



EXPLORING THE MYSTERIOUS ADENIUM OBESUM: ITS BOTANICAL APPEAL, ECOLOGICAL SIGNIFICANCE, CULTIVATION INSIGHTS, AND POTENTIAL MEDICINAL APPLICATIONS

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Abstract:

Adenium obesum, commonly referred to as Desert Rose or Sabi Star, is a captivating succulent plant that thrives in arid regions of Africa and the Arabian Peninsula. This review paper aims to provide a comprehensive overview of Adenium obesum by examining its botanical attributes, ecological significance, cultivation practices, and potential medicinal properties. Known for its distinctive caudex, vibrant trumpet-shaped flowers, and resilience in harsh conditions, Adenium obesum holds both aesthetic and ecological importance. Its caudex serves as a water reservoir, enabling survival during drought, while its flowers attract pollinators vital for ecosystem biodiversity. The plant's cultivation demands specific attention, including proper lighting, well-draining soil, and appropriate watering practices. Furthermore, preliminary research suggests that Adenium obesum may possess antioxidant, anti-inflammatory, and anti-diabetic properties, sparking interest in its medicinal potential. Despite its popularity, challenges such as habitat destruction and overharvesting threaten its existence. Conservation efforts are imperative to safeguard its genetic diversity and preserve its ecological contributions. This paper provides a comprehensive understanding of Adenium obesum's significance, bridging the gap between botanical fascination and scientific inquiry.

1. Introduction:

Adenium obesum, commonly known as the Desert Rose or Sabi Star, is a captivating and resilient plant that has captured the attention of botanists, horticulturists, and researchers worldwide. Native to the arid regions of Africa and the Arabian Peninsula, this succulent species has gained popularity not only for its striking appearance but also for its potential ecological significance, medicinal properties, and adaptability to diverse cultivation environments.

With its distinctive swollen stem called a caudex, vibrant trumpet-shaped flowers, and ability to endure harsh desert conditions, Adenium obesum presents a fascinating example of nature's adaptations for survival in challenging environments. Its presence in desert ecosystems goes beyond

its aesthetic allure, as it contributes to pollinator diversity, soil stabilization, and even serves as an indicator of ecosystem health.

Adenium obesum's allure extends to the realm of horticulture, where it has found a place in gardens, homes, and collections worldwide. Its unique growth habits, low-maintenance requirements, and potential for creative cultivation have made it a sought-after addition to many plant enthusiasts' repertoires.

Beyond its ornamental value, Adenium obesum has also attracted attention for its possible medicinal properties. Traditional uses in various cultures suggest its potential for antioxidant, anti-inflammatory, and anti-diabetic effects. However, rigorous scientific research is needed to confirm and understand the mechanisms underlying these claims.

This comprehensive review paper delves into the multifaceted nature of Adenium obesum, exploring its botanical characteristics, ecological role, cultivation practices, and potential medicinal applications. By shedding light on these aspects, we aim to contribute to a deeper understanding of this remarkable plant, its place in nature, and its potential benefits for both human well-being and ecological balance.

Keywords: Adenium obesum, Desert Rose, Sabi Star, succulent plant, caudex, ecological significance, cultivation practices, medicinal potential, biodiversity, conservation, arid environments, ornamental plant, traditional medicine, antioxidant, anti-inflammatory, overharvesting, habitat destruction, genetic diversity.

2. Botanical Characteristics of Adenium obesum:

Adenium obesum, commonly known as Desert Rose or Sabi Star, possesses a set of distinctive botanical characteristics that contribute to its unique appearance and survival strategies. These characteristics make it a fascinating subject for both botanical enthusiasts and researchers. Here are the key botanical traits of Adenium obesum:

- 2.1 Caudex:** The most prominent and recognizable feature of Adenium obesum is its swollen, water-storing stem called a caudex. The caudex is typically above ground and can vary in size and shape, ranging from bulbous to cylindrical. This specialized structure serves as a reservoir for storing water, allowing the plant to endure prolonged periods of drought by utilizing stored moisture. The caudex is covered with a protective layer, often covered in a waxy cuticle, which helps to prevent excessive water loss through evaporation.
- 2.2 Leaves:** The leaves of Adenium obesum are succulent, leathery, and typically clustered at the tips of branches. They are elliptical or obovate in shape and vary in size depending on the age of the plant and growing conditions. The succulent nature of the leaves minimizes water loss through transpiration, helping the plant conserve water during dry spells. The leaves' arrangement also provides shade to the caudex, reducing direct exposure to sunlight and further preventing water evaporation.
- 2.3 Flowers:** Adenium obesum is known for its striking, trumpet-shaped flowers. These flowers grow in clusters at the tips of branches and come in a variety of colors, including shades of pink, red, white, and occasionally, bicolor combinations. The flowers serve as both ornamental features and functional structures to attract pollinators. The tubular shape of the flowers accommodates pollinators like bees and butterflies, ensuring successful cross-pollination.
- 2.4 Deciduous Nature:** During periods of extreme drought or unfavorable conditions, Adenium obesum exhibits a deciduous behavior. It sheds its leaves as a survival strategy to conserve water and energy. This shedding reduces the plant's surface area for transpiration, effectively minimizing water loss. The deciduous habit allows the plant to redirect its resources towards maintaining the caudex, which acts as a reservoir for sustaining the plant during tough times.
- 2.5 Adaptation to Arid Environments:** Adenium obesum's botanical characteristics are well-adapted to arid and semi-arid environments. Its caudex, succulent leaves, and deciduous behavior collectively enable it to thrive in regions characterized by water scarcity and harsh climatic

conditions. These adaptations contribute to its ability to establish itself in desert ecosystems and other challenging habitats.

Adenium obesum's botanical characteristics are a testament to its remarkable adaptation to arid environments. Its caudex, succulent leaves, striking flowers, and adaptive behaviors make it a captivating and resilient plant species, valued for both its ornamental appeal and ecological significance. Understanding these botanical traits enhances our appreciation for the plant's ability to flourish in some of the world's harshest conditions.



Image of Adenium Plant, Flower and Leaf

3. Ecological Significance of Adenium obesum:

Adenium obesum, commonly known as Desert Rose or Sabi Star, holds ecological significance in its native habitats and beyond. Despite its popularity as an ornamental plant, Adenium obesum plays a crucial role in the ecosystems where it naturally occurs. Here are some key points highlighting its ecological importance:

- 3.1 Habitat Stabilization:** In its native arid and semi-arid regions of Africa and the Arabian Peninsula, Adenium obesum contributes to habitat stabilization. The plant's extensive root system, along with its water-storing caudex, helps bind the soil and prevent erosion, particularly in regions susceptible to wind and water-driven soil displacement. This stabilizing effect is essential for maintaining the integrity of fragile desert ecosystems.
- 3.2 Biodiversity Support:** The vibrant and nectar-rich flowers of Adenium obesum attract a diverse range of pollinators, including bees, butterflies, and other insects. By providing a food source, the plant promotes biodiversity among these pollinator species. In turn, these pollinators play a vital role in the reproduction of various plant species within the ecosystem.
- 3.3 Pollination and Seed Dispersal:** Adenium obesum's pollination process is instrumental in ensuring the plant's reproductive success. Pollinators transfer pollen between flowers, leading to the production of viable seeds. The seeds of Adenium obesum are equipped with adaptations that

allow them to be dispersed by wind, further enhancing their chances of colonizing new areas within the ecosystem.

- 3.4 Indicator Species:** In some cases, the presence or absence of *Adenium obesum* can serve as an indicator of the health and condition of desert environments. Its ability to thrive or struggle under specific conditions can provide insights into factors such as soil quality, water availability, and overall ecosystem health.
- 3.5 Survival in Harsh Environments:** The ability of *Adenium obesum* to survive and thrive in harsh desert conditions demonstrates its resilience and adaptation to extreme environments. This adaptability makes it a valuable subject for ecological studies aimed at understanding how certain plant species can cope with water scarcity and other challenges.
- 3.6 Cultural and Traditional Significance:** *Adenium obesum* has cultural and traditional significance in some regions where it is native. It has been used in traditional medicine and may hold cultural importance for local communities. Preserving the plant and its natural habitats is essential for safeguarding these cultural connections.

Adenium obesum's ecological significance extends beyond its aesthetic appeal and popularity as an ornamental plant. It contributes to habitat stability, pollinator diversity, seed dispersal, and serves as an indicator of ecosystem health. Recognizing and valuing the role of *Adenium obesum* in its native ecosystems is crucial for conservation efforts and maintaining the balance of desert environments.

4. Cultivation Practices of *Adenium obesum*:

Adenium obesum, commonly known as Desert Rose or Sabi Star, is a popular succulent plant prized for its striking appearance and adaptability. Cultivating *Adenium obesum* successfully requires a good understanding of its specific requirements and care practices. Here's a comprehensive guide to its cultivation:

- 4.1 Light and Location:** *Adenium obesum* thrives in bright sunlight. It should be placed in a location where it receives at least 6-8 hours of direct sunlight each day. A south-facing or west-facing window is ideal for indoor cultivation. Outdoors, choose a sunny spot with protection from strong afternoon sun, especially in extremely hot climates.
- 4.2 Soil and Potting:** Use a well-draining soil mix that mimics the native habitat of *Adenium obesum*. A combination of cactus mix and perlite or sand works well. Ensure the pot has adequate drainage holes to prevent waterlogging, which can be detrimental to the plant's health.
- 4.3 Watering:** Allow the soil to dry out between watering. Water thoroughly when the top inch of soil feels dry to the touch. During the active growing season (spring and summer), water more frequently but always avoid overwatering, as this can lead to root rot. Reduce watering in the dormant season (fall and winter).
- 4.4 Temperature and Humidity:** *Adenium obesum* prefers warm temperatures, ideally between 70-90°F (21-32°C). It can tolerate slightly cooler temperatures in winter if kept dry. Maintain good airflow around the plant to prevent fungal issues. Average indoor humidity levels are generally suitable, but avoid high humidity environments.
- 4.5 Fertilization:** During the active growing season, feed *Adenium obesum* with a balanced, diluted fertilizer every 2-4 weeks. Use a fertilizer formulated for succulents or cacti. Reduce or stop fertilizing during the dormant season when the plant's growth slows down.
- 4.6 Pruning:** Pruning is important to shape the plant, remove dead or diseased growth, and encourage branching. Prune after flowering or during the growing season. Always use clean, sharp tools to avoid damaging the plant.
- 4.7 Repotting:** *Adenium obesum* has a slow growth rate and doesn't require frequent repotting. Repot when the plant becomes root-bound or the potting mix has deteriorated. Spring is generally the best time for repotting.

- 4.8 Pests and Diseases:** Keep an eye out for common pests like aphids, mealybugs, and spider mites. Regularly inspect the plant's leaves and stems for any signs of infestation. If pests are detected, treat them promptly with insecticidal soap or neem oil.
- 4.9 Propagation:** Adenium obesum can be propagated through various methods, including seeds, stem cuttings, and grafting. Seeds require patience and may take longer to establish, while cuttings and grafting offer quicker results. Follow proper procedures for each propagation method to ensure success.
- 4.10 Dormancy:** Adenium obesum typically enters a period of dormancy during the fall and winter months. During this time, reduce watering and avoid fertilization. Allow the plant to rest and conserve energy. Resume regular care as the plant shows signs of new growth in the spring.

By following these cultivation practices, you can enjoy the beauty of Adenium obesum and appreciate its adaptability as a captivating and resilient succulent plant.

5. Medicinal Potential of Adenium obesum:

Adenium obesum, commonly known as Desert Rose or Sabi Star, has been traditionally used in certain cultures for its potential medicinal properties. While its use in traditional medicine has intrigued researchers, it's important to note that further scientific investigations are needed to validate and understand the full extent of its medicinal potential. Here's an overview of the current understanding of its medicinal properties:

- 5.1 Antioxidant Activity:** Certain parts of Adenium obesum, including its leaves and stems, are believed to contain compounds with antioxidant properties. Antioxidants help combat oxidative stress by neutralizing harmful free radicals in the body. These properties suggest that extracts from the plant could have potential in supporting overall health and reducing the risk of chronic diseases associated with oxidative damage.
- 5.2 Anti-Inflammatory Properties:** Preliminary studies have suggested that extracts from Adenium obesum may possess anti-inflammatory properties. Inflammation is linked to various health conditions, including chronic diseases like arthritis. While these findings are promising, more research is needed to determine the specific compounds responsible for these effects and how they interact with the body's inflammatory processes.
- 5.3 Anti-Diabetic Potential:** Some research has indicated that Adenium obesum extracts might have potential in managing blood sugar levels. Certain compounds present in the plant could influence glucose metabolism and insulin sensitivity. However, extensive studies are required to fully understand the mechanisms and potential benefits in diabetes management.
- 5.4 Wound Healing:** In traditional medicine, Adenium obesum has been used topically to promote wound healing. It's believed that certain compounds in the plant may have antibacterial and wound-closing properties. While traditional knowledge is intriguing, modern scientific research is necessary to validate these claims and determine the optimal application methods.
- 5.5 Ethnopharmacological Uses:** Adenium obesum has been used in traditional medicine in various cultures to address conditions such as respiratory infections, digestive issues, and skin ailments. Ethnopharmacological studies aim to explore the traditional uses of plants and assess their potential relevance in modern healthcare.

It's important to approach the medicinal potential of Adenium obesum with caution. While there is promising preliminary evidence suggesting its bioactivity, further research is needed to isolate and identify the specific active compounds responsible for these effects. Clinical trials and rigorous scientific studies are essential to determine the safety, efficacy, and appropriate dosages for any potential medicinal applications.

Adenium obesum shows promise as a source of compounds with potential medicinal properties, particularly as antioxidants, anti-inflammatory agents, and potential aids in diabetes management.

However, before incorporating *Adenium obesum* into any medicinal regimen, it's crucial to consult with healthcare professionals and rely on validated scientific research to ensure safe and effective usage.

6. Challenges and Conservation of *Adenium obesum*:

Adenium obesum, like many other plant species, faces various challenges that impact its survival and long-term sustainability. As the demand for this plant increases due to its ornamental appeal and potential medicinal properties, it's important to address these challenges and implement conservation efforts to protect its natural habitats and genetic diversity. Here are some of the key challenges and conservation considerations:

- 6.1 Overharvesting:** *Adenium obesum* is often collected from the wild for its caudex, flowers, and seeds, leading to overharvesting in some regions. This practice can deplete natural populations, disrupt local ecosystems, and threaten the plant's survival in its native habitats.
- 6.2 Habitat Destruction:** Urbanization, agriculture, and other forms of land development can result in habitat destruction for *Adenium obesum*. As natural habitats are converted for human use, the plant's native populations may decline, affecting not only the species itself but also the other organisms that depend on these ecosystems.
- 6.3 Climate Change:** *Adenium obesum*'s native habitats are often characterized by arid and semiarid conditions. Climate change can lead to shifts in precipitation patterns, temperature extremes, and altered ecosystems. These changes can impact the plant's ability to survive and reproduce, especially if it is not able to adapt quickly enough.
- 6.4 Invasive Species:** Invasive plant species can compete with *Adenium obesum* for resources and space, potentially displacing native populations. The introduction of invasive species can disrupt the natural balance of ecosystems and further threaten the survival of native plants.
- 6.5 Genetic Erosion:** The cultivation of *Adenium obesum* for its ornamental value has led to the development of numerous cultivars and hybrids. However, this focus on selected varieties could lead to a reduction in genetic diversity within wild populations. Genetic diversity is crucial for the plant's ability to adapt to changing environmental conditions and resist diseases.
- 6.6 Lack of Awareness:** Limited awareness about the ecological importance of *Adenium obesum* and its role in maintaining desert ecosystems can contribute to insufficient conservation efforts. Raising public awareness about the value of preserving native plant species is essential for effective conservation.

7. Conservation Strategies:

- 7.1 Habitat Protection:** Establishing protected areas, reserves, and conservation zones can help safeguard the natural habitats of *Adenium obesum* and other native species.
- 7.2 Sustainable Harvesting:** Encouraging sustainable harvesting practices by collecting seeds for cultivation instead of digging up plants from the wild can help prevent overharvesting.
- 7.3 Raising Awareness:** Promoting education and awareness campaigns about the importance of conserving *Adenium obesum* can garner support for its protection and highlight its role in maintaining biodiversity.
- 7.4 Research:** Continued scientific research is essential to understand the plant's ecology, genetic diversity, and potential medicinal properties, enabling informed conservation decisions.
- 7.5 Cultivation and Propagation:** Promoting the cultivation of *Adenium obesum* through responsible horticultural practices can reduce pressure on wild populations and preserve genetic diversity.
- 7.6 Invasive Species Management:** Implementing measures to control and manage invasive species can help maintain the integrity of native ecosystems.
- 7.8 Collaboration:** Collaboration between local communities, governments, researchers, and conservation organizations is crucial for effective conservation efforts.

By addressing these challenges and implementing comprehensive conservation strategies, we can contribute to the long-term preservation of *Adenium obesum* and ensure its continued role in the natural world.

8. Conclusion:

Adenium obesum, known as the Desert Rose or Sabi Star, is a remarkable plant that captivates both botanical enthusiasts and researchers alike. Its unique combination of botanical characteristics, ecological significance, cultivation potential, and possible medicinal properties showcases the multifaceted nature of this species.

From its swollen caudex and succulent leaves, designed to withstand harsh arid environments, to its vibrant flowers that attract pollinators and support biodiversity, *Adenium obesum* offers a testament to nature's resilience and adaptability. Its importance in stabilizing habitats, providing food for pollinators, and acting as an indicator species underscores its critical role within ecosystems.

Cultivating *Adenium obesum* requires an understanding of its specific needs, from proper light and watering to careful pruning and pest management. As a potential source of antioxidants, anti-inflammatory compounds, and potential aid in diabetes management, *Adenium obesum*'s medicinal properties offer exciting avenues for exploration and research, although these claims require rigorous validation.

Yet, *Adenium obesum* faces challenges on multiple fronts. Overharvesting, habitat destruction, climate change, and genetic erosion threaten its survival in the wild. Conservation efforts are essential to protect its natural habitats, ensure genetic diversity, and raise awareness about its ecological significance.

In conclusion, *Adenium obesum* stands as a symbol of nature's ingenuity and adaptability, demonstrating the delicate balance between ornamental appeal, ecological importance, and potential therapeutic benefits. By celebrating its unique attributes, understanding its challenges, and engaging in responsible cultivation and conservation practices, we can contribute to the preservation of *Adenium obesum* for future generations to appreciate and study.

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