]</sup>

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## REFERENCE

1. Exploring the Mysterious Adenium Obesum: its botanical Appeal, Ecological significance cultivation insights, and potential medicinal applications, Dr. Shyashank Tiwari, Shreya Talreja.
2. A review on Adenium obesum: A potential endemic medicinal plant in Oman, Associate Professor Dr. Md. Amzad Hossain.
3. Evaluation of different extraction methods on antimicrobial potency of Adenium obesum stem against food borne pathogenic bacterial strains in Oman, Mohammad Amzad Hossain, Tahiya Hilal Ali Al-Abri, Amira Hamood Salim Al-Musalami, Md. Sohail Akhtar, Sadri Said.
4. Biological Activities of Adenium obesum (Forssk) Roem. & Schult. A Concise Review, D. Paul, K. Biswas, S. Sinha.
5. N Vitro Evaluation of Antioxidant, Anticancer, and Anti-Inflammatory Activities of Ethanolic Leaf Extract of Adenium obesum, Ahmad Alshehri, Afza Ahmad, Rohit Kumar Tiwari, † Irfan Ahmad, Ali G. Alkhathami, Mohammad Y. Alshahrani, Mohammed A. Asiri, Tahani M. Almeleebia, Mohd Saeed, Dharmendra Kumar Yadav, Irfan Ahmad Ansari.
6. Kiyohara H., Ichino C., Kawamura Y., Nagai T., Sato N., Yamada H., et al. (2012). In Vitro anti-influenza Virus Activity of a Cardiotonic Glycoside from Adenium Obesum (Forssk). *Phytomedicine*, 19(2): 111–114. 10.1016/j.phymed.2011.07.004.
7. Ali A., Ali A., Husain Warsi M., Ahmad W., Tahir A. (2021). Chemical Characterization, Antidiabetic and Anticancer Activities of Santolina Chamaecyparissus. *Saudi J. Biol. Sci*, 28(8): 4575–4580. 10.1016/j.sjbs.2021.04.060.
8. Das K., Roychoudhury A. (2014). Reactive Oxygen Species (ROS) and Response of Antioxidants as ROS-Scavengers during Environmental Stress in Plants. *Front. Environ. Sci*, 2: 53. 10.3389/fenvs.2014.00053.
9. Isbilen O., Volkan E. (2021). Allium Willeaum Holmboe Exerts Anticancer Activities on Metastatic Breast Cancer Cells MCF-7 and MDA-MB-231. *Heliyon*, 7(8): e07730.

10.1016/j.heliyon.2021.e07730.

10. Kiyohara H., Ichino C., Kawamura Y., Nagai T., Sato N., Yamada H., et al. (2012). In Vitro anti-influenza Virus Activity of a Cardiotonic Glycoside from *Adenium Obesum* (Forssk.). *Phytomedicine*, 19(2): 111–114. 10.1016/j.phymed.2011.07.004.
11. Pizzino G., Irrera N., Cucinotta M., Pallio G., Mannino F., Arcoraci V., et al. (2017). Oxidative Stress: Harms and Benefits for Human Health. *Oxid. Med. Cell Longev*, 2017; 8416763. 10.1155/2017/8416763.