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MEDICAL IMPORTANCE OF AK PLANT (CALOTROPIS PROCERA) IN TREATMENT OF HUMAN DISEASES

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ABSTRACT

From ancient times to the present, herbal remedies have been used. The history of ethnopharmacology predates humankind. Herbal remedies have an astounding range of therapeutic applications. Ayurvedic plants like Calotropis procera Linn. are utilized in many traditional medicines to treat a wide range of ailments. There is substantial medicinal efficacy in the plant's extracts from various sections. When dried, the entire plant has strong expectorant, antihelmintic, and tonic properties. The roots function similarly and have laxative properties as well. The latex is traditionally used to cure vertigo, baldness, hair loss, toothache, intermittent fevers, rheumatoid/joint swellings, and paralysis, while the powdered root is used to treat bronchitis, asthma, leprosy, dermatitis, and elephantiasis. It is used to alleviate joint pain with the leaves.

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KEYWORDS: pharmacological actions, wound healing, anti-hyperglycemic impact, and Calotropis procera.

INTRODUCTION

Calotropis procera, often known as Aak, is a natural medication that has been used for medical purposes since ancient times. Despite being rather poisonous, the medication has been used successfully to treat a number of illnesses, including juzam (leprosy), zeeq-un-nafs (asthma), waja-ul-mufasil (arthritis), istisqa (ascites), and iltehab (inflammatory disorders). It's in the genus Calotropis and family Asclepedaceae. This genus contains four species, although only two—Calotropis procera and Calotropis gigantea—are known to provide therapeutic benefits [1]. In dry and semi-arid areas, it is widely grown without the use of irrigation, chemical fertilizers, pesticides, or other agronomic techniques. Plants are a valuable bio-indicator for tracking pollution in samples from urban and suburban areas with different Br, Mn, Se, Cr, and Zn concentrations [2]. The primary source of pharmaceuticals has continued to be medicinal plants; in fact, a large number of the drugs that are currently on the market were either directly or indirectly produced from them. The most successful method has been thought to be the one that uses natural ingredients to discover novel medications. From ancient times to the present, herbal remedies have been used in medical systems as crude treatments [3]. With the development of scientific understanding, the field of ethnobotanical pharmacy expanded. These plant-based medications should be readily available to consumers and have fewer adverse effects [4]. Calotropis procera is a flowering shrub of the family Asclepediaceae. It is famous with different names based on its habitat, such as Dead Sea plant, Kisher and Usher in Arabic; Calotropis, Calotrope, Dead Sea fruit, Desert wick, Giant milkweed, Mudarfibre, Rubber tree, Rubber bush, Swallow-wort where Sodom apple is known in English; Akdo, Akada, and Madar in Hindi; the local term for this shrub is Aak or Ak [5].

It's a small tree or xerophytic perennial shrub that has 2 to 6 m tall stems with tap roots that reach 3 to 4 m into the ground. If a plant's components are broken or cut, a thick, milky sap or latex is released from the plant. C. procera can withstand varying degrees of soil salinity, drought stress, and high light in hard and desert settings. It can grow on a wide range of soil types. Because of this, it can be found in many tropical and subtropical nations [6] . For a long time C. procera has been utilized as a medicinal plant. It has been used to treat a wide range of illnesses, most notably infectious infections [7] . Furthermore, C. procera is grown close to

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temples and was worshipped by the ancient Indians (Sharma & Sharma, 1999). It is also utilized as a milk-clothing agent for making wagashi, a traditional cheese from African. C. procera showed a diverse array of biological activities such as antimicrobial , antidiarrhoeal , wound healing , anti-inflammatory , anticancer or cytotoxic , in vivo immunomodulatory , analgesic , anthelmintic , antioxidant , and in vivo anti-hyperglycemic [8] . A plant used in Ayurveda, Calotropis procera Linn (Asclepiadaceae Family) has significant therapeutic qualities. It is also known by many colloquial names, including Ark, Swallow wart, or milkweed, as well as Madar (Hindi), Alarka (Sanskrit), and Swallow-Wort (English). It is a common wasteland weed in Indonesia, Malaysia, China, and India [9]. It is also found in most warm-weathered regions of the world on dry, sandy, and alkaline soils. C. procera Linn grows to a height of 5.4 m and is an erect, tall, massive, densely branched perennial shrub or small tree with milky latex all over the plant [10]. Triterpenoids, flavonoids, cardiac glycosides, cardenolides, anthocyanins, α-amyrin, β-amyrin, lupeol, β-sitosterol, flavonols, marine, resins, a potent bacteriolytic enzyme called calactin, a nontoxic proteolytic enzyme called calotropin, and a wax are all present in the phytochemistry of the plant. Ayurvedic medicine makes use of the fresh or dried leaves of plants as well as their roots, root bark, and flowers [11]. The leaves when powdered can be used as a purgative, to treat liver issues, to improve sexual health, to relieve headaches and stomachaches, and to reduce swelling and pain. The plant has historically been used as an analgesic, antipyretic, and antifungal [12]. The dried leaves are used to treat rheumatic pain and paralysis, and as an expectorant and anti-inflammatory. The roots and dried latex are used as a snake poisoning remedy. It is also used to treat intestinal worms and piles as an abortifacient. Migraine sufferers can also be treated with delicate leaves [13].

The medicinal properties of plants in the Asclepiadaceae family are diverse. In conventional medicine, the genus Calotropis is used to cure leprosy, ulcers, tumors, splenic and liver problems, and piles. Additionally, it has purgative, anthelmintic, anticoagulant, antipyretic, analgesic, anti-inflammatory, and antibacterial properties [14]. It also functions as a palliative for blood pressure and breathing issues. According to several studies, it also possesses a neuromuscular blocking effect. Family members are thought to be prospective sources of anticancer drugs and are rich in cardiac glycosides [15]. "Procera" is a Latin word that alludes to the cuticular wax on its leaves and stem, while "Calotropis" is a Greek word that means "beautiful," alluding to its blossoms. In different regions of the world, it is referred to by a

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variety of common names, including rubber tree, ushar, big milkweed, giant sodomite, wild cotton, and so on. Fruit morphology differs between its subspecies [16], C. procera subsp. procera and C. procera subsp. hamiltonii. Additionally, it is very similar to its congeneric plant. The multipurpose plant Calotropis procera offers a variety of provisioning ecological functions [17]. In North Africa, the Middle East, South Asia, and Southeast Asia, it has been frequently employed in traditional medical systems . Since ancient times, it has also been used for fiber, fuel, feed, and lumber. Due to its socioeconomic significance, it has been introduced beyond of its native region (into Asia and Africa). Its naturalization in the newly introduced habitats was made possible by morpho-physiological adaptations and its tolerance of a broad variety of environmental circumstances. As a result, the plant has been identified in some locations as an invasive weed of wastelands, overgrazed pastures, and improperly managed agricultural fields [18].

The plant is also well-known for its poisonous qualities, which can cause dermatitis, iridocyclitis, and other deadly side effects. It has been demonstrated that the aqueous flower extract has analgesic, antipyretic, and anti-inflammatory properties. Plant decoction containing aerial parts has neuromuscular inhibiting properties [19]. It has been reported that the ethanolic extracts of the various components, particularly the flower and bud extracts, have antimalarial properties. Seed extract in chloroform exhibits antibacterial action [20].Although Calotropis procera is found practically everywhere in Nigeria, it is more prevalent in the country's north.Calotropis procera is a woody, perennial shrub with large, oval, fleshy leaves that grows wild in mild temperate and tropical climates. It has a grayish green color [21].

C. procera is considered an important traditional medicine in Nigeria. It is used to treat feverish illnesses, indigestion, rheumatism, eczema, diarrhea, and common colds. It can be used either alone or in conjunction with other herbal medicines. Cough and toothache relief, as well as rabies therapy, can all benefit from latex combined with honey. Leaf extracts, latex, and chopped leaves of the plant have demonstrated antinematode properties in vitro and in vivo. It has been noted that using C. procera leaves as an alternative for treating water can reduce the overall viable count [22].

Trichopis procera With milky latex throughout, linn is an erect, tall, big, heavily branched, perennial shrub or small tree that can reach a height of 5.4 meters. Bark is bubbly and gentle. Strong, terete branches with fine, tightly packed cottony pubescence (particularly on young).

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Acute, thick, glaucous, green, sub-sessile, opposite, decussate, broadly ovate-oblong, elliptic or obovate, covered in fine cottony pubescent hair when young but glabrous later in life, and base cordate leaves. Young plants have tomentose flowers in umbellate cymes, while the glabrous, ovate, and sharp calyx. The corolla is smooth, with upright lobes that are elliptical and sharp, and coronal scales that are equal in length and later compressed beyond the staminal column. Follicles can be oval, ellipsoid, or subglobose. Largely round, sharp, flattened, minutely tomentose, brown, and silky seeds the coma measures 3.2cm [23].

An enzyme termed calotropain, found in the leaves of Calotropis procera, causes the coagulation of cow or goat milk and is responsible for the milk production process founded . The curd was made accessible on the market in various shapes and sizes through the process of coagulation with the leaves of C. procera following heating, draining, and molding . Scientific validation for the use of C. procera leaves and latex as natural food preservative and medicinal agents is provided by their antibacterial and antioxidant characteristics .

The nutritive and phytochemical content of the plant may be related to its therapeutic and nutritional qualities. Thus, certain nutritional markers were present in both the leaves and the seeds [24]. Eighty percent of the world's population, mostly in underdeveloped nations, uses traditional medicines to treat common healthcare issues. They are utilized as a medicinal and as food in almost every culture. What's even more amazing is that over 25% of contemporary drugs are derived from plants [25]. The plant's following biological activities have garnered a lot of attention: Among the earlier pharmaceutical research are accounts the antifungal, insecticidal, and anticancer properties of C. procera [6]. The plant's blooms have larvicidal, analgesic, anti-inflammatory, antipyretic, and hepatoprotective properties [26].

Methodology

Vernonia amygdalina and Calotropis procera leaves (extract source) obtained in March 2016 and verified at the Department of Botany's Herbarium voucher numbers UILH/001/1023 and

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UILH/002/962 were deposited in the Department of Plant Biology, University of Ilorin, Nigeria. Staphylococcus aureus, Pseudomonas aeruginosa, and 88 other stock cultures Test organisms Aspergillus niger, Trichophyton rubrum, and Candida albicans were acquired from the University of Ilorin's Department of Pharmaceutical Microbiology, as published in the West African Journal of Pharmacy (2017) 28 (2). The following materials were used in the agar diffusion tests: nutritional agar (Biomalk, India), Sabouraud dextrose agar (SDA), liquid paraffin, and white soft paraffin (BDH Chemicals Ltd., Poole, England). Methanol was obtained from Guangdong Chemical Reagent [27].

Obtaining and processing plant samples

We gathered fresh leaves from the Clusia rosea and Calotropis procera plants in the Ado-Ekiti government reserve areas and Odo Ado. In the Federal Polytechnic, AdoEkiti plant science laboratory, both plants were recognized and verified. The leaves were brought inside the lab, where they were cleaned with running water and left to dry for ten days beneath a canopy. For additional analysis, the dried leaf was ground up in a blender, sieved, and kept in polythene bags. Water and 95% ethanol were used to extract individual plant leaves that had been pulverized. In order to extract the powder, 20 g of each leaf powder were soaked for 48 hours with intermittent stirring in a beaker filled with 200 ml of a particular solvent. Whitman was used to filter the beaker's contents after 48 hours [28].

Phytochemical Research

Using the techniques described by Abegunde , the phytochemical screening of both aqueous and ethanolic extracts of Calotropis procera and Clusia rosea leaves was carried out [29].

Test organisms

Salmonella typhi, Pseudomonas aeruginosa, Staphylococcus aureus, Escherichia coli, and Streptococcus pyrogenes are the microorganisms used for the antibacterial activity [30].

Assay for antibacterial

The antimicrobial test was carried out utilizing a technique that was documented . For the antibacterial experiment, nutrient agar media were acquired from the Federal Polytechnic, Ado-Ekiti, Microbiology Laboratory. The media from Agar were ready and autoclaved for 20 minutes at 121 °C to sanitize. After being moved onto a different, sterile petri plate with laminar air flow, the nutrient agar medium was allowed to cool before solidifying. The cotton swab technique was used to inoculate the bacterial culture. Following the inoculation and even

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dispersion of bacteria on the media's surface, forceps were used to impregnate prepared discs containing varying concentrations of plant extract (0.5, 1.0, 1.5, 2.0, and 2.5 mg/L) into the media's surface, and the Petri dishes were then moved [31].

Administration of extracts

One teaspoon of the 8.98 g powdered leaf extract from the dried extract was combined with 100 g of animal feed. For four weeks in a row, the animals were fed a mixed animal feed that included leaf extract on a daily basis. The rats were slaughtered when the treatment was discontinued. The rats' fasting blood glucose was checked every week throughout the duration of the four-week investigation [32].

Initiation of diabetes

Every animal was given a regular food and given a week to get used to it. A single intraperitoneal (IP) injection of freshly made alloxan monohydrate at a dose of 100 mg/kg body weight was used to cause diabetes in rats that had been fasting for at least 10 hours. Measurements of blood glucose levels were taken both before and after induction [33].

Feed for animals

Grower mash, which is commercially prepared rat food, was acquired from PS Mandrides Plc in Kano, Nigeria.The feed's composition is listed below:

Crude protein :15.50%

Crude fiber:7.40%

Calcium :6.59%

Phosphorus: 4.85%

2500k cal/kg is the amount of metabolic energy.

Analytical Statistics

Each experiment was run three times, and the results were reported as mean ± standard deviation (SD). Graph Pad Prism and Microsoft Excel were used to create the plots. One-way and two-way ANOVA were used to examine the data, and $P < 0.05$ was regarded as statistically significant [34].

Gathering of floral arrangements

C. procera's vibrant ,well-nourished full-bloomed blooms were selected from the district of

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Bahawalpur in Southern Punjab. These plants, which are referred to as N5 nationwide and fall under the National Highways Authority's purview, were growing along the road. The flowers were moved to the laboratory and stored in a paper bag. Dr. Arshad Javaid, a botanist and co-author of this paper, recognized and verified the plant specimen before carrying out any other steps [35].

Review Literature

The goal of the current project was to investigate the post-infectional changes linked to the development of Calotropis procera leaf spot disease, which is caused by Passalora calotropidis. It is a significant member of the Asclepiadaceae subfamily and family of medicinal plants, Apocynaceae [36]. To evaluate the post-infectional changes linked to the disease progression, a number of parameters were examined in the current work, including leaf area, number of leaf spots, biochemical parameters, such as total chlorophyll content, total protein content, and antioxidative enzyme activities, such as catalase (CAT), ascorbate peroxidase (APX), and guaiacol peroxidase (GPX). Using GC-MS, a number of organic acids, including fumaric acid (FA), citric acid (CA), succinic acid (SA), and malic acid (MA), were also examined. Total protein and chlorophyll contents were shown to decrease with illness severity [37]. It is extremely difficult to control rats in forestry, agriculture, retail, animal husbandry, poultry, and human hygiene. widespread application of Chemical rodenticides pose a risk to the environment and to people [38].

Calotropis procera Dryand is a plant that is often known as "Rui" in Marathi and "Mudar" in Hindi. It is a member of the Apocynaceae family and goes by other common names as Apple of Sodom and Rubber Bush. (Pakistan and India). It is well recognized that the bark and leaves have anti-hyperglycemic, analgesic, antipyretic, neuromuscular blocking, purgative, and anti-cancer properties in addition to healing wounds [39]. A powerful bacteriolytic enzyme called calactin, a nontoxic proteolytic enzyme called calotropin, and a wax were isolated from the heartwood of Calotropis procera. The phytochemistry of the plant reveals the presence of triterpenoids, flavonoids, cardiac glycosides cardenolides, anthocyanins, α-amyrin, β-amyrin, lupeol, β-sitosterol, flavanols, mudarine, resins, and lupeol. The pharmacological properties of Calotropis procera are the main topic of this review [40].

In Madhya Pradesh, caletropis procera is a traditional medicinal plant. Most people refer to it as Aak. The richest source of bioactive components, this plant is valued in India for treating a

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variety of illnesses. Thus, a phytochemical analysis using several plant extracts was conducted [41]. A phytochemical property screen was conducted on the Calotropis procera extract. It contains the bioactive substances alkaloids, sugars, glycosides, reducing sugar, flavonoids, tannin, phenolics, saponins, protein, terpendoids, and steroids, according to the results of the phytochemical analysis. The effects of C. procera extracts in methane and petroleum ether were studied [42]. The leaves of Calotropis procera (Ait.) R. Br. were macerated for seven days using ethanol as a solvent. To get a water and n-butanol fraction, the dry residue was dissolved in water and divided. The obtained n-butanol fraction was run through a column Chromatography. Human hepatoma cell lines were used to test chloroform, chloroform:methanol (9:1), chloroform:methanol (7:1), chloroform:methanol (1:1), and methanol elutes of n-butanol fraction of ethanolic extract of Calotropis procera (Ait) R.Br. leaves [43]. Medicinal plants are the oldest recognized source of healthcare in human history. It makes sense to look for more affordable and superior plant-based alternatives while also exploring for novel therapeutics.

A display of Calotropis Procera noteworthy biological properties as lenitive, carminative, spasmogenic potentials, antimicrobial, antioxidant, and abortifacient properties, as well as antibacterial, insecticidal, antifungal, and antiparasitic actions, nematocidal, proteolytic, antinflammatory, bronchial asthma, antidysentric, antisyphilitic, antirheumatic, mullusccide, diaphoretic, therapy of leprosy, bronchial asthma, anticancer activities, stomach, dyspepsia, ulcer [44].

Plants have been utilized as a source of therapeutic chemicals since ancient times, and they are an important part of the traditional medical system used to treat illnesses. The richest source is plants of organic compounds that are bioactive on Earth. The phytochemical characteristics of Calotropis procera leaves extracted with methanol and petroleum ether were studied.The findings imply that the leaf's phytochemical qualities can be used to treat a number of illnesses [45].

Hexane, butanol, ethyl acetate, and aqua were used to extract the flowers of C. procera in order to assess their antibacterial activity against different human diseases using the agar well diffusion method. Salmonella typhi, Escherichia coli (O157:H7), Micrococcus luteus KIBGE-IB20 (Gen Bank accession: JQ250612), and methicillin-resistant Staphylococcus aureus (MRSA) KIBGE-IB23 (Gen Bank accession: KC465400) are among the microorganisms

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employed in this work [46]. Bioactive component contents were greater in Calotropis procera. Higher values of total phenolic compounds (71.32 mg GAE/g), total antioxidants (651% DPPH inhibition), the enzyme catalase (4716µg/g), and ash content were obtained from the samples' chemical examination [47].

The pH values (16.72%) and total carotenoids (1987 mg/100 g) were higher in the Calotropis procera, but the Adhatoda vasica leaves had higher levels of peroxidase (1322 µg/g) and superoxide dismutase (4566 µg/g) enzymes. Compared to Calotropis procera, the flower extract of Adhatoda vasica has higher levels of organic matter (89.99%) and flavonoids (0.87 mg/100g) [48].

Traditional medical practices have traditionally employed Calotropis procera (Ait.) R.Br. A variety of pharmacological activities, including cytotoxic, antidiabetic, antioxidant, analgesic, anti-inflammatory, antiarthritic, and anthelmintic properties, have been demonstrated by pharmacological studies involving aqueous and organic extracts of different parts [49]. Calotropis procera and its phytoconstituents, including cardenolides, terpenes, flavonoids, enzymes, and other chemical constituents antimicrobial, myocardial infarction, wound healing, anticonvulsant, hepatoprotective, and immunological responses. UNBS1450 is a chemically altered version of 2-oxovorus charin, a voruscharin compound derivative that was discovered in the root bark of the Calotropis procera plant using Unibioscreen. It seems to have encouraging anti-cancer properties [50].

Apocynaceae family member Calotropis procera is a valuable medicinal plant with numerous valuable phytochemicals including flavonoids, alkaloids, triterpenes, glycosides (mainly cardenolides), steroids, saponins, proteins, and enzymes. Numerous biological activities of C. procera, including its anti-inflammatory, antioxidant, anticancer, wound-healing, and broad-ranging antibacterial properties, have been well studied and documented. This review's primary goal was to provide comprehensive information on the antibacterial activity of C. procera latex, various crude extracts, and a few isolated compounds that have undergone antimicrobial property testing. Extensive information about the antibacterial, antifungal, anti-protozoal, and antiviral characteristics of C. procera was analyzed and summarized in tabular form from previously published original articles as well as more recent ones. The collected information included plant parts, the place of origin, and the kind of test.

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The desire to find and create novel, complementary, or synergistic anti-cancer drugs persists despite the tremendous advancements in cancer therapies over the past few decades. The coarse shrub Calotropis procera has long been recognized as a highly promising source of compounds with anti-bacterial, anti-schizonticidal, anti-inflammatory, anti-diarrheal, larvicidal, and cytotoxic properties. For ages, this plant has piqued the curiosity of scientists due to its many components, including norditerpenic esters, organic carbonates, the cysteine protease protein, alkaloids, flavonoids, sterols, and multiple forms of cardenolides. Cardenolides are a chemical class that have been shown to have therapeutic usefulness and to have prospective drug candidates discovered through related bioactivity evaluation and structure–activity relationship (SAR) research.

Summary

Calotropis procera (CP), communally known as Aak, is a xerophytic perennial shrub in the Apocynaceae family that is found in China.Procera is locally known as Aak or Madar in Hindi, milk weed in English and belongs to the family Apocynaceae and subfamily Asclepiadoideae. Although a wasteland plant, it is of sacred use as its flowers . All over the world use the plant in treatment of various diseases like snake bite, body pain, asthma, epilepsy, cancer, sexual disorders, skin diseases and many more. This plant contains various phytoconstituents such as flavonoids, terpenoids, cardenolides, steroids oxypregnanes etc. Though literature searches reveal many reviews about ethnomedicinal uses, chemical composition and pharmacological activities, no recent papers are available that provide an overview of the therapeutic potential and toxicity of Calotropis procera. Hence, the insight of this review is to provide a systemic summary phytochemistry, pharmacology, toxicology and therapeutic potential of Calotropis procera and to highlight the gaps in the knowledge so as to offer inspiration for future research. Phytoconstituents of this plant have been used to treat several illnesses including colds, asthma, arthritis, diarrhea, and skin disorders in China and other parts of Asia for a very long time.Anti-tumor studies with extracts of Calotropis procera (Ait.) R.Br. root employing Hep2 cells and their possible mechanism of action.Anti-tumor potential of root extracts of Calotropis procera : methanolic extract (CM), hexane extract (CH), aqueous extract (CW) and ethylacetate extract (CE) and its possible mechanism against Hep2 cancer cells has been investigated. Extract-treated cells exhibited typical morphological changes of apoptosis. Results of flow cytometric analysis clearly demonstrated that root extracts initiated apoptosis of Hep2 cells through cell

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cycle arrest at S phase, thus preventing cells from entering G2/M phase. Results of the study indicate that the root extracts of C. procera inhibit the proliferation of Hep2 cells via apoptot review ic and cell cycle disruption. Calotropis procera, also known as apple of Sodom or desert cotton, has been used in traditional medicine for various purposes. Here's a summary of its importance in treating human diseases:Anti-inflammatory and pain relief: Used to treat arthritis, fever, and body pain. Antimicrobial properties: Effective against bacterial and fungal infections.Wound healing: Used to treat wounds, cuts, and skin infections.Anticancer properties: Shows potential in treating certain types of cancer.Cardiovascular health: Used to treat high blood pressure, heart failure, and cholesterol.Respiratory issues: Used to treat asthma, bronchitis, and cough.Digestive issues: Used to treat constipation, diarrhea, and indigestion.Antioxidant properties: Helps protect against oxidative stress and cell damage.Antiviral properties: Effective against certain viral infections. Investigate the plant's efficacy and safety in various disease. Investigate the plant's impact on pathways, gene expression, and cellular process . Design and synthesize analogs with improved pharmacological properties.Agricultural and environmental Investigate the plant's potential in phytoremediation and soil cleanup.

Overuse or improper use of Calotropis procera can have adverse effects on human health, including:

1. Toxicity:The plant contains toxic compounds like calotropin and uscharin, which can cause:

- Nausea and vomiting
- Diarrhea and abdominal pain
- Fever and headache
- Dizziness and tremors

2. Cardiovascular issues

- Hypotension (low blood pressure)
- Bradycardia (slow heart rate)
- Cardiac arrhythmias

3. Respiratory problem: Bronchospasm and asthma

4. Liver and kidney damage: Prolonged use can lead to:

- Hepatotoxicity (liver damage)
- Nephrotoxicity (kidney damage)

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5. Allergic reactions: Allergic contact dermatitis (skin rash, itching, and blistering)

6. Blood thinners (e.g., warfarine). Diabetes medication.Pregnancy and lactation. The plant's toxic compounds may harm the fetus or baby, so it's essential to avoid using it during pregnancy and lactation.

It is crucial to use Calotropis procera under the guidance of a healthcare professional and to follow traditional or establish does recommendations to minimize the risk of adverse effects.

Conclusion

Based on available research reports, the pharmacological and therapeutic potential of CP are collected and summarized. CP contains numerous phytoconstituents such as flavonoids, steroids, alkaloids, volatile oils, esters, and many more which are responsible for the majority of the pharmacological actions including antioxidant, antibacterial, antifungal, anti-diabetic, anti-cancer, antimicrobial, anti-inflammatory effect and anti-ulcer effects. Thus,it is proved from research that calatropis procera is of great importance in pharmaceutical industry and play a key role in treatment of many diseases.

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