

A Systemic Review on Epiphyllum Oxypetalum

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Abstract: *Oxypetalum epiphyllum* (DC.) A common decorative and therapeutic plant, haw is a member of the cactus family. Given that it blooms at night, like most other white flowers, and that its lovely flowers resemble lotuses, it is commonly referred to as the Queen of the Night, Night Blooming Cereus, or Lady of the Night. It is one of the underutilized resources that can be substituted for digitalis and is found in tropical regions of the world. The Shoshone Indian tribe uses the night-blooming Cereus to treat heart pain and refers to it as "pain in the heart."

As a unique plant, *Epiphyllum oxypetalum* Haw. (Family: Cactaceae) has been used for several traditional medicinal purposes. Shortness of breath, uterine bleeding, and coughing up blood have all been treated with the plant. Significant biological and pharmacological effects, including antibacterial, antioxidant, and anti-inflammatory properties, have been reported in earlier studies on this plant. Previous writers have reported on a limited number of phytochemicals. Despite the plant's many therapeutic benefits, researchers have not given it much attention.

Keywords: *Epiphyllum oxypetalum* Haw. Traditional uses and Pharmacological properties, Antibacterial activity, Phytochemicals.

INTRODUCTION

Commonly referred to as Brahma Kamal or Nishagandhi in India, Bakawali or Bunga Raja in Malaysia, Kadupul in Sri Lanka, Gekka Bijin in Japan, and Wijaya Kusuma in Indonesia, *E. oxypetalum* Haw Although it is found throughout much of North America and South East Asia, this species is endemic to southern Mexico. This night-blooming cereus, commonly referred to as the Queen of Night, Lady of Night, or Orchid Cactus, is a significant medicinal plant that is a member of the Cactaceae family (Dandekar et al., 2015).

The oxypetalum gets its name from the petals' sharp form. It's still unclear where this species came from. According to Dandekar et al. (2015), it is a fake Brahma Kamal, however it is considered a sacred plant in India under the name Brahma Kamal. *Saussurea obvallata* (DC.) Edgew. is the botanical name of the authentic Brahma Kamal, which is

indigenous to the Himalayan region of India. While *S. obvallata* belongs to the Asteraceae family, *E. oxypetalum* is a member of the Cactaceae family. When the flower is in bloom, the house where it grows is lucky, prosperous, and people who pray to God during that time are said to have their requests answered.

This flower, which is named after the Hindu mythological God of creation, Brahma, only blooms once a year. Only a few hours are spent in blossom.

This plant is associated with the tale of Brahma emerging in a lotus blossom from Vishnu's navel. It does not blossom in every home, yet it is considered a sacred flower. According to recent estimates, a disproportionate number of people in a number of developing nations rely significantly on traditional healers and medicinal herbs to meet their basic medical needs. Throughout documented human history, plants have been used for therapeutic purposes. Historically, traditional medicines that primarily use medicinal plants have been essential substitutes for mainstream medications in impoverished nations. It is more common for impoverished communities living in rural areas without access to healthcare to use medicinal plants or their products. On the other hand, the demand for medicinal plants has skyrocketed worldwide due to their diverse chemical makeup and ability to produce novel therapeutic moieties that may be used to treat a wide range of ailments.

The ancient green-hued *Epiphyllum oxypetalum* plant may grow to a height of 2–6 m and has dark green leaves. The woody, branch-rich trunks and shoots of these plants can have a diameter of 2 cm or more. These plants have low, lance-shaped, sideways leaves. nocturnal (blooming at night), funnel-shaped, fragrant, thinning, wavy, and serrated leaves, a linear top of narrow leaves with a 1.6–1.8 mm interest, and glossy green leaves on the upper surface and underside of sharp-pointed leaves.

PLANT CLASSIFICATION

Table I lists *E. oxypetalum*'s classification. In order to identify medicinal plants, species information is

crucial. This helps to ensure that plant samples are collected and used correctly.

Classification of *E. oxypetalum* in Table I:

CLASSIFICATION	IDENTIFY
Kingdom	Plantae
Subkingdom	Tracheobionta
Phylum	Magnoliophyta
Class	Magnoliopsida
Sub Class	Hamamelidae
Order	Caryophyllales
Family	Cactaceae
Genus	Epiphyllum
Species	Epiphyllum oxypetalum
Synonyms	Cereus oxypetalum, Epiphyllum purpusii, Phyllocactus oxypetalus, Phyllocactus purpusii, Cactus oxypetalus , latifrons
Local Name	Wijaya Kusuma (Indonesia); tan hua (China); bakawali (Melayu). orchid cactus; beauty under the moon (International); brahma kamala, nishagandhi (India); kadupul (Sinhala)

➤ BOTANY AND TAXONOMY

It bears large, star-shaped, fragrant white blooms. It is around 6 to 8 inches in diameter and blooms after sunset. Before morning, the blossoms close, but at night they stay open. The flowers are made from flattened plant parts and can grow up to 30 cm in length and 12–17 cm in breadth. Despite being a cactus, the genus *Epiphyllum* is occasionally referred to as "epicacti" or "jungle cacti" to differentiate it from the related desert vegetation. It bears large, star-shaped, fragrant white blooms. It is around 6 to 8 inches in diameter and blooms after sunset. Before morning, the blossoms close, but at night they stay open. The flowers are made from flattened plant parts and can grow up to 30 cm in length and 12–17 cm in breadth. Despite being a cactus, the genus *Epiphyllum* is occasionally referred to as "epicacti" or "jungle cacti" to differentiate it from the related desert vegetation.

➤ PHARMACOGNOSTIC CHARACTERISTICS

Epiphyllum oxypetalum is considered to be popular as an ornamental plant. It produces a large white coloured flower that blooms for a single night. Thus, it is referred to as night blooming cereus.

Growth Form

Perennial shrub. It is an epiphytic cactus, freely branched that grows up to 6m tall in the wild.

Habitat

Mainly grown in the tropical rain forest and temperate forest.

➤ MORPHOLOGICAL CHARACTERISTICS

Foliage

There are no leaves produced by this species. They produce modified stems that resemble leaves instead, and they have comparable purposes.

Stems

The strong, circular midrib of flattened stems is encircled by scalloped, fleshy wings. The stems are ascending, branching, and upright. The primary stems are terete, up to 6 meters long, laterally flattened, and base-lineous. The secondary stems are dark green, elliptic, acuminate, flat, many branches, and up to 15-50×5-12cm6.

Flowers

28 cm long by 13 cm wide, the fragrant, star-shaped flowers are nocturnal and made up of 25–30 white, linear petals. The trademark smell is caused by benzoyl salicylate. Green, naked, and slightly angled are pericarpels. Short and thin bracteoles are present. The containers are 13–18 cm in length, have a green base, and are 4–9 mm in diameter, brownish, and arching. Acute, linear, and 8–10 cm long, the outer petals are reddish to amber. Up to 8–10 cm long and

2–5 cm wide, the inner petals are pale, oblanceolate, oblong, and acuminate. Stamens are thin, greenish white, or white. From the core of the flower, a complex white stigma emerges. Greenish white, pale yellow, or white styles have many lobes, are 4 mm thick, and are as long as inner tepals. Opening between 8 and 10 PM, flowers peak in fullness between 12 and 3 AM, and then close before morning. Flowers don't bloom very often. Stems that have been manipulated to resemble leaves end in flower buds. After a few hours of minor swelling, they bloom later in the evening.



Figure no.1

Flowering season

June-October

Fruits

Fruits appear to be rare, which is purplish red in colour, oblong, 16×5.7 cm, seeds are 2- 2.5×1.5mm

➤ ORGANOLEPTIC CHARACTERISTICS



The leaves are glabrous, dark to light green in hue, and have a distinct smell and astringent flavour. The dried powder appears to have a yellowish brown hue.

Microscopy

Thick mesophyll tissue that is not divided into palisade and spongy is visible in the transverse section of the leaves. Two to three layers of homogeneous cells make up the epidermis. While the stomata are paracytic and occasionally tricytic, the epidermis is almost smooth with few trichomes. Mucilage and mucilage canals fill the tissue of leaves. The sclerenchyma sheath, phloem zone, xylem vessels, and pith tissue—which consists of big, thin-walled cells packed with starch grains—are all part of the midrib's avascular bundle. Chlorophyll pigments are found in mesophyll cells close to the epidermis, while starch grains and frequently star-shaped cystolith crystals, which are 500–750 microns long, are found in inner mesophyll cells.

Cultivation

Even though the plant is a cultivated species, it thrives in the bright, indirect sunlight. Soil that is sandy, slightly acidic, and rich in detritus is ideal. It likes soil that is damp yet drains properly. In the summer, water the plant frequently. It is propagated by cuttings or layering of the rhizome, herbaceous stem, and leaves. It can be cultivated indoors as well. A leaf is either planted in the ground or positioned horizontally on the ground to support the plant. Another option is to submerge the chopped stem in water. After three weeks, adventitious roots emerge, at which point they can be placed in a soil-filled pot. The phylloclade's borders are where bulbil-like structures first appear.



Figure no.2

Synonyms

Cereus oxypetalus, *Cactus oxypetalus*, *Cereus latifrons*, *Epiphyllum aacuminatum*, *Epiphyllum grande*, *Cactus oxypetalus*, *Phyllocactus oxypetalus*.

Common names

Cereus at night, a Dutch man's pipe, Lord of the night, Lady of the night, Dutch pipe cactus, *Epiphyllum broadleaf*, Jungle Cacti with Orchid Cacti.

CHEMICAL COMPOSITION

According to Dandekar R et al. (2015), GC-MS analysis of an alcohol extract of *Epiphyllum oxypetalum* leaves showed the presence of compounds like ethanol, 1-(2-Hydroxy-5-methylphenyl)-, 4-Hydroxy-2-methylacetophenone, Megastigmastrienone, Cycloocta-1, 3-triene, 2, 3, 5, 8,8-hexamethyl, 4-((1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol, 2, 5-Dihydroxy-4-sopropyl-2, 4, 6-cycloheptatrien-1-one, n-hexadecanoic acid, octadecanoic acid, phytol; 22-stigmasten-3-one; Cholesta-22, 24-dien-5-ol, 4-dimethyl; 6-octen-1-ol, 3-dimethyl; Stigmsterol. Sulfurous acid, cyclohexylmethyl hexyl ester, allyldimethyl (prop-1-ynyl) silane, hepacosane, nonadecane, 2-methyl-, hexadecane, 2, 6, 10, 14-tetramethyl-, octadecane, 2-methyl-, eicosane, 2-methyl-, spinasterone, 4, 22-stigmastadiene-3-one, tetracosane, hentriacontane, steroid cypionate

➤ TRADITIONAL USES

Many Asian civilizations, such as those in Malaysia, Vietnam, and India, are aware of its therapeutic qualities. The plant is commonly used in traditional medicine to treat bleeding disorders, respiratory diseases, and pain and inflammation reduction. *E. oxypetalum* is an essential component with a number of traditional uses. The phylloclades have antibacterial properties and include some active substances. Additionally, the stem is used medicinally to treat heart conditions and dropsy. The petals of the faded flower are used by Vietnamese people to produce soups that are supposed to have aphrodisiac and tonic medical qualities. Additionally, flower has the ability to hasten the healing of wounds. Additionally, it is utilized for coughing up blood, uterine bleeding, and dyspnea.

➤ PHARMACOLOGICAL ACTIVITIES

ANTIOXIDANT ACTIVITY

The in vitro antioxidant properties of *Epiphyllum oxypetalum* were reported by Dandekar R et al. (2015). Using the DPPH test method and hydrogen peroxide scavenging, the alcohol and aqueous extract of dried *Epiphyllum oxypetalum* leaves were assessed for their capacity to scavenge free radicals. The aqueous extract's maximum free radical scavenging activity (34.23 ± 0.88) was found to be lower than the DPPH method's (60.37 ± 1.67). In both alcohol and aqueous extract, the highest percentage of inhibition was noted at $2000 \mu\text{g/ml}$. At $500 \mu\text{g/ml}$ concentration, the highest inhibition by alcohol extract (43.76 ± 0.97) and aqueous extract (27.07 ± 0.16) was observed in the hydrogen peroxide scavenging method. As a standard reference, ascorbic acid is utilized in both techniques.

ANTI-INFLAMMATORY ACTIVITY

Dandekar R. et al. (2015) found that alcohol and an aqueous extract of *Epiphyllum oxypetalum* leaves had anti-inflammatory properties. In vitro methods, such as protein denaturation inhibition and human red blood cell membrane stabilization, were used to conduct the study. A carrageenan-induced paw oedema paradigm was used to evaluate the in vivo anti-inflammatory efficacy in Wistar albino rats. Both alcohol extract and aqueous extract showed a dose-dependent increase in the percentage inhibition of protein denaturation and membrane stabilization.

ANTIBACTERIAL

The leaf extract from *E. oxypetalum* may have antibacterial qualities that work against both gram-positive and gram-negative bacteria, unlike antifungals. Antibiotics work better when combined with silver (sometimes called silver nanoparticles, or AgNPs) made from an aqueous extract of *E.oxypetalum*. In addition to being cost-effective and environmentally benign, this mixture may have potential uses in biomedicine.

AgNPs' large surface area and compact size allow them to effectively fight off a variety of drug-resistant bacteria. They can interact with chemicals and become more effective antibacterials as a result. By combining with proteins to form complex compounds that compromise the integrity of the bacterial cell membrane, flavonoids work as an antibacterial agent. These compounds have the ability to break down cell walls and disrupt the permeability of cells. A class of polyphenolic chemicals, especially

tannins, exhibit antibacterial properties in addition to flavonoids.

ANTIDIABETIC

One of the antidiabetic effects of *E. oxypetalum* leaf methanol extract was the suppression of α -amylase. As a hypoglycemic drug, α -amylase is particularly effective in treating hyperglycemia in individuals with type 2 diabetes. This enzyme prolongs the time needed for the digestion of carbohydrates and slows down the rate at which glucose is absorbed. The consequence is a reduction in the postprandial rise in plasma glucose⁴⁵. Among the secondary metabolite compounds having antidiabetic effects include phenolics, alkaloids, flavonoids, and steroids.

ANTIMICROBIAL ACTIVITY

Antimicrobial activity of *E. oxypetalum* leaf extracts against various microorganisms, including *Staphylococcus aureus*, *Escherichia coli*, *Bacillus subtilis*, *Klebsiella pneumonia*, and *Aspergillus* species, has been reported (1). The extracts exhibited promising antimicrobial activity, except against *A. terreus*, *A. niger*, and *R. oryzae* (1). Phytochemical analysis revealed the presence of phenolic compounds, glycosides, saponins, steroids, terpenoids, tannins, and resins in the leaves (1). Additionally, silver nanoparticles biosynthesized from the aqueous leaf extract of *E. oxypetalum* showed antibacterial activity against *Propionibacterium acne*.

ANTIMICROBIAL ACTIVITY

Antimicrobial activity of *E. oxypetalum* leaf extracts against various microorganisms, including *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis*, *Klebsiella pneumonia*, *Rhizopus oryzae*, *Aspergillus terreus*, *Aspergillus niger*, and *Aspergillus oryzae*, was investigated (1). The extracts showed promising antibacterial activity against all tested bacteria, while the fungi *A. terreus*, *A. niger*, and *R. oryzae* exhibited mild antimicrobial activity (1). Phytochemical analysis revealed the presence of phenolic compounds, glycosides, saponins, steroids, terpenoids, tannins, and resins in the leaves. Additionally, silver nanoparticles synthesized from the aqueous leaf extract demonstrated antibacterial activity against *Propionibacterium acne*.

➤ NANOPARTICLE BIOSYNTHESIS AND ANTIBACTERIAL ACTIVITY

An aqueous leaf extract of *Epiphyllum oxypetalum* reduced silver nitrate and had antimicrobial properties, which led to the biogenic creation of silver nanoparticles, according to Priti Paralikar et al. (2014). FT-IR analysis, NTA analysis, Zeta potential, and UV-visible spectroscopy were used to analyze the produced silver nanoparticles. According to the results, the average size of the silver nanoparticles produced in this way is 86 nm. *Propionibacterium acne*, *Pseudomonas aeruginosa*, and *Klebsiella pneumonia* were examined for antibacterial activity using the disc diffusion method on the produced silver nanoparticles of aqueous leaf extract of *Epiphyllum oxypetalum*, both alone and in conjunction with commercial antibiotics. The result of the investigation showed that the produced silver nanoparticles had a considerable bactericidal effect.

ANTIMICROBIAL POTENTIAL

The phytochemical properties, nutritional worth, and antibacterial activity of *Epiphyllum oxypetalum* leaf extract were documented by Upendra R. S. et al. in 2012. Vitamin niacin (0.18 mg/g), fatty acids (4.6 mg/g), and proteins (14 mg/g) were all present in significant proportions in the plant's nutritional values.

Glycosides, saponins, steroids, phenols, proteins, resins, tannins, and terpenoids were found in the petroleum ether, acetone, and ethanol extract of *Epiphyllum oxypetalum*, but reducing sugars, alkaloids, flavonoids, sterols, phlobatannins,

TOXICITY STUDY

When creating therapeutic plants, safety is a key factor. Using the QSAR-Toxicity Estimation Software Tool (TEST), the toxicity of eleven chemicals identified in the methanol extract of *E. oxypetalum* leaves by GC-MS analysis was assessed.

All of the substances, however, were expected to be benign or low toxicity in oral rats. Animals can be used less frequently for toxicity estimations when in silico research is conducted. The results of this investigation raised the possibility that *E. oxypetalum* leaves are safe for human consumption and may one day be utilized to make new drugs. Naturally, that must be followed by scientific proof of the in vivo toxicity of *E. oxypetalum* leaf extracts and specific components in animal models.

➤ FUTURE PROSPECTS

In light of the evidence presented, it appears that the *E. oxypetalum* plant may eventually be used to produce pharmaceutical compounds. So, it can be used as a natural medicine raw material to cure a variety of illnesses. This plant produces chemical substances in the form of primary and secondary metabolites in its leaves and flowers.

The chemical compounds found in this plant, including stigmasterol, testosterone cypionate, and others, are mostly steroids. This plant has not been shown to contain any active chemical components that have any particular pharmacological effects. Quality requirements for the manufacturing of extracts or fractions will be established by these isolates. The pharmacological action of *E. oxypetalum* may have antibacterial, antioxidant, and anti-inflammatory properties. To find out if the chemical components found in these plants, especially steroids, can be employed for other therapeutic purposes such as aphrodisiacs, contraception, or hormone treatment for fertility, more research is necessary.

CONCLUSION

According to the literature review, *Epiphyllum oxypetalum* is a significant medicinal plant that has a wide range of therapeutic applications. Numerous chemical elements found in the plant are responsible for its various pharmacological and therapeutic qualities.

Even though the plant is one of the tropical region's underutilized resources, its potential for medical use has not yet been investigated, but it is anticipated to produce excellent results in the future.

REFERENCES

- [1] Paralikar P. Biogenic synthesis of silver nanoparticles using leaves extract of *Epiphyllum oxypetalum* and its antibacterial activity. *Austin J of Biotech and Bioeng*, 2014; 1(7):
- [2] Dandekar R, Fegade B and Bhaskar VH. GC-MS analysis of phytoconstituents in alcohol extract of *Epiphyllum oxypetalum* leaves. *J of Pharmaco and Phyto*, 2015; 4(1): 149-154.
- [3] Dandekar R, Fegade B and Bhaskar VH. Antioxidant Evaluation of Free Radical Scavenging Activities of *Epiphyllum oxypetalum*. *World J of Pharm and Pharma Sci*, 2015; 4(9): 1301-1309.
- [4] Singh R. Medicinal plants: A review, *Journal of Plant Science*, 3(1-1), 2015, 50- 55.
- [5] Suresh Arumugam, Senthil Kumar Natesan. Pharmacognostical studies and phytochemical investigation of *Baleria noctiflora* Linn (Acanthaceae), *International Journal of Pharmacognosy and Phytochemical Research*, 7(3), 2015, 450- 456.
- [6] Jyoti Kishen Kumar, Snehalatha Nadigar, Shubha B, Rahila Banu, Mrudhula Tripathi and Upendra R S. A review on the genus: *Epiphyllum*, *International Journal of Advanced Research in Engineering and Technology*, 7(6), 2015, 90-97.
- [7] Dandekar R, Fegade B, Bhaskar V H. GC- MS analysis of phytoconstituents in alcohol extract of *Epiphyllum oxypetalum* leaves, *Jounal of Pharmacognosy and Phytochemistry*, 4(1), 2015, 149-154.
- [8] Available from: <http://www.indianbotanists> : *Epiphyllum oxypetalum* (brahmakamal): Orchid Cactus- An interesting plant.
- [9] Akbar S, Hanif U, Ali J, Ishtiaq S, Pharmacognostic studies of stem, roots and leaves of *Malva parviflora* L. *Asian Pac. J Trop. Biomed*. 2014; 4:410-415.
- [10] Aslam I, Afridi MSK. Pharmacognostic characterization of *Beaumontia grandiflora* (Roxb.) Wall. leaf for taxonomic identification for quality control of a drug. *J Appl. Res. Med. Aromat. Plants*. 2018; 8:53-59.
- [11] Chanda S. Importance of pharmacognostic study of medicinal plants: An overview. *J Pharmacogn. Phytochem. JPP*. 2014; 2:69-73.
- [12] Chen BYKK. *Pharmaceutical Sciences*. 1967; 4:1535- 1541.
- [13] Dandekar, R, Fegade B, Bhaskar VH. GC-MS analysis of phytoconstituents in alcohol extract of *Epiphyllum oxypetalum* leaves. *J Pharmacogn. Phytochem*. 2015; 4:149-154.
- [14] Rucha Dandekar, Bharti Fegade and V H Bhaskar. In vitro evaluation of free radical scavenging activities of *epiphyllum oxypetalum*, *World Journal of Pharmaceutical Research*, 4(7), 2015, 1301-1309.
- [15] Anju Venugopal, Suresh Arumugam, Suriya Annamalai, Senthil Kumar Natesan. In vitro screening of methanolic leaf extract of *Albizia saman* (JACQ) MERR, for their antioxidant property, *International Journal of Pharmacy and Health care Research*, 2(3), 2014, 179-183.

- [16] Rucha Dandekar, Bharti Fegade and Arvind Naik. Evaluation of anti-inflammatory activity of alcohol and aqueous extract of epiphyllum oxypetalum leaves, World Journal of Pharmacy and Pharmaceutical Sciences, 4(7), 2015, 851-858.
- [17] Paralikar P. Biogenic Synthesis of Silver Nanoparticles Using Leaves Extract of Epiphyllum oxypetalum and its Antibacterial Activity, Austin Journal of Biotechnology and Bioengineering, 1(7), 2014, 1-5.
- [18] Upendra R S, Pratima Khandelwal. Assessment of nutritive values, phytochemical constituents and biotherapeutic potentials of epiphyllum oxypetalum, International Journal of Pharmacy and Pharmaceutical Sciences, 5(4), 2012, 421-425.