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Indigenous knowledge of the utility and utilization aspects of *Calotropis procera* (Ait.) R. Br. in western Rajasthan, India

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Abstract

The present study is carried out in western Rajasthan to document the indigenous knowledge of traditional and other medicinal uses of *Calotropis procera* (Ait.) R. Br. The *Calotropis* species, locally known as Aak, Aakada and Madar, is deeply associated with the culture and livelihood of indigenous people in this area. Some of the indigenous practices are for shelter, agriculture equipment, firewood, hunting, fibre, fodder, toys, timber, musical instruments, ethnomedicine etc. The present study not only establishes the validity of indigenous knowledge but also indicates the urgency to use and conserve it properly, which will be seriously threatened under pressure from modernisation and especially on account of the industrialisation among the new generation.

Keywords: *Calotropis procera*, India, Indigenous knowledge, Western Rajasthan

Introduction

Rajasthan is the largest state of India, and the present study comes under a desertic zone called, “The Great Indian Desert”. It is also called “The Thar Desert”. Geographically, it lies between 24°58’-26°32’ longitude and 70°52’-72°52’ latitude. It shares borders with Gujarat, Haryana and the Sindh province of Pakistan.

The climate of western Rajasthan is tropically arid, with maximum temperatures in winter ranging between 25 °C and 49 °C in summer. During winter minimum temperature falls to a great extent and becomes less than 2 °C at night and in summer 35 °C. The desert receives an average annual rainfall of less than 25 cm. Amazingly the local people have adapted to extreme temperature variations and constant water shortage. The area is characterized by the dry desert vegetation of trees, shrubs and herb species. The ‘Thar Desert’ has a vast diversity of vegetation, like *Acacia jacquemontii*, *Acacia Senegal*, *Colligonum polygonoides*, *Calotropis procera*, *Salvadora persica*, *Salvadora oleoides*, *Leptadenia pyrotechnica*, *Temerix aphylla*, *Prosopis cineraria*, *Tecomella undulata* and so on. These areas are inhabited by the major tribes of the state, viz., Bhil, Meghwal and Kalbelia. These tribes have local indigenous knowledge. The indigenous people and ethnic races throughout the world developed their own culture, costumes, medicinal practices etc. The surrounding plants form an integral part of their culture. They have adapted themselves to survive and multiply under the harsh climate conditions in the desert and information about the uses of plants is passed on from generation to generation only through oral words. Modernization, transmigration, industrialisation, colonization and other development activities have threatened traditional knowledge: there is an urgent need to conserve the knowledge of indigenous people.

Calotropis procera (Ait) R.Br. (Asclepiadoideae), commonly known as Aak, Aakada and Madar is an evergreen bush or small tree found in western Rajasthan. *Calotropis procera* is one of the most important species of commerce and is valued for its traditional uses. The lightweight and white coloured wood is used for making many commercial ornaments, such as “Katputali”.

All the plant parts, like the root, stem, leaves and flowers of *Calotropis procera* are commonly used in indigenous systems (Biplab *et al.*, 2010) ^[1]. The latex of *Calotropis procera*, which is easily accessible, is utilised as a wound healing agent as well as an anti-inflammatory, anti-rheumatism, and anti-diarrhoea agent (Qari, 2010) ^[14]. In addition to being used as an appetite

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stimulant and a spasmogenic, milky latex is also utilised as an abortifacient (Oudhia, 2001) [13]. For the treatment of asthma, the flowers of *Calotropis procera* have been studied (Dewan, 2004) [2].

A significant contribution has been made by several workers on the Ethnobotany in India (Jain, 1975 [7]; Rao, 1981 [15]; Gangwar *et al.*, 1990 [3]; Hedge *et al.*, 1996 [5]; Hamilton, 1995) [4]. In Rajasthan, these studies have been carried out by different parts of the state (Sebastian & Bhandari, 1984 [16]; Joshi, 1995 [8]; Singh & Pandey, 1980 [17]; Katewa & Arora, 1997 [9]; Katewa *et al.*, 2003 [10]; Jain *et al.*, 2005 [6]; Meena & Yadav, 2010 [11]; Meena & Yadav, 2011 [12]). However, data on western Rajasthan for ethnomedicinal and traditional uses of *Calotropis procera* are scantier. Therefore, an attempt has been made here to collect information about indigenous and traditional uses of this species in their day-to-day requirements, including their living system, culture, medicinal uses and ethno-veterinary uses. The study is based on interviews with indigenous and tribal people living in this area who are entirely dependent on the plants occurring around them.

Methods

The study is based on an extensive and intensive field survey conducted in the western Rajasthan, a part of the arid desert, from 2020 to 2023. In order to collect data regarding the use of *Calotropis procera*, different areas were selected. Normally indigenous people are conservative regarding the common belief that if they disclose the property of plants, the useful property of plants is lost forever. To solve the problem, before launching the fieldwork report, it was established with the village priest (Bhopa) or the headman of the community. However, the information was collected through interviews taken with individuals and groups from Bhopa, including elderly men and women and shepherds. The collected information was cross-examined at different localities through

different sources.

The collected information from informants were photographed and the identified useful plant products were collected and deposited at the Herbaria and ethnobotanical laboratory, Department of Botany, MLV Govt. College, Bhilwara, Rajasthan for authentication and future reference.

Results and Discussion

Taxonomic classification

Kingdom:	Plantae
Division:	Magnoliopsida
Order:	Gentianales
Family:	Apocynaceae
Subfamily:	Asclepiadoideae
Genus:	<i>Calotropis</i>
Species:	<i>Procera</i>

Botanical description

Calotropis procera (Ait.) R. Br. is a perennial shrub that stands erect and has many branches with milky latex throughout. A stout and terete stem with fine, cottony pubescence that is appressed. The leaves are acute, widely ovate-oblong, decussate, sub-sessile, thick green and covered in thin cottony pubescent hairs. Flowers grow in umbellate cymes, are tomatoes on young plants, and have a glabrous calyx with 5–6 ovate coronal scales that are equally long and narrower than the staminal column. Follicles can be oval, ellipsoid, or sub-globose. The seeds are silky, brown, roughly ovate, and sharp and flattened, minutely tomatoes. Fig. - 2(A), 2(B) & 2(C).

Calotropis is an important plant from an ethnobotanical perspective. The present medicinal and indigenous knowledge used for various purposes and its traditional as well as ethnomedicinal uses are described in Table 1 and Table 2. There is perhaps and became abundantly present.

Table 1: Traditional uses of *Calotropis procera* by indigenous people of western Rajasthan

S.N.	Plant Part used	Product	Manufacturing method
1.	Wood	Dasher (Mathani) Firewood Huts Ladder Agricultural implements	Wood is used for the making of mathani. Mathani is used for meshes (Bilona). Churning is a process in which milk is churned to make butter by local people. (Fig-8). The stem is used as firewood. The wood is used for making doors, windows, roofing and building huts because it has great properties against termites. (Fig.-7). It is used to make ladders. A ladder is used to help climb trees. (Fig.-9). It is used to make agricultural implements like ploughs locally known as ' Hal' . The plough is cultivated behind the ox and camel. (Fig.-6)
2.	Fibre	Rope Gophan (Sling) Bows and Bags Cots (Charpai or Manji)	The most durable rope was made from the fibre of <i>Calotropis procera</i> . This rope, due to its lack of striking property, it is used in deep water mooring. It is used to extract water from deep wells in western Rajasthan. (Fig.-3). The rope is used to make a fine sling. Sling is used by local people as a protection weapon against birds and other animals on the farm (Fig.-4). Due to the unavailability of other fibres and the fine quality of this, fine threads are constructed, which are used to make bags and bows. The fine string has been used to make cots (Manji or Charpai), (Fig.-5). The rope is used to weave cots and after weaving, the cots are rubbed with different dyes. (Fig.-5)
3.	Leaves	Tea cups Fodder	The leaves of <i>Calotropis</i> are used by the villagers as cups and Dona. (Fig.-10). Dried leaves and flower parts are eaten by goats and sheep.

Table 2: Ethanomedicinal uses of *Calotropis procera* by natives of western Rajasthan

S. N.	Plant part used	Name of disorder	Methods of Administrative
1.	Latex	Snakebite Fever Joint pain Valva swelling (Gala Upadna) Knee pain	One drop of latex is mixed with 1 mg sang to prepare a tiny tablet, which is given orally one or two times a day. 1-2 drops of latex are mixed with 1 mg sand to make a small tablet, which is taken orally once or twice a day to cure fever. 8-10 drops of latex are applied to joints for a week to reduce the swelling. A drop of latex for one week is applied on the central portion of the head to cure lowering of the vulva. 10-12 drops of latex for twice a week are used for knee pain with the help of a camel's pellet at the time of sunset.
2.	Leaves	Knee pain and Ribs pain Fever Asthma	7-8 fresh leaves applied with mustard oil and warmed slightly, these tide on the affected knee or Rib portion for pain relief for one week. ¼ to ½ teaspoon of dried leaf powder is taken orally twice a day to cure fever. A powder of fresh leaves is filled in a chillum and inhaled to cure asthma. Its repeats from time to time when filling like asthma.
3.	Flower	Cough	For cough relief, half a teaspoon of dried flower powder is taken twice daily.



Fig 1-10: Ethanobotanical uses of *Calotropis procera* in Western Rajasthan

Conclusion

In recent years, ethnobotanical and traditional uses of natural compounds, especially those of plant origin, have received much attention, as they are well known for their efficacy and are generally believed to be safe for human use. This information about *C. Procera's* ethnobotanical values and how these ethno-herbal data play an important role in life. Moreover, it can be an initiative for further phytochemical and pharmacological investigation about the medicinal use of the plant, which may be a step ahead towards new drug development.

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