

Abrus precatorius L.: a wild medicinal climber of India

Gireesh Tripathi¹ and Sweta Mishra^{2*}

¹Shri Krishna University, Chhatarpur, Madhya Pradesh, India;²Ambika Prasad Research Foundation, Odisha, India; *Email-Id: swetamishra.rdwu@gmail.com

ABSTRACT

Fabaceae shows unique diversity of flowering plants. It has trees, climbers, herbs, shrubs, prostrates having food, medicinal, ecological, and economic values. Some plants are toxic but potential to treat many diseases and disorders. Among the toxic species of Fabaceae family, *Abrus precatorius* is a common climber having medicinal, ecological, and economic values. Present study highlights its importance and illustrations are provided here for easy identification in the field.

Keywords: Fabaceae, medicinal climber, toxicity, traditional medicine

INTRODUCTION

The term of medicinal plants includes a various type of herbs, climbers, shrubs, trees used in herbalism or in Ayurveda. These medicinal plants consider as a rich resource of ingredients which can be used in drug development and synthesis (Yudharaj et al. 2016). Traditional medicinal plants are an important element of indigenous medical systems throughout the world. The importance and prominence of plants in traditional medicines are documented globally but still some misunderstandings are there about the biological and conservation needs of species utilized (Karunamoorthi et al. 2013). These plants are going to play an essential role in the medicinal field especially treating many critical untreatable

disorders (Mohammed 2019). In many countries the herbal medicines make use of legumes encountered in the family like Caesalpiniaceae, Fabaceae, and the Mimosaceae (Dar et al. 2017). *Abrus precatorius* L. is a popular medicinal plant belonging to the family Fabaceae or the pea family, is a native plant of India subcontinent and the East and West Indies (Prabha et al. 2015; Bhakta and Das 2020). *Abrus precatorius* is mainly considered as a poisonous plant due to the presence of most lethal toxin, Abrin, a toxalbumin in seeds that inhibits protein synthesis causing cell death and there is no antidote for this poisoning. Clinical features commonly include nausea, severe vomiting, diarrhoea, abdominal pain, and gastrointestinal bleeding (Karthikeyan and Amalnath 2017). Beside this, the plant is considered as a valuable source of unique natural products for development of medicines against various diseases and disorders. The roots, seeds, leaves and the whole plant is used in traditional folklore medicine (Das et al. 2016).

DESCRIPTION

Abrus precatorius is a woody twinning plant with characteristic toxic red seeds with black mark at the base. It is an ornamental, twining, much-branched, slender, perennial, deciduous woody vine which grows to a height of 10–20 ft when supported by other plants. Stem cylindrical, wrinkled, bark smooth-textured, brown. Leaves are alternate, compound, feather-like, with small oblong leaflets while the flowers are numerous and appear in the leaf axils along the stems. Flowers are numerous and appear in the leaf axils along the stems, shorter than leaves, fascicled on the swollen nodes and occur in clusters 1 to 3

inches long, usually pink to purple, or occasionally white. The plant produces stout and short brownish pods, which curl back on opening to reveal pendulous red and black seeds, 4 to 6 peas in a pod. Seeds elliptic to sub-globose, smooth, glossy, shining red with black blotch (Das et al. 2016; Saraf et al. 2018; Figure 1).

ETHNO-MEDICINAL USES

Seeds are grinded with lime and applied externally on acne, sore and abscess. Decoction of leaves are taken orally to treat cough and flu. The plant is used in some traditional medicine to treat scratches and sores and wounds caused by dogs, cats, and mice, and are also used with other ingredients to treat leukoderma. The roots of are useful for the treatment of jaundice and bile haemoglobinuria. Paste of roots is used to cure recovery from tumours and for inhibiting abortion. Grinded root powder of is taken thrice a day for four days to cure cough. Decoction of fresh root or seed in hot water is used as an anti-malarial and anti-convulsant. Seeds are taken for tuberculosis and painful swellings. They are considered abortifacient, anodyne, aphrodisiac, antimicrobial, diuretic, emetic, expectorant, emollient, febrifuge, haemostat, laxative, purgative, refrigerant, sedative, vermifuge, boil, cancer, cold, colic, conjunctivitis, cough, diarrhoea, fever, gastritis, gonorrhoea, jaundice, malaria, night-blindness, ophthalmia, rheumatism, diabetes, and chronic nephritis. Leaves are laxative, expectorant, and aphrodisiac medicines and are used in urticaria, eczema, stomatitis, conjunctivitis, alopecia areata, migraine, lymphomas/ leukaemia, and dysmenorrhoea. Paste of

leaves and seeds is applied for greying of hair (Nath et al. 1992; Garaniya and Bapodra 2014; Bhakta and Das 2020).



Figure 1: Seeds of *Abrus precatorius*

PHARMACOLOGICAL VALUES

Pharmacological studies of *Abrus precatorius* demonstrated a wide-range of biological activities including antitumor, antimicrobial, insecticidal, antiprotozoal, antiparasitic, anti-inflammatory, anthelmintic, ant yeast, antispasmodic, antidiarrheal, antioxidant, immunomodulatory, antifertility, antidiabetic, and other pharmacological activities. It also possesses abortifacient effect, antigonadotropin effect, ant spermatogenic effect, embryotoxic effect, hemagglutinin activity, insect sterility induction, intestinal fluid retention effect, intestinal motility inhibition, luteal suppressant effect, reverse transcriptase inhibition, smooth muscle stimulant activity, spermicidal effect, teratogenic activity etc (Bhatia et al. 2013; Prabha et al. 2015).

ECONOMICAL VALUES

Abrus precatoriu is best known for its seeds, which are used as beads and in percussion instruments. Seeds are widely used in native jewellery for their bright coloration. Most beans are commonly black and red in colour, suggesting a ladybug or bull eye, but there are black, white, and green varieties as well. In Trinidad in the West Indies the brightly coloured seeds are strung into bracelets and worn around the wrist or ankle to ward off jumbies or evil spirits and “mal-yeux” – the evil eye. The Tamils use *Abrus* seeds of different colours. For many years these seeds are used for decorative and gold-weighting basis. In India they are much valued and are used in native jewellery because of their bright colouration. As *Abrus precatorius* seeds are used as measurement to weight Jewellery and the seeds of this plant have very consistent weight and weight

approximately equal to 105 milligrams. From ages Indians are using these seeds to weigh gold using a unit of measurement called as Ratti (Figure 2).



Figure 2: Seeds are using in gold-weighing

TOXICITY

It is one of the most potent plant toxins to human, contains one of the most lethal toxins, Abrin, a toxalbumin that inhibits protein synthesis causing cell death. The toxin, a protein, is poorly absorbed in the digestive tract and rarely, if ever, causes systemic toxicity via the oral ingestion. Symptoms are like nausea, severe vomiting, diarrhoea, abdominal pain, gastrointestinal bleeding etc. However, if injected parentally, it can enter the systemic circulation, where it has potent effects on protein synthesis, and even in small amounts can lead to

fatalities (Reedman et al. 2008; Karthikeyan and Amalnath 2017). All parts of the plant are poisonous and the seeds are often ingested as a means of suicide in our country (Subrahmanyam et al. 2008). The toxicity signs of abrin are much like ricin (toxic ingredient in *Ricinus communis*). Whole intact seeds when ingested it passes through the Gastrointestinal tract without absorption resulting in no toxicity. Since the seed is not intact as it has been perforated, gut enzymes react with the seed resulting in toxicity (Kafle 2018). Cattle are also infected by these seeds while grazing. In India, the poisoning of cattle with *Abrus* is of interest since it is one of the means employed for the malicious destruction of cattle (Elavarasan and Senthil 2012).

REFERENCES

- Bhakta S., and Das S.K. (2020). The medicinal values of *Abrus precatorius*: a review study. Journal of Advanced Biotechnology and Experimental Therapeutics. 3(2): 84-91.
- Bhatia M., Siddiqui N. A., and Gupta, S. (2013). *Abrus Precatorius* (L.): An Evaluation of Traditional Herb. Indo American Journal of Pharmaceutical Research.3(4):3295-3315.
- Dar R. A., Shahnawaz, M., and Qazi, P. H. (2017). General overview of medicinal plants: A review. Journal of Phytopharmacology. 6(6): 349-351.
- Das A., Jain V., and Mishra A. (2016). A brief review on a traditional herb: *Abrus precatorius* L. International Journal of Forensic Medicine and Toxicological Sciences. 1(1):1-10.
- Elavarasan R. and Senthil K.R. (2012). *Abrus precatorius* and its ill effects. International Journal of Pharmaceutical Science and Research. 3:1516-1519.
- Garaniya N. and Bapodra A. (2014). Ethno botanical and Phytopharmacological potential of *Abrus precatorius* L.: A review. Asian Pacific Journal of Tropical Biomedicine. 4: S27.

- Kafle A. (2018). Sushree Sangita Mohapatra and Inderpal Reddy. A Brief Review on Toxicity of *Abrus Precatorius* in Animals. Journal of Entomology and Zoology Studies. 6(2): 1102-1104.
- Karthikeyan A., and Amalnath S.D. (2017). *Abrus precatorius* Poisoning: A Retrospective Study of 112 Patients. Indian Journal of Critical Care Medicine. 21(4):224-225. doi: 10.4103/ijccm.IJCCM_320_16.
- Karunamoorthi K., Jegajeevanram K., Vijayalakshmi J. and Mengistie E. (2013). Traditional Medicinal Plants: A Source of Phytotherapeutic Modality in Resource-Constrained Health Care Settings. Journal of Evidence-Based Complementary & Alternative Medicine. 18(1):67-74.
- Mohammed A.H. (2019). Importance of medicinal plants. Research in Pharmacy and Health Sciences. 5: 124-125.
- Mohammed A.H. (2019). Importance of medicinal plants. Research in Pharmacy and Health Sciences. 5: 124-125. <https://doi.org/10.32463/rphs.2019.v05i02.01>.
- Nath D., and Sethi N. (1992). Commonly used Indian abortifacient plants with special reference to their teratologic effects in rats. Journal of Ethnopharmacology. 36(2):147-154.
- Prabha M.P., Perumal C., Kumar P., Soundarajan S., Srinivasan. M., and Sampathkumar R. (2015). Pharmacological activities of *Abrus precatorius* (L.) seeds. International Journal of Pharmaceutical and Medicinal Research. 3(2):195-200.
- Reedman L., Shih R.D., and Hung O. (2008). Survival after an intentional ingestion of crushed *Abrus* seeds. Western Journal of Emergency Medicine. 9(3):157-159.
- Saraf A., Saraf A., and Chaturvedi A. (2018). Phytochemical Analysis and Chemical Fingerprinting of Seeds of *Abrus precatorius* L. Chemical Science Transactions. 7(1):63-70. DOI:10.7598/cst2018.1460.
- Subrahmanyam D., Mathew J. and Raj M. (2008). An unusual manifestation of *Abrus precatorius* poisoning: A report of two cases, Clinical Toxicology. 46(2): 173-175.
- Yudharaj M., Shankar R., Sowjanya B., Sireesha B., Naik E.A. and Priyadarshini J. (2016). Importance and uses of medicinal plants – an overview. International Journal of Preclinical & Pharmaceutical Research. 7(2): 67-73.