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Review Article

A comprehensive analysis of *Cestrum nocturnum*: Its phytochemical composition, pharmacological applications and toxicity profile in the context of traditional medicinal practices

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Abstract

According to traditional medicine, the study gives a full look at the phytochemical makeup, pharmacological uses, and toxic profile of *Cestrum nocturnum* (night-blooming jasmine). The review sought to connect traditional knowledge with scientific evidence, assessing the therapeutic potential and safety concerns linked to this plant. The methods involved conducting a comprehensive search of peer-reviewed literature and ethnobotanical databases. The focus was on studies that examined the chemical composition, pharmacological effects, and toxicological properties of *Cestrum nocturnum*. The data pertaining to traditional uses, active compounds, therapeutic effects, dosage, and adverse reactions were thoroughly extracted and carefully analyzed. The results indicate that *Cestrum nocturnum* contains a range of phytochemicals, such as alkaloids, glycosides, flavonoids, and essential oils. Pharmacological studies have extensively documented its various effects, including anti-inflammatory, analgesic, antimicrobial, anticonvulsant, and sedative properties. Common applications involve the treatment of ailments like epilepsy, anxiety, and skin disorders. Nevertheless, there have been some concerns raised about the plant's toxicity, specifically related to the presence of solanine alkaloids. In conclusion, *Cestrum nocturnum* shows great potential as a source of bioactive compounds that could have valuable therapeutic applications. However, more research is needed, including thorough clinical trials and toxicity assessments, to determine the safety and effectiveness of this treatment for specific conditions. This review highlights the significance of combining traditional knowledge with scientific validation to fully harness the potential of *Cestrum nocturnum* in modern medicine, while also prioritizing its safe and responsible utilization.

Keywords: *Cestrum nocturnum*, phytochemistry, pharmacology, toxicology, traditional medicine.

INTRODUCTION

Medicinal plants remain a source of useful medicinal substances, utilized in both contemporary and traditional medicine. Plants are utilized in traditional medical systems worldwide, particularly in rural areas, to regulate, manage, and treat many human and animal illnesses[1]. They are administered in the form of powders, extracts, decoctions, or infusions. There is a strong demand for precise and current information on the characteristics, applications, effectiveness, safety, and efficacy of botanical products due to the current global shift towards using natural treatments derived from plants. Multinational medicine corporations are actively searching the plant kingdom for physiologically active lead compounds[2].

The use of herbal medicine continues to be the primary form of healthcare for a significant portion of the world's population, particularly in developing nations. This is mainly due to financial constraints that prevent access to costly western medications and healthcare services. Additionally, traditional treatments are often preferred from an ethnic and spiritual standpoint[3]. Herbal remedies or plants are believed to have chemical components that are highly compatible with the human body, as they are naturally integrated into the biological processes of live plant life. For centuries, people have relied on natural remedies derived from plants to address various health conditions. Lately, there has been a surge in interest surrounding the utilization of plant-based wellness supplements for both preventing and treating illnesses. Medicinal plants have been a cornerstone of traditional medicine for centuries, providing effective treatments for various diseases and promoting overall well-being. Thus, there is ample potential to delve into novel methods for preventing and treating diseases through the use of medicinal plants[4].

The Solanaceae family classifies the specific plant in question under various names such as *Cestrum*

nocturnum, lady of the night, night-blooming jessamine, night-scented jessamine, night-scented cestrum, or poisonberry. Despite its West Indies origins, it has adapted to South Asia. Originating in America, people have extensively cultivated *Cestrum nocturnum* for its potent floral scent, which has spread to tropical regions worldwide, including the Pacific[5]. Its presence is particularly notable in numerous regions, with significant recognition across Mesoamerica. Formerly, the assumption was that this species was native solely to South America. The tropical Pacific region of the old world shows a broad distribution of this plant species, which thrives on multiple islands. Records indicate that this plant has primarily been cultivated for ornamental purposes in China and Singapore, and it is also popular for decorative use in India[6]. This comprehensive review article will present detailed insights into the phytochemistry, pharmacology, and toxicity profile of *Cestrum nocturnum*, shedding light on its potential medicinal properties and cultural significance. Additionally, it will explore the potential for further research and development of this plant species in various regions around the world.

Plant Profile

Botanical Description

The night-blooming jasmine (Figure 1), scientifically known as *Cestrum nocturnum*, possesses a number of unique physical characteristics that distinguish it from other members of the Cestrum genus (Table 1). *C. nocturnum* stands out due to the unique structure of its epidermal cells[3]. Those on the abaxial surface of *C. nocturnum* have polygonal to irregular shapes, while those on the abaxial surface of *C. diurnum, C. elegans,* and *C. parqui* are irregular and have walls that curve away from the center. In addition, *C. nocturnum* stands out due to its hypostomatic leaves, a characteristic it shares with most Cestrum species, with the exception of C. parqui, which has amphistomatic leaves. *C. nocturnum*, like other species in the genus, possesses stomata that are anomocytic and anisocytic[4]. Additionally, *C. elegans* possesses diacytic stomata. Furthermore, *C. nocturnum* lacks trichomes and exhibits anomocytic stomata on the abaxial surface, a feature shared with Cestrum intermedium, another species within the same genus. The karyotype of the genus Cestrum stands out for its uniqueness[6]. The chromosome number of x = 8, along with its large size and complex heterochromatin patterns, are consistent features found throughout the genus, including *C. nocturnum*. In addition, the environmental adaptability of *C. nocturnum* and its wide distribution in warm to subtropical regions set it apart from other species in the genus. This information on the physical, chemical, and anatomical traits of *C. nocturnum* is crucial for accurately distinguishing it from other Cestrum species. It greatly aids in taxonomical classification and prevents any confusion or misidentification.

Table 1: Botanical description of *Cestrum nocturnum*

Feature	Description
Common Name	Night-blooming Jasmine, Lady of the Night
Scientific Name	*Cestrum nocturnum*
Family	Solanaceae
Habit	Evergreen shrub
Height	2-4 meters
Leaves	Simple, alternate, oblong to lanceolate, 6-20 cm long, glossy green
Flowers	Small, tubular, greenish-white to creamy white, clustered in axillary or terminal cymes
Blooming Time	Nocturnal; flowers open at night
Fragrance	Strong, sweet fragrance, especially at night
Fruits	Berry, white or pale green, contains numerous seeds
Stem	Woody, slender, light brown to gray
Roots	Fibrous root system
Habitat	Prefers warm, tropical, and subtropical climates
Soil Preference	Well-drained, fertile soils; tolerant of a variety of soil types

Figure 1: Plant of *Cestrum nocturnum*

Geographical description

The night-blooming jasmine, commonly referred to as the queen of the night, is a flowering plant that originates from tropical areas in the Americas. It is distributed from Mexico and the West Indies to Brazil and Argentina. This plant has remarkable adaptability and thrives in diverse climatic conditions. It has been widely cultivated and developed in many regions around the globe, encompassing places characterized by warm temperate, subtropical, and tropical temperatures[3]. *Cestrum nocturnum*, a plant renowned for its remarkable adaptability, can flourish in a wide range of soil compositions, including nutrient-rich and well-drained soils as well as dry, sandy, or clay-based substrates. This species is extremely versatile and durable. *Cestrum nocturnum* is frequently encountered in its native habitat, flourishing in diverse surroundings such as mixed deciduous or evergreen woods, forest perimeters, and regions that have been disrupted, such as roadsides, abandoned lots, and agricultural clearings. It possesses the capacity to create dense and expansive thickets that can outperform and replace indigenous plant groups[4]. The *Cestrum nocturnum* plant has been imported and grown in several places worldwide, including the southern United States, the Mediterranean region, and sections of Asia and Africa. It is widely esteemed for its enchanting nocturnal blossoms and its capacity to function as an appealing plant for decorative, hedge, and landscaping uses. However, in some locations where it has been introduced, *Cestrum nocturnum* has demonstrated the capacity to become an invasive species, posing a threat to local ecosystems and biodiversity, particularly in regions with similar climatic conditions to its original habitat (Table 1)[6].

Phytochemistry of *Cestrum nocturnum*

Night-blooming jasmine, scientifically known as *Cestrum nocturnum*, is a popular ornamental plant that has attracted considerable interest for its rich phytochemical composition and possible medicinal uses (Table 2).

The phytochemical composition of *Cestrum nocturnum* encompasses 1-acetyl D-erythritol, which has been identified in the leaves. This particular compound plays a role in the plant's pharmacological capabilities. By means of spectroscopic analyses, 1-acetyl D-erythritol, has been characterized and may exhibit bioactive attributes that warrant further exploration for potential medicinal uses[7]. The existence of this compound within *Cestrum nocturnum* underscores its chemical variability and implies that additional investigations into this botanical species may uncover new bioactive compounds with pharmaceutical advantages. Haggag's report highlights the diverse range of secondary metabolites found in *Cestrum nocturnum*, including alkaloids, flavonoids, saponins, tannins, and phenolic acids. The leaves of this plant are especially abundant in these compounds[8]. Cinnamic acid, luteolin, quercetin, and propyl gallate are a few phytochemicals that enhance the plant's pharmacological potential. Inayat *et al.* identified a new glycoside in *Cestrum nocturnum*. It is called 3-O-β-D-xylopyranoside-olean-12-en-28-oic acid and is in the oleanane class. The compound is a derivative of β-arabinopyranosyl, with a substitution at position 28 on the O atom. The structure is β-D-galactopyranosyl-(1-2). The chemical is β-D-glucopyranosyl-(1-4)-β-D-glucopyranosyl ester, and it comes with two other compounds that have already been named: nocturnoside A and karativoside A. These chemicals have a high concentration of saponins and enhance the plant's pharmacological capabilities[9]. The glycoside, when isolated, has a bisdesmosidic character, suggesting its potential for bioactivity. Marwa *et al.* found that *Cestrum nocturnum* has unique phytochemicals, like cypermethrin and 3-butynyl-2,2,5-trimethyl-1,3-dioxane-5-methanol, that make it more useful as a medicine. These chemicals have a crucial role in the biological and pharmacological characteristics of *C. Nocturnum* [10]. Gas chromatography-mass spectrometry (GC-MS) was used by Pratip *et al.* to look at compounds like ethyl citrate, phytol, 4-isobutylmorpholine, n-hexadecanoic acid, and α-

amyrin[11]. This finding has significant implications for pharmacology and presents new avenues for ethnopharmacological research. According to Ahmed *et al.,* the composition of phytochemicals in one species of Cestrum includes nicotine, nornicotine, ursolic acid, vitamin D3, and its derivatives[12]. The compounds analyzed exhibit a range of properties that enhance the plant's pharmacological potential, such as analgesic, anti-inflammatory, and NF-κB inhibitory activities.

Table 2: Some key phytochemicals class and its specific identified in *Cestrum nocturnum*

Phytochemical Class	Specific Compounds
Saponins	Pennogenin tetraglycoside, nocturnoside A, karativoside A
Flavonoids	Flavonol glycosides, rutin, quercetin, kaempferol
Phenolic Compounds	Cinnamic acid, gallic acid, chlorogenic acid
Essential Oils	Linalool, benzaldehyde, benzyl alcohol
Fatty Acids	(Specific compounds not widely reported)
Other	Oleanane-type glycosides

Ethnopharmacology of *Cestrum nocturnum*

Cestrum nocturnum, often known as night-blooming jasmine, is a shrub typically seen in gardens and is classified under the Solanaceae family. This plant has an extensive historical record of being utilized to address a diverse array of health issues. Recent research has focused on studying the compounds derived from *Cestrum nocturnum*, uncovering their potential medical characteristics and therapeutic uses. Phytochemical research has revealed that *Cestrum nocturnum* contains a diverse array of bioactive substances, including phenylethanoid glycosides, polysaccharides, lignans, and iridoids. The plant's extracts and components have demonstrated a wide range of pharmacological actions, including as neuroprotective, immune modulating, anti-inflammatory, liver protecting, and antioxidant capabilities (Figure 2).

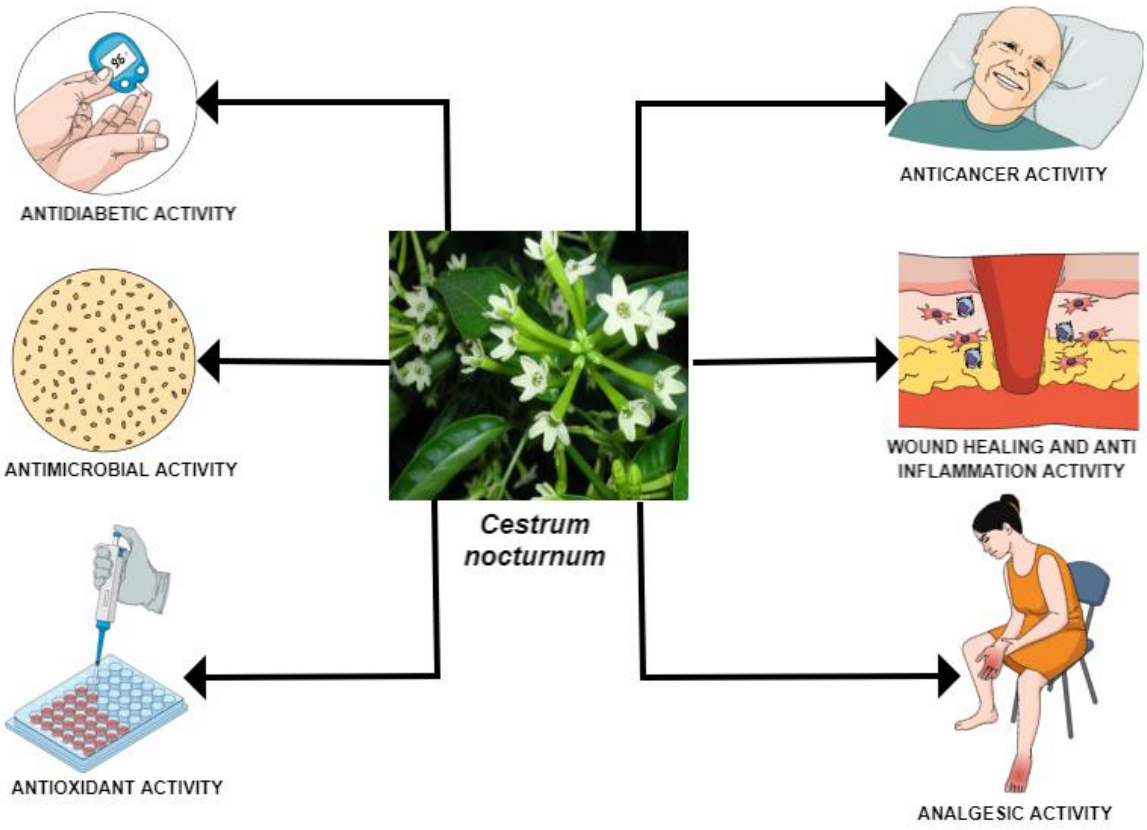

Figure 2: Pictorial representation of pharmacological activity of *Cestrum noctrunum*

Ahmed *et al*. identified important pharmacological substances extracted from *Cestrum nocturnum*. These compounds include bioactive phytoconstituents that have a strong affinity for interacting with the catalytic locations of α-amylase and acetylcholinesterase (AChE). These chemicals demonstrate the properties of being antioxidants, antidiabetic agents, and anti-Alzheimer's agents. The methanolic fraction of *C. nocturnum* leaf extract exhibited high antioxidant activity against DPPH and ABTS radicals, as well as antagonistic impacts on α-amylase and AChE functions[12].

Haggag reported that flavonoids are among the main pharmacological components extracted from *Cestrum nocturnum*. Quercetin has been researched for its anti-inflammatory properties, while kaempferol has demonstrated potential in the prevention of cancer. The existence of these biologically active substances in *Cestrum nocturnum* underscores its potential for therapeutic use in many health disorders[8].

A new steroidal saponin, a flavonoid compound, and a triterpene saponin were found by Nasr *et al.* in the flowers of *Cestrum elegans*. These were found along with a previously known steroidal saponin. These compounds exhibited varying effects against Gram-positive and Gram-negative bacteria, as well as demonstrated antifungal and antiviral properties[13]. Certain compounds demonstrated the most potent biological effects upon the hepatitis A virus, with antiviral activities of 34.3% and 25%, respectively, at a non-toxic dose of 1.56 µg/mL on the vero cell line.

A study by Valencia-Mejia *et al*. tested different substances from *C. nocturnum* against two types of fungi, *F. solani* and *F. kuroshium*, to see which ones were effective at killing them. The results showed that the crude extract, fractions, and a pure compound from *C. nocturnum* all exhibited significant antifungal activity. This study emphasizes the value of investigating the variety of plants in the evergreen montane cloud forest of Veracruz, Mexico, as a potential source of new antifungal compounds. It was found that pennogenin tetraglycoside, a steroidal saponin-type compound, was the main antifungal compound in *C. nocturnum* that killed *F. kuroshium*. This is the first report of the presence of this compound in *C. nocturnum* and its efficacy against the causal agent of *Fusarium dieback*. It highlights the possibility of herbal remedies in the search for biocontrol substances against phytopathogenic fungi[14].

Marwa *et al.,* extracted important insecticidal chemicals from *Cestrum nocturnum*, such as cytomethrin and 3-butynyl-2,2,5-trimethyl-1,3-dioxane-5-methanol. Cypermethrin is frequently employed as an insecticide, but 3-butynyl-2,2,5-trimethyl-1,3-dioxane-5-methanol exhibits promising medicinal potential. The presence of cytomethrin in these compounds gives them the potential to exterminate insects. Additionally, the inclusion of 3-butynyl-2,2,5-trimethyl-1,3-dioxane-5-methanol allows for the investigation of their therapeutic qualities in various scenarios[15].

Iguchi *et al.* conducted a comprehensive study on the chemical composition of the leaves of *Cestrum newellii*. As a result, they discovered eight previously unknown steroidal glycosides. These glycosides were categorized into four groups: spirostanol, furostanol, pseudofurostanol, and cholestane glycosides. Additionally, three known cholestane glycosides were also identified[16]. The individual chemical components extracted from Cestrum newellii were shown to be ineffective in causing the death of HL-60 human promyelocytic leukemia cells, as determined by the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-2H-tetrazolium bromide test. This is despite the fact that the plant itself highly toxic.

Chaskar *et al.* identified many important pharmacological substances derived from *Cestrum nocturnum*, including ethyl citrate, phytol, 4-isobutylmorpholine, n-hexadecanoic acid, and α-amyrin. These molecules may have therapeutic benefits due to the presence of α-amyrin, a pentacyclic triterpene with diverse biological properties. These uses include repelling insects, eliminating germs, and perhaps exhibiting biological activity. The components isolated using the plant's methanol extract show potential for additional investigation into their distinct pharmacological advantages and uses[11].

The n-butanol part of *Cestrum nocturnum* flowers was studied by Deng Pan *et al.,* who found important chemicals for medicine, such as fractions C4 and C5. These chemicals demonstrate substantial cytotoxicity against cancer cell lines while displaying minimal immune toxicity against T and B cells. They trigger programmed cell death in cancerous cells by inducing DNA damage and suppressing the activity of topoisomerase II[17].

Tyagi *et al,.* documented the presence of many isolated chemicals in *Cestrum nocturnum*, including saponin, alkaloid, tannin, amino acid, and carbohydrate. These substances were discovered in different botanical extracts. Saponin was detected in both water and ethanolic extracts; alkaloid was present in all extracts except for the hexane extract; tannin was identified in water, ethanol, and methanol extracts; amino acids were discovered in water and ethanolic extracts; and carbohydrates were detected in water and methanolic extracts. These chemicals are responsible for the plant's anticoagulant effects [18].

Reports say that *Cestrum diurnum* can effectively stop mice from licking their paws when they are exposed to carrageenan and formalin. This supports the traditional use of the plant to treat pain and inflammation. The results suggest that *Cestrum diurnum* might work by decreasing the amount of NF-κB p65 protein and/or stopping the activity of autacoids like histamine, serotonin, and prostaglandin [19].

Kamboj observed that a hydroalcoholic extract obtained from *Cestrum nocturnum* successfully suppressed the function of α-amylase, with an IC_{50} value of 45.9 µg. This suggests that it has the capacity to be employed as a highly effective medicine for diabetes.

The study highlights the importance of natural inhibitors, namely those found in *C. nocturnum*, for managing post-meal hyperglycemia[20]. It suggests that such inhibitors might be used as a substitute for powerful synthetic inhibitors since they have a safer profile.

Sahane *et al.,* found that both the hydroalcoholic extract and saponin fraction of *Cestrum nocturnum* leaves raised the levels of many biochemical markers in streptozotocin-induced diabetic rats. The histological analysis of the pancreas in diabetic rats revealed degenerative alterations in β-cells. However, these abnormalities were notably restored following administration with the leaf extract and saponin fraction [21]. This suggests that the extract and fraction have the capacity to restore the functionality of islet cells.

Bhuskute *et al.,* determined that both ethanolic and aqueous extracts derived from the leaves of *Cestrum nocturnum* demonstrate antianxiety and antidepressant properties in rodents. - In comparison to the aqueous extract, the ethanolic extract of *Cestrum nocturnum* leaves displayed a greater antianxiety and antidepressant effect[22].

Dina *et al.,* found that the essential oil of *Cestrum diurnum* L., obtained through steam distillation (SD), demonstrated potent antiviral effects against HCoV-229E, with an IC50 of 10.93 µg/mL. On the other hand, the essential oils obtained through microwave-assisted hydro-distillation (MAHD) and hydrodistillation (HD) showed moderate activity, with IC50 values of 119.9 and 148.2 µg/mL, respectively. Phytol, octadecyl acetate, and tricosane, three important parts of the essential oil, strongly attached to the coronavirus 3-CL (pro) protein in molecular docking experiments. In addition, when used at a dose of 50 µg/mL, all three essential oils decreased the levels of the inflammatory indicators NO, IL-6, and TNF-α. They also stopped the expression of IL-6 and TNF-α genes in RAW264.7 macrophage cell lines used in an LPS-induced inflammation model[23].

Nagar *et al*. observed that the ethanolic extract ointment of *Cestrum nocturnum* (EECN) includes phytoconstituents that enhance the body's natural healing process and may be utilized as an efficient agent for wound healing. The EECN ointment has significant efficacy in enhancing wound strength, accelerating epithelialization, enhancing tensile strength, and promoting the viability of collagen in the surrounding area of the wound. These findings imply that EECN ointment holds promise as a valuable therapy for wound healing [24].

Toxicity profile of *Cestrum nocturnum*

Several studies suggest that different components of the plant have variable levels of toxicity. An instance of this may be seen with the ethanolic extract derived from the leaves of *Cestrum nocturnum*[7]. This extract exhibited a high level of toxicity against brine shrimp during the Brine Shrimp Lethality Test (BSLT). The LC_{50} values, which varied depending on the dose, showed that the extract had lethal effects on both pests and bacteria[25]. Furthermore, research has demonstrated that the n-butanol fractions extracted from the flowers of *Cestrum nocturnum* have the ability to eradicate cancer cell lines while exhibiting minimal immunological toxicity towards T and B lymphocytes[26]. This implies that they have the potential to combat malignancies while minimizing negative impacts on the immune system[27]. However, it is important to exercise caution, as certain species within the Cestrum genus, such as *Cestrum diurnum*, have been found to have harmful effects on cells. Some of these effects are strange things happening when cells divide and small nuclei forming in the root apical meristem cells of *Allium cepa*[28]. This highlights the significance of exercising caution while utilizing herbal remedies derived from these plants. *Cestrum nocturnum* leaves have been shown to possess hypoglycemic characteristics, indicating their potential efficacy in treating diabetes in animal models[29]. This indicates that they could possess medical properties, but it is crucial to thoroughly comprehend their pharmacological and toxicological characteristics. In summary, although *Cestrum nocturnum* shows potential in traditional medicine due to its many bioactivities, it is important to thoroughly assess its possible toxicity, especially when used in high concentrations or for extended periods, in order to assure safe therapeutic usage.

Traditional and Commercial uses of *Cestrum nocturnum*

Cestrum nocturnum, sometimes referred to as the night-blooming jasmine or 'Lady of the Night,' is a very adaptable plant that has been widely used for both traditional and commercial purposes in different areas. Native to the tropical Americas, this alluring plant has fascinated societies around, leading to its incorporation into mythology, medical traditions, and contemporary enterprises. A fascinating characteristic of the plant is its strong connection with folklore and traditional traditions, which are deeply ingrained. *Cestrum nocturnum* is revered and carries profound symbolic meaning in several cultures, frequently being integrated into religious rites, spiritual ceremonies, and medicinal treatments[30]. The plant's flowering at night and its captivating scent have sparked stories and folklore, since it is highly respected for its magical attributes and believed healing abilities.

In addition to its cultural significance, *Cestrum nocturnum* has been widely used in traditional medicine, especially in underdeveloped areas. The plant's foliage, blossoms, and fruits have historically been employed to remedy a diverse array of afflictions, encompassing gastrointestinal disorders, respiratory illnesses, and dermatological troubles[31]. The plant has been integrated into herbal mixtures and applied topically in specific areas, demonstrating its adaptability and extensive understanding of its therapeutic capabilities.

Recently, *Cestrum nocturnum* has become increasingly popular in the cosmetic and fragrance sectors. The plant's alluring aroma emitted throughout

the night has been extensively studied, with research emphasizing its potential for commercial utilization in the perfume and cosmetic industries. Moreover, the plant's abundant phytochemical composition, which includes flavonoids, terpenes, and other bioactive chemicals, has attracted the attention of the pharmaceutical and nutraceutical sectors. As a result, continuous research is being conducted to explore its possible medicinal uses[18].

In addition to its economic value, the ecological importance of *Cestrum nocturnum* has also been acknowledged. This plant plays a crucial role in promoting local biodiversity and maintaining populations of pollinators, especially those that are active at night, such as moths[21].

To summarize, the wide range of uses of *Cestrum nocturnum*, including both traditional and folkloric practices as well as modern commercial applications, underscores the plant's versatile importance. As research progresses, the distinctive characteristics and possibilities of *Cestrum nocturnum* are becoming increasingly clear. It is obvious that this plant is a fascinating and useful subject of study, with the potential for further integration into several sectors of human life and business.

CONCLUSION

The comprehensive findings from the extensive analysis of *Cestrum nocturnum* highlight the plant's varied significance in the realm of traditional medicine. The phytochemical analysis reveals a diverse array of biologically active chemicals, including alkaloids, flavonoids, and terpenoids, which may contribute to the plant's potential medicinal applications. The pharmacological assessment highlights the plant's potential effects in various domains, such as neuroprotection, anti-epileptic activity, and analgesic qualities. In addition, the analysis of the toxicity profile emphasizes the need for cautious and regulated use of the plant, as it can lead to adverse effects. Understanding the complete range of *Cestrum nocturnum's* chemical makeup, medicinal uses, and safety profile allows us to appreciate its importance in traditional medicine and opens up avenues for further research and potential advancements in natural remedies. This plant's wide range of properties makes it an exciting prospect for future research and development in the pharmaceutical industry. It holds the potential to offer novel treatment options for a variety of health conditions.

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REFERENCES

1. Casierra-Posada F, Jarma-Orozco A. Nutritional Composition of Passiflora Species. Nutritional Composition of Fruit Cultivars. 2015 January 517-534. https://doi.org/10.1016/B978-0-12-408117-8.00022-2

2. Cavero RY, Akerreta S, Calvo MI. Pharmaceutical ethnobotany in Northern Navarra (Iberian Peninsula). J Ethnopharmacol [Internet]. 2011 Jan 133(1):138-46. https://doi.org/10.1016/j.jep.2010.09.019 PMid:20883764

3. Abouelnour A, Elsayed A, El-Demerdash M. Morphological, phytochemical, and therapeutic potentials investigation of some species of Cestrum L. (Solanaceae family). Bull Fac Sci Zagazig Univ. 2022 Feb 0(0):0-0. https://doi.org/10.21608/bfszu.2022.115228.1109

4. Islam MR, Ahmed S, Sadia SI, Sarkar AK, Alam MA. Comprehensive Review of Phytochemical Content and Applications from Cestrum nocturnum: A Comparative Analysis of Physicochemical Aspects. Asian J Res Biochem. 2023 December 13(4):43-58. https://doi.org/10.9734/ajrb/2023/v13i4271

5. Chowdhury N, Ghosh A, Bhattacharjee I, Laskar S, Chandra G. Determination of the n-alkane profile of epicuticular wax extracted from mature leaves of Cestrum nocturnum (Solanaceae: Solanales). Nat Prod Res. 2010 September 24(14):1313-7. https://doi.org/10.1080/14786410903246868 PMid:20803375

6. Alrabayah I, El Hawary S, kandil zeinab, El-Kadder E, Essa A, Elraey M. Genus Cestrum Therapeutic Potential: An Updated Review of its Phytochemical, Pharmacological, and Morphological Features. Egypt J Chem. 2023 July 0(0):0-0. https://doi.org/10.21608/ejchem.2023.214022.8048

7. Oktavia AI, Mardiyah M, Syarifah AL. Toxicity Test for Yellow, Red, and Purple Flowers (Cestrum elegans) Leaves Using the Brine Shrime Lethality Test Method. PHARMADEMICA J Kefarmasian dan Gizi. 2021 September 1(1):9-15. https://doi.org/10.54445/pharmademica.v1i1.6

8. Haggag MI. Phytochemical profile for Cestrum nocturnum leaves ethanolic extract and isolation of a rare flavonoid using different chromatographic and spectroscopic techniques. J Med Plants Stud. 2022;10(2):143-50. https://doi.org/10.22271/plants.2022.v10.i2b.1403

9. Inayat H, Khan I, Ahmad VU, Rani M, Khan MA. Isolation and structure elucidation of a new oleanane type glycoside from the aerial portion of cestrum nocturnum. Bull Chem Soc Ethiop. 2020 January 34(1):141-8. https://doi.org/10.4314/bcse.v34i1.13

10. El-Demerdash MM, El-Sayed AS, Georg NM, Abou-Elnour A, Nosier H. Biosystematic studies of some Egyptian species of Cestrum (Solanaceae). Mol Biol Rep [Internet]. 2021 May 48(5):4497-515. https://doi.org/10.1007/s11033-021-06471-1 PMid:34101109

11. Chaskar PK, Tank SH, Doshi GM. Gas chromatography-mass spectroscopy studies on Cestrum nocturnum macerated methanolic extract. Asian J Pharm Clin Res. 2017 March 10(3):259-63. https://doi.org/10.22159/ajpcr.2017.v10i3.16134

12. Ahmad VU, Baqai FT, Fatima I, Ahmad R. A spirostanol glycoside from Cestrum nocturnum. Phytochemistry. 1991;30(9):3057-61. https://doi.org/10.1016/S0031-9422(00)98252-9 PMid:1367796

13. Abuzaid H, Amin E, Moawad A, Usama Ramadan, Abdelmohsen, Hetta M, Mohammed1 R. Liquid Chromatography High-Resolution Mass Spectrometry Analysis, Phytochemical and Biological Study of Two Aizoaceae Plants Plants: A New Kaempferol Derivative from Trianthema portulacastrum L. Pharmacognosy Res. 2020 October 10:24-30. https://doi.org/10.4103/pr.pr_119_19

14. Valencia-Mejía E, León-Wilchez YY, Monribot-Villanueva JL, Ramírez-Vázquez M, Bonilla-Landa I, Guerrero-Analco JA. Isolation and Identification of Pennogenin Tetraglycoside from Cestrum nocturnum (Solanaceae) and Its Antifungal Activity against Fusarium kuroshium, Causal Agent of Fusarium Dieback. Molecules. 2022March 27(6):1-17. https://doi.org/10.3390/molecules27061860 PMid:35335224

15. Begum AS, Goyal M. Research and Medicinal Potential of the genus Cestrum (Solanaceae) - A Review. Pharmacogn Rev. 2007 July 1(2):320-32.

16. Iguchi T, Takahashi N, Mimaki Y. A total of eight novel steroidal glycosides based on spirostan, furostan, pseudofurostan, and cholestane from the leaves of cestrum newellii. Molecules. 2020 Sep 25(19):3-16. https://doi.org/10.3390/molecules25194462 PMid:32998410

17. Wu DP, Lin TY, Lv JY, Chen WY, Bai LR, Zhou Y, Huang JL, Zhong ZG. Cestrum nocturnum flower extracts attenuate proliferation and induce apoptosis in malignant cells through inducing DNA damage and inhibiting topoisomerase II activity. Evidence-based Complement Altern Med. 2017 January 2017:1-8. https://doi.org/10.1155/2017/1456786 PMid:28250789

18. Tyagi CK, Jhade D, Shah SK. Evaluation of anticoagulant activity of aqueous extract of Coestrum nocturnum. Int J Phytomedicine. 2016 feb 8(4):525-32. https://doi.org/10.5138/09750185.1969

19. Rashed KN, Ćirič A, Glamočlija J, Calhelha RC, Ferreira ICFR, Soković M. Identification of the bioactive constituents and the antibacterial, antifungal and cytotoxic activities of different fractions from Cestrum nocturnum L. Jordan J Biol Sci. 2018 July 11(3):273-9.

20. Kamboj A, Kumar S, Kumar V. Evaluation of antidiabetic activity of hydroalcoholic extract of cestrum nocturnum leaves in streptozotocin-induced diabetic rats. Adv Pharmacol Sci. 2013 Sep 2013:150401. https://doi.org/10.1155/2013/150401 PMid:24151502 PMCid:PMC3787616

21. Sahane RS, Wankhade PA, Shrungarpure MA. Pharmacological and phytochemical investigation of Cestrum nocturnum leaf extract for antihyperglycemic and antihyperlipidemic activity . Int J Res Pharmacol Pharmacother. 2014 Oct-Dec 3(4):255-68.

22. P. Katolkar, S. Bhuskute and N. Duragkar PKSB and ND. Evaluation of Antianxiety and Antidepressant Activity of Cestrum Nocturnum Leaves. Int J Res Biosci Agric Technol. 2015 May 2(3):232-6. https://doi.org/10.29369/ijrbat.2015.03.II.0067

23. Bahgat DM, Gad HA, Al-Sayed E, Mahmoud SH, Mostafa A, Mahfouz NM, Eldahshan OA, Nasser B. Singab A. Essential Oil of Cestrum diurnum L.: GC/MS Analysis, in Vitro and in Silico Anti-HCoV-229E Effects and Inhibitory Activity against LPS-Induced Inflammation. Chem Biodivers [Internet]. 2023 Apr 1;20(4):e202201045. https://doi.org/10.1002/cbdv.202201045 PMid:36811152

24. Nagar HK, Srivastava AK, Srivastava R, Kurmi ML, Chandel HS, Ranawat MS. Pharmacological Investigation of the Wound Healing Activity of Cestrum nocturnum (L.) Ointment in Wistar Albino Rats . J Pharm. 2016 January 2016:1-8. https://doi.org/10.1155/2016/9249040 PMid:27018126 PMCid:PMC4785265

25. Uddin ME, Ahmad T, Arif-Uz-Zaman M, Rahman T, Ranjan N, Nazmuzzaman M, Manik MA. Standardization and improving of in vitro micropropagation of night jasmine (Cestrum Nocturnum L.). Plant Arch. 2016 Jun 16(1):279-84.

26. Mimaki Y, Watanabe K, Sakagami H, Sashida Y. Steroidal glycosides from the leaves of Cestrum nocturnum. J Nat Prod. 2002 January 65(12):1863-8. https://doi.org/10.1021/np020276f PMid:12502329

27. Julsrigival J, Julsrigival S, Chansakaow S. The diurnal and nocturnal floral scent of dracaena fragrans (L.) Ker Gawl. in Thailand. Chiang Mai Univ J Nat Sci. 2020 January 19(1):52-60. https://doi.org/10.12982/CMUJNS.2020.0004

28. Buchbauer G, Jirovetz L, Kaul VK. Volatiles of the Absolute of Cestrum nocturnum L. J Essent Oil Res. 1995;7(1):5-9. https://doi.org/10.1080/10412905.1995.9698455

29. Al-Reza SM, Rahman A, Cho YS, Kang SC. Chemical composition and antioxidant activity of essential oil and organic extracts of cestrum nocturnum L. J Essent Oil-Bearing Plants. 2010 March 13(5):615-24. https://doi.org/10.1080/0972060X.2010.10643871

30. Ali Khan M, Inayat H, Khan H, Saeed M, Khan I. Antimicrobial activities of the whole plant of Cestrum nocturnum against pathogenic microorganisms. African J Microbiol Res [Internet]. 2011 March 5(6):612-6. Available from: http://www.academicjournals.org/ajmr

31. Keshari AK, Srivastava R, Singh P, Yadav VB, Nath G. Antioxidant and antibacterial activity of silver nanoparticles synthesized by Cestrum nocturnum. J Ayurveda Integr Med [Internet]. 2020 Jan-Mar 11(1):37-44. https://doi.org/10.1016/j.jaim.2017.11.003 PMid:30120058 PMCid:PMC7125370