IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 5, Issue 2, January 2025

A Review on Calotropis Gigantea Latex Used in Skin Conditions

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Abstract: *Calotropies Gigantea (Giant Calotropis) It is a multipurpose plant belonging to the family (Apocyanaceae) it has been known for the centuries for its pharmacological importance. This plant found all over India. In Hindi, it commonly known as Arka, Calotropies Gigantea is the one of the plant which has been best natural resources and ancient knowledge for its used. It has been traditionally used for the treatment of various diseases such as Skin diseases, Wound,Burns, Asthma etc. The Latex of the calotropis gigantea is a milky white substance it has many medicinal properties and pharmaceutical value. it's rich in the bioactive compounds, including cardenolides and terpenoids proteins, tannins, flavonoids,and steroids. The latex have many used in the traditional medicines for many conditons, it includes bleeding, inflammation, pain, and fever.*

In recent studies it have also explored its potential in treating cancer, diabetes and cardiovascular diseases. This review aims to provide a comprehensive overview on its phytochemical, pharmacological, and therapeutic applications of Calotropis gigantea latex, highlighting its potential as a valuable natural remedy. Various pharmacological activities reported like analgesic activity, antipyretic activity, preganancy interceptive activity, anti-inflammatory activity, antifungal activity, Antidermal activity. calotropis gigantea Linn is well-known Healthful herb, it also known as Milkweed, it has been used in Unani, Ayurvedic,and Siddha system of medicines for many years..

Keywords: Arka, Skin diseases, Latex, Cardenoids, milkywhite subs, Natural remedy, Antidermal activity

I. INTRODUCTION

Calotropis gigantea plant belonging to Apocyanaceae family it has been used in traditional medicine for centuries to treat the skin conditions. The latex of calotropis gigantea it has been reported to possess amtidermal, anti-inflammatory, antioxidant, antimicrobial and wound healing properties, making it is a potential natural remedy for skin conditions.

The used of Calotropis gigantea latex in skin conditions date back to ancient Ayurvedic and Unani medicine, where it was used to treat a range of skin ailments, includes enzema, acne, dermatitis, and wound.

Calotropis gigantea, is a plant native to tropical Asia and Africa,it has been used for centuries in traditional medicine for its diverse therapeutic properties. The latex of Calotropis gigantea, in particular, has been reported to possess anti-inflammatory, antioxidant, and wound-healing activities, making it a promising natural remedy for various skin conditions.

The plants grows white or violet colored flower in bunches and contains latex throughout.In Ayurveda,Indian practitioners have used the shoot, leaf, roots, flowers and latex extracts of Calotropis gigantea for treatmentnof skin duseases, wound, insect bites, fevers, nausea, vomiting and diarrhea , arthritis and also reported to have antibacterial and antifungal properties by researchers.

Milkweed (Crown flower weed) is an another name of it. Calotropis gigantea is latex-producing plant that produces latex after a tissue injury. This milkweed plant has gained popularly in recent years as a potential pesticide source against insects pests. Plant latex contains Alkaloids, tannins, gum, sugars, starch, resins, and proteins. This plant was widely used by all segments of society, either directly as folk remedies or indirectly as a pharmaceutical preparation of recent medicine

DOI: 10.48175/IJARSCT-23081

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DESCRIPTION OF THE PLANT:

Plant profile:

Name: Calotropis gigantea

Synonyms: Gaint Calatrope, Crown flower

Family: Apocyanaceae

Habitat: Native to tropical Asia, now cultivated in many parts of world

Chemical Constituents:

- Cardenoides (Calatropin, Calatoxin)
- Flavonoids (Quercetin, Kaempferol)
- Alkaloids (Calotropamine)
- Glycosides (Calotroposide)

Description:

- **Height:** The plant growup to 4 meters (13 feet) tall.
- **Stem**: the stem is erect, branched, and covered with a thick, grayish-brown bark.
- **Leaves:** the leaves are large, elliptical, and pointed, measuring up to 20 cm (8 inches) long and 10 cm (4 inches) wide.
- **Flowers**: The flowers are purple or lilac in color, star-shaped, and arrange in clusters at the end of branches.
- **Fruits:** The fruits are long, narrow pods, up to 10cm (4 inches) long, containing numerous seeds.
- **Latex:** white or milky white, thick and sticky liquid, Viscous in nature.

Fig.no1: Calotropis gigantea

Taxonomical Classification:

Kingdom : Plantae
Subkingdom : Trachecheobionta
Class : Dicotyledones
Sub-class : Asteridae
Order : Gentianales
Family : Apocynaceae
Sub-family : Asclepidiaceae
Genus : Calotropis
Species : Calotropis gigantea

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Vernacular name of plant:

Indian vernacular names	Hindi: Ak, Akwan Sanskrit: Ark,Arka Tamil: Yerukku, Yerukkam Telugu: Jilledu, Jilledi Kannada: Yeruke, Yerukku Malayalam: Yerukku, Arka Marathi: Rui, Ak Gujarati: Akado, Ak Punjabi: Ak, Akwan
International vernacular names	Arabic: Ushear French: Calotropis geant Indonesian: Akar, Akwan Malaysian: Akar, Akwan Portuguese: Calotropis gigante Swahili: Mkungu
Other vernacukar names	Gaint Milkweed Crown Plant Giant Calotropis Mudar Ak, Akwan

Chemical Constituents of Calotropis Gigantea Latex

Cardenolides

1. Calotropin: A cardenolide glycoside with potent cardiotonic activity.
2. Calotoxin: A cardenolide glycoside with anti-inflammatory and antioxidant properties.
3. Uscharin: A cardenolide glycoside with cardiotonic and anti-inflammatory activities.

Flavonoids

1. Quercetin: A flavonoid with antioxidant, anti-inflammatory, and anticancer properties.
2. Kaempferol: A flavonoid with antioxidant, anti-inflammatory, and antimicrobial activities.
3. Isorhapontigenin: A flavonoid with antioxidant and anti-inflammatory properties.

Terpenoids

1. Lupeol: A triterpenoid with anti-inflammatory, antioxidant, and antimicrobial activities.
2. β-Sitosterol: A phytosterol with anti-inflammatory and antioxidant properties.
3. Stigmasterol: A phytosterol with anti-inflammatory and antioxidant activities.

Alkaloids

1. Calotropamine: An alkaloid with anti-inflammatory and antioxidant properties.
2. Uscharidine: An alkaloid with anti-inflammatory and antioxidant activities.

Glycosides

1. Calotroposide: A cardenolide glycoside with cardiotonic and anti-inflammatory activities.
2. Uscharoside: A cardenolide glycoside with anti-inflammatory and antioxidant properties.

Phenolic Acids

1. Caffeic acid: A phenolic acid with antioxidant and anti-inflammatory activities.
2. Ferulic acid: A phenolic acid with antioxidant and anti-inflammatory properties.
3. p-Coumaric acid: A phenolic acid with antioxidant and anti-inflammatory activities.

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Other Compounds

1. Saponins: Calotropis gigantea contains saponins, which have been reported to possess anti-inflammatory and antioxidant activities.
2. Tannins: The plant contains tannins, which have been shown to possess antioxidant and anti-inflammatory properties

Phrmacological Activity of Calotropis Gigantea Latex

Anti-Inflammatory Properties

- Inhibition of inflammatory mediators: Calotropis gigantea latex has been show activity to inhibit the production of inflammatory mediators such as TNF-α, IL-1β, and IL-6.
- Antioxidant activity: The latex has antioxidant properties, which can protect against oxidative stress and inflammation.

Antimicrobial Properties

- Antibacterial activity: Calotropis gigantea latex has been shown to exhibit antibacterial activity against various bacteria, such as Staphylococcus aureus and Escherichia coli.
- Antifungal activity: The latex has also been shown to exhibit antifungal activity against fungi, including Candida albicans.
- Antiviral activity: Calotropis gigantea latex has been reported to exhibit antiviral activity against various viruses, including HIV and herpes simplex virus.

Cardiovascular Properties

- Cardiotonic activity: The cardenolides present in Calotropis gigantea latex have been shown to exhibit cardiotonic activity, which can help to improve the heart function.
- Vasodilatory activity: The latex has also been shown to exhibit vasodilatory activity, which can help to lower blood pressure.

Anticancer Properties

- Cytotoxic activity: Calotropis gigantea latex has been shown to exhibit cytotoxic activity against cancer cell lines, including breast, lung, and liver cancer cells.
- Antiproliferative activity: The latex has also been shown to exhibit antiproliferative activity, which can help to inhibit the growth of cancer cells.

Neuroprotective Properties

- Antioxidant activity: Calotropis gigantea latex has been shown to exhibit antioxidant activity, which can help protect against the oxidative stress and neurodegeneration
- Anti-inflammatory activity: The latex has also been shown to exhibit anti-inflammatory activity, which can help to reduce inflammation and neurodegeneration.

Immunomodulatory Properties

- Immunosuppressive activity: Calotropis gigantea latex has been shown to exhibit immunosuppressive activity, which can help reduce inflammation and immune responses.
- Immuno enhancing activity: The latex has also been shown to exhibit immunoenhancing activity, it can help to stimulate immune responses.

Wound Healing Properties

- Accelerated wound healing: Calotropis gigantea latex has been shown to accelerate wound healing by promoting collagen synthesis, improving tissue strength, and enhancing wound contraction.

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- Antimicrobial activity: The latex has also been shown to exhibit antimicrobial activity, which can help prevent wound infections.

Antidiabetic Properties

- Hypoglycemic activity: Calotropis gigantea latex has been shown to exhibit hypoglycemic activity, which can help lower blood sugar levels.
- Antioxidant activity: The latex has also been shown to exhibit antioxidant activity, which can help reduce oxidative stress and inflammation associated with diabetes.

Antipyretic and Analgesic Properties

- Antipyretic activity: Calotropis gigantea latex has been shown to exhibit antipyretic activity, which can help reduce fever.
- Analgesic activity: The latex has also been shown to exhibit analgesic activity, which can help relieve pain

Therapeutic uses of calotropis gigantea Latex:

1. **Anti-Inflammatory and Pain Relief**

Calotropis gigantea has been used to treat inflammatory conditions such as arthritis, gout, and rheumatism. The plant's anti-inflammatory and analgesic properties help to reduce pain and swelling.

2. **Skin Conditions**

The plant has been used to treat various skin conditions, including eczema, psoriasis, acne, and dermatitis. The anti-inflammatory and antimicrobial properties of Calotropis gigantea help to soothe and heal the skin.

3. **Wound Healing**

Calotropis gigantea has been used to treat wounds, cuts, and abrasions. The plant's antimicrobial and anti-inflammatory properties help to prevent infection and promote wound healing.

4. **Fever and Respiratory Issues**

The plant has been used to treat fever, cough, and respiratory issues such as bronchitis and asthma. The anti-inflammatory and expectorant properties of Calotropis gigantea help to reduce fever and relieve respiratory symptoms.

5. **Gastrointestinal Issues**

Calotropis gigantea has been used to treat gastrointestinal issues such as diarrhea, dysentery, and stomach ulcers. The plant's anti-inflammatory and antimicrobial properties help to soothe and heal the digestive tract.

6. **Cancer Treatment**

The plant has been used in traditional medicine to treat various types of cancer, including breast, lung, and liver cancer. The anti-cancer properties of Calotropis gigantea are attributed to its ability to induce apoptosis (cell death) and inhibit cancer cell growth.

7. **Anti-Viral and Anti-Bacterial Properties**

Calotropis gigantea has been shown to possess anti-viral and anti-bacterial properties, making it effective against various infections, including HIV, herpes, and tuberculosis

8. **Anti-Parasitic Properties**

The plant has been used to treat parasitic infections such as malaria and filariasis. The anti-parasitic properties of Calotropis gigantea help to eliminate parasites from the body.

9. **Anti-Fungal Properties**

Calotropis gigantea has been shown to possess anti-fungal properties, making it effective against various fungal infections, including ringworm and athlete's foot.

10. **Immunomodulatory Effects**

The plant has been shown to possess immunomodulatory effects, helping to boost the immune system and prevent infections

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Traditional uses of calotropis gigantea Latex:

Ayurveda system of medicines:

- Kshara: Calotropis gigantea latex is used to prepare kshara, a type of Ayurvedic medicine used to treat skin conditions, wounds, and inflammation.
- Vrishya: The latex is used as a vrishya (aphrodisiac) to enhance fertility and virility.
- Raktapitta: Calotropis gigantea latex is used to treat raktapitta (bleeding disorders) due to its styptic and hemostatic properties.

Siddha system of medicines:

- Vatham: Calotropis gigantea latex is used to treat vatham (inflammatory conditions) due to its anti-inflammatory and antioxidant properties.
- Kapham: The latex is used to treat kapham (respiratory conditions) due to its expectorant and bronchodilatory properties.
- Pitham: Calotropis gigantea latex is used to treat pitham (skin conditions) due to its antiseptic and antifungal properties.

Unani system of medicines:

- Irsal: Calotropis gigantea latex is used as an irsal (purgative) to treat constipation and other digestive disorders.
- Mufarreh: The latex is used as a mufarreh (stimulant) to enhance fertility and virility.
- Munzij: Calotropis gigantea latex is used to treat munzij (inflammatory conditions) due to its anti-inflammatory and antioxidant properties

Benefits of Calotropis gigantea Latex in skin care:

1. Anti-aging: Calotropis gigantea latex may help reduce fine lines, wrinkles, and age spots due to its antioxidant and anti-inflammatory properties.
2. Skin soothing: The latex may help soothe and calm irritated skin, reducing redness and inflammation.
3. Wound healing: Calotropis gigantea latex may accelerate wound healing by promoting collagen synthesis, improving tissue strength, and enhancing wound contraction.
4. Antimicrobial: The latex has antimicrobial properties, which can help prevent the growth of microorganisms that can cause skin infections.
5. Skin hydration: Calotropis gigantea latex may help lock in moisture, leaving the skin feeling soft, smooth, and hydrated

II. CONCLUSION

Calotropis gigantea is a valuable plant with a rich history of traditionl used in Ayurvedic medicines. Its unique combination 0f phytochemicals, including cardenolides, flavonoids, and terpenoids, contributes to its therapeutic potential. The plant has demonstrated significant pharmacological activities, including anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties

REFERENCES

[1]. Pathak, A. K., and Argal, A. 2007. Analgesic activity of Calotropis gigantea flower. Fitoterapia 78: 40–42.
[2]. Kirtikar, K. R, and Basu, B. D. 1995. Indian Medicinal Plants, Sudhindhra Nath Basu: Allahabad.
[3]. Allen TF. 1994. Handbook of Materia Medica and Homeopathic Therapeutics. Jain Publishers (P) Ltd: New Delhi.
[4]. Aminuddin and Girach RD. 1993.Observations on ethnobotany of the Bhunjia—a tribe of Sonabera plateau, Kalahandi, Orissa. Ethnobotany 5: 84.
[5]. Boericke W. 1999. Pocket Manual of Homeopathic Materia Medica and Repertory, Jain Publishers (P) Ltd, New Delhi.

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[6]. Manandhar MP.1990. Folklore medicine of Chitwan district, Nepal. Ethnobotany 2: 33.
[7]. Nadkarni KM, Nadkarni AK. 1976. Indian Materia Medica. Bombay Popular Prakashan Pvt. Ltd.
[8]. Saha JC and Kasinathan S. 1961. Ecbolic properties of Indian medicinal plants. Indian J Med Sci. 49:1094–1098.
[9]. Chopra RN, Nayar SL and Chopra IC. 1956. Glossary Indian medicinal plants, CSIR, New Delhi.
[10]. Shobha RS, Govind K, Biju B,. 2007. Pregnancy interceptive activity of the roots of Calotropis gigantea Linn. in rats. Contraception. 75: 318– 322.
[11]. Manoranjan A. and Joyanta KG. 2006. Evaluation of anti-inflammatory activity of Calotropis gigantea (AKANDA) in various biological systems. Nepal Med Coll J. 8 (3): 156-61.
[12]. Pathak AK, Saraf S, Dixit VK. 1991. Hepatoprotective activity of Tridax procumbens- Part I. Fitoterapia 62: 307–313.
[13]. Ayyappa Das M.P., Dhanabalan R., Doss, A.2009. In Vitro Antibacterial Activity of Two Medicinal Plants against Bovine Udder Isolated Bacterial Pathogens from Dairy Herds, Ethnobotanical Leaflets 13: 152-58.
[14]. Saraf S and Dixit VK. 1991. Hepatoprotective activity of Tridax procumbens Part II. Fitoterapia 62: 534–536.
[15]. Diwan PV, Karwande I, Margaret I, Sattur PB. 1989. Pharmacology and biochemical evaluation of Tridax procumbens on inflammation. Indian J. Pharma. 21:1-7.
[16]. Saraf S, Pathak AK, Dixit VK. 1991. Hair growth promoting activity of Tridax procumbens. Fitoterapia. 62: 495–498.
[17]. Udupa SL, Udupa AL, Kulkarni DR. 1991. Influence of Tridax procumbens on lysyl oxidase activity and wound healing. Planta Medica. 57: 325–327.
[18]. Perumal SR, Ignacimuthu S, Raja DP. 1999. Preliminary screening of ethnomedicinal plants from India. J. of Ethnopharm. 66: 235–240.
[19]. Taddei A, Rosas RAJ. 2000. Bioactivity studies of extracts from Tridax procumbens. Phytomedicine. 7: 235–238.
[20]. Ravikumar V, Shivashangari KS, Devaki T. 2005. Effect of Tridax procumbens on liver antioxidant defense system during lipopolysaccharide induced hepatitis in d-galactosamine sensitized rats. Mol. Cell. Biochem. 269 (1-2); 131-136.
[21]. Umesh T, Bhawna R, Paramjit S,. 2004. Immunomodulatory effects of aqueous extract of Tridax procumbens in experimental animals. J. of Ethnopharm. 92: 113–119.
[22]. Kakuta H, Zheng X, Oda H,. 2008. Cyclooxygenase-1-selective inhibitors are attractive candidates for analgesics that do not cause gastric damage. design and in vitro/in vivo evaluation of a benzamide-type cyclooxygenase-1 selective inhibitor". J. Med. Chem. 51 (8): 2400–11.
[23]. Volans G, Hartley V, McCrea S, Monaghan J. 2003. Non-opioid analgesic poisoning. Clinical Medicine, 3 (2): 119–23.