

Arka (Calotropis): Poison or Nectar – A Critical Review

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Abstract

When poison is used in appropriate manner it works like nectar and even nectar also act as a poison when it is used in a erroneous way. *Arka*, one of the upvisha included in Agadtantra is an example of plant having both therapeutic and toxicological properties. *Arka* (Calotropis) is known by different name in different part of world like Madar, AlArka, French cotton or Rooster tree, and Widuri have spiritual value in Hindu mythology used from ancient period in folklore, traditional and contemporary medicine. All parts of the plant : root, bark, leaf, latex, flower are used for preparing *Arka* formulation and are used for treatment of a number of diseases or cure several illnesses such as toothache, sprain, ear ache, ringworm, rheumatism, syphilis, epilepsy, skin diseases, diarrhoea, piles, malaria, mental disorders and several other illness of liver and spleen on the other hand it is a poisonous plant, its latex is irritant- causes local toxic effect, neurotoxicity and also due to anticholinergic responses cause various fatal presentation. Serum is highly virulent toxicant. Calotropin compound in the latex is more toxic than strychnine which are responsible for the cytotoxicity. When the juice is applied to eyes can result in ocular toxicity, lead to blindness. Since it is a plant having both medicinal and toxic effect on human being, the judicious use of *Arka* formulation is recommended.

Key Words: *Arka* (Calotropis), As poison, As nectar, judicial use

Introduction

There is nothing in this world which can't be used as medicine after proper consideration. With appropriate use even a sharpest poison can be a good life saving medicine. On the contrary with improper use even a good medicine can be as hazardous as a poison to our body.⁽¹⁾ When the physician use his 'yukti' during the use of vishdrayas in medicine for therapeutic purposes even poison act as '*prandayi rasayan*'⁽²⁾ If Visha draya is used in medicine with proper processing, it helps not only to eradicate the toxicity of the drug but also imbibes additional therapeutic properties and makes the drug more useful⁽³⁾ *Arka* is one of the upvisha included in Agadtantra used from ancient period in folklore ,traditional and contemporary medicine. Apart from its significant use in treating many diseases, it is a poisonous plant. It is a plant of "*Nav-grahavatika*" where it represents the planet sun, having spiritual value in Hindu mythology⁽⁴⁾ Three varieties of *Arka* Calotropis (Asclepiadaceae family) are mentioned according to different floras and its botanical classification. Calotropis Procera Ait -white flower, Calotropis Gigantea L. - purple flowers, additional third variety namely Calotropis acia has been mentioned by some floras. According to medicinal values there are two species i.e. Calotropis procera Ait. and Calotropis gigantea L. Calotropis is planted as a medicinal plant not only in India, Malaysia in Sri Lanka, Bangladesh but also in other countries.⁽⁵⁾



Figure 1 : Plant Nav-grahavatika

Material And Methods

Description of *Arka* extensively reviewed from various classical texts like Brihartrayi, Laghutrayi and Nighantus. References have also been collected from contemporary text, medical journals related toxicological and therapeutic properties. Phytochemical and pharmacological properties of *Arka* (Calotropis) have been studied. Various researches and case studies related to *Arka* poisoning were studied. Clinical and review articles related therapeutic use of *Arka* have been evaluated.

Arka as poison:

Arka is one of the Sthavar, upvisha. Toxic effect of *Arkaaksheera* : By internal usage in large doses it causes (*Vanti*) vomiting and (*Rechana*) diarrhoea and by external use

it causes breaking of the skin due to its (*Kshara*) caustic effect, loss of sight occurs when enters the eyes. Therefore one must be careful while collecting this latex and see that it does not come in contact with the eyes⁽⁶⁾ *Arka* (*Calotropis Procera/Gigantea*) is mentioned in list of poisonous substances under the Schedule E(1) of Drugs and Cosmetic Rules 1945 in Ayurvedic including Siddha and Unani System of Medicine⁽⁷⁾. *Arka* is classified as Organic Irritant Poison. Commonly known as – Milkweeds, because of the latex they produce. *Calotropis* species are poisonous plants, they yield – Four active principles- Uscharin, Calotoxin, Calactin and Calotropin. The leaves and stem when cut or crushed yield an acrid milky juice, which is acidic in reaction. The milky exudation from the plant is a corrosive poison. Extracts from the flowers of *Calotropis Procera* have shown strong cytotoxic activity. The extracts are also harmful to the eyes. All parts are poisonous. Cattle often stay away from the plants because of their unpleasant taste and their content of cardiac glycosides in their sap (extract). The root of *Calotropis Procera* is highly poisonous to cobras and other poisonous snakes which cannot stand even its smell. The hazardous effects of the *calotropis*, the milky exudates from the plant is a corrosive. It is said to have mercury like effects on the human body and is some- times referred as vegetable mercury.

Signs and Symptoms- Milk being an irritant, neurotoxic and also due to anticholinergic responses cause toxicity and various fatal presentation. Serum containing 3% of Gigantin is highly virulent toxicant. Calotropin compound in the latex is more toxic than strychnine which are responsible for the cytotoxicity.

Local-When the juice is applied to the skin, it causes redness, vesication, lesions resembling bruises on skin (called fabricated injuries), which at times can lead to pustule formation and vesication. Juice when installed into the eyes or coming in contact with eyes can result in severe conjunctivitis can cause ocular toxicity, lead into blindness.

Oral- When taken large doses internally by mouth, *Madar* juice and latex gives rise to an acrid, bitter taste and a burning pain in mouth throat and stomach, followed by salivation, stomatitis, vomiting, diarrhea, dilated pupils, tetanic convulsions, collapse and death. Sometimes delirium may occur. The fatal dose is not determined.

Toxic part: Root, stem, leaves, latex. Fatal dose: uncertain. Fatal period: ½ - 8 hrs.^(8,9,10)

Many case studies and many case reports elaborate the harmful effects, cardiovascular toxicity, Cutaneous and Ocular toxicity of *Calotropis* latex and *Calotropis* leaves^(11,12,13,14)

Arka (Calotropis) as Nectar:

All the parts of the plant are used in Indian medicine, the flowers as digestive stimulants; the leaves as external poultice; the powdered root as an emetic; and the milky juice as a vesicant, depilatory, and for treatment of chronic skin conditions.⁽¹⁵⁾

Ayurvedic Pharmacopeia of India (API) contains information about *Arka* (*Calotropis Procera*) Roots and *Arka* (*Calotropis Procera*) Leaf. Karma : Bhedana, Dipana, Krimighna, Vishaghna, Vranahara, Vatahar, Shopha and Shwasahara. *Therapeutic Uses* - Shvasa, Gulma, Krimiroga, Kandu, Kustha, Vrana, Shotha, Pliharoga, Arsa. *Dose* - 250-750 mg of the drug in powder form.⁽¹⁶⁾

Both types of *Arka* are used for medicinal purposes in cure of - Diarrhea (*Atisara*), Vata, Kushta, Kandu, Visha, Vrana, Pliha, Gulm, Arsh, Kapha, Udarrog, and Krumi. The roots, leaves, flowers, and Kshir (latex) of both types of *Arka* are used in medicine.

Indication: Krimidantasula, Mukha ksata, Arshas, Snake bites, Lootha visha: Shireesha beeja bhavana with *Arka* Ksheera Vrishchika Visha, *AlArka* Visha^(17,18)

Some widely used Formulations of Arka: *Arka*alavana, *Arka*avati, *Arka*atailam, *Adrakaghruta*, *Mahavishagarbha* tailam, *Vajraka* tailam, *Marichaditailam*, *Shankhavati*, *Ksharagulika*, *Kalyanakalavana*, *Trailokya Chintamoni Rasa*.⁽¹⁹⁾ Total of 375 formulations have been obtained in the analysis that are used in almost 57 varied diseases.⁽²⁰⁾

Phytochemical screening: The roots -relieve pain and also applied to sprains to ease the swelling and pain. The flowers: are used as a milk drink to treat a variety of complaints including coughs, asthma and indigestion, as well as cholera.

The dried leaves: used as an expectorant, and anti-inflammatory, for the treatment of paralysis and rheumatic pains. The dried latex and dried root: are used as an antidote for snake poisoning. It is also used as an abortifacient for the treatment of piles and intestinal worms. The tender leaves of the plant: are also used to treat migraine. The capsulated root *Arka* powder: is effective against diarrhea and asthma. Plant is also known for its use in folk medicines. Traditionally, the plant has been used as antifungal, antipyretic, and analgesic agent. Latex of *calotropis* exhibited local anesthetic activity⁽²¹⁾

Pharmacological screening : Antidiabetic activity, Antioxidant activity, Wound Healing, CNS Activity, Anticancer, Anti-diarrheal effect, Anti-malarial, Antimicrobial, Anti-inflammatory Activity, Anti-arthritis Hepatoprotective, Alopecia Anti-asthmatic Activity, Vasodilation Activity, Analgesic Activity, Procoagulant activity, Anthelmintic activity, Antiviral Activity, Insecticidal Activity, Antivenom activity.⁽²²⁾ The calotropin which is a content of the latex are

used to treat edema, ringworm, syphilitic sores, leoprasia, cutaneous dryness, painful dental cavities, rheumatism and syphilis. Nearly all plant components including leaves, bark, root, latex and flowers are used to treat or cure many disorders including toothache and many different spleen and liver disorders including earache, sting, sprain, ringworm, syphilis, anxiety pain, leprosy, rheumatism, skin diseases, boils and sores, diarrhea, piles, ulcers, malaria and mental disorders⁽²³⁾

Conclusion

Herbal medicines or herbal products are being used by many people for their health care in different public health-care settings. World Health Organization says 70–80% of the world populations rely on non-conventional medicines mainly of herbal sources in their healthcare. In combination of classical and modern literature review and research studies reports justify the use of *Calotropis* as therapeutic use in health care setting for the treatment of various pathological alterations. Both species of *Calotropis* are wild and abundantly available. Since it is a plant having both medicinal and toxic effect on human being, so it should be used after proper knowledge. As the wise saying goes excess leads to distress, the judicious use of herbal medication is recommended otherwise it will lead to complication. This paper is an attempt to give a detail review of *Calotropis sp.* including both its therapeutic and toxicological considerations. This article will help physicians, pharmaceutical companies and students to use *Arka* (*Calotropis*) - a magical remedy, in day to day practice with proper considerations. This article will inspire and motivate researchers to work on medicinal properties of *Arka* (*Calotropis*) and to use plant resources in field of medicine considering its toxicological properties.

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