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A Critical Review of *Karveera* & Its Toxicity

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ABSTRACT

The medicinal properties and clinical uses of thousands of plants have been described in Ayurvedic classics. One such plant mentioned in Ayurveda i.e., Karveer (*Thevetia nerifolia*). It is used by Ayurvedic physician in various diseases, especially in the skin disease. Karveer are potentially lethal plants after ingestion. All parts of the plants are toxic and contain a variety of cardiac glycosides including nerifolin thevatin A, thevatin B, oleandrin. Ingestion of Karaveer result in nausea, vomiting, abdominal pain, diarrhoea, dysarrhythmia and hypocalcaemia in most cases. Most parts of the Karveer plant are poisonous its seeds are mainly used for suicidal poisoning. This article compiles all the information related to Karveer such as introduction, historical review, fatal dose, fatal period, karma, indication, therapeutic action, mode of action, sign and symptoms of its toxicity, management, postmortem appearance, medico legal aspects.

KEYWORDS

Karveer, Thevetia nerifolia, Toxicity



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INTRODUCTION

Karveer is commonly a garden plant in India and many other parts of the world¹. It is found commonly through much of the tropics and subtropics including Nepal, India and Srilanka. There are now tens of thousands of (Karaveera) yellow oleander poisoning cases in South Asia each year and resulting in probably thousands of deaths. Management of patients with severe poisoning may be difficult and costly²⁻⁸. It grows in and around houses, hutments and on the roadside and often seen forming protective material around garden .

HISTORICAL REVIEW

- Vedas are known as the most ancient text. Karveer is mentioned in Rigveda under the reference of Hrudya Vanaspati.
- In Kautilya Arthshastra along with other ingredients it was used for making “Madanayoga”.
- In Bruhattrayees at three instances at least, references about Shveta Karveera are available. This gives a clue that there were two varieties, Rakta & Shveta. The root part is mentioned as poisonous.
- In Sangraha Kaala (Astang Sangraha and Astang Hridaya), various Nighantu references are available. Acharya Vagbhatta has mentioned Karveer for treatment of

Garbhini Kandu and Kikkisa in Sharira sthan.

- Madyama khand of Sharangadhar Samhita also introduce various therapeutics application of Karveer like Karveer Mool lepa, Karveer Tailum for Keshachyuti. Chakradatta which serves as faithful guide for Ayurveda practitioner and research worker.

• BOTANICAL DESCRIPTION

Karveer is a tree from the family Apocynaceae. It has characteristic funnel shaped flowers that are typically yellow in colour. The fruits are somewhat globular, slightly fleshy and have a diameter of 4-5cm. The fruits which are green in colour become black on ripening. Each fruit contains a nut which is longitudinally and transversely divided. All parts of the plants contain milky juice¹.



(Fig 1)



(Fig 2)



(Fig 3)



(Fig 4)

COMMON NAME- Yellow oleander, be still tree, digoxin, lucky nut, yellow bell ¹

SPECIAL CHARACTERISTICS- The entire thevetia plant is poisonous .The seeds are more poisonous and contain toxic cardiac glycoside like Thevetin and Peruvoside that can cause severe illness or even death if ingested. The sap may cause skin irritation. Burning the wood or plant material can produce toxic smoke.⁶

DISTRIBUTION- Karveer, a large ever green shrub with milky juice found in the Himalayas from Nepal westwards to Kashmir up to 1,950m and in upper gangetic plains and Madhya Pradesh . It is frequently grown in garden throughout India for its fragrance, showy flowers, it is also grown as hedge.

Karveer is found in Himalaya, Nepal to Kashmir, Uttar Pradesh, Punjab, Baluchistan, Dakshina Bharat, China and Japan.¹

CULTIVATION- The plant is widely cultivated in garden for its elegant and shady foliage and scented handsome flowers. It requires little attention except sunshine and well-drained soil with open compost. It is grown from seeds and cuttings, transplants well, and can endure drought and frost to some extent. Since it is not browsed by cattle or oats, yellow oleander may be used for a



forestation in the moisture tract. Sometimes these plants are grown along canal bunds to provide leaves for the development of compost.

ACTIVE PRINCIPLES-¹

Nerium oleander –Oleandrin, Neriin, Neriodorin, Folinerin.

Thevetianerifolia- Cerberia, Nerifolin, ThevetinA&B, Peruvoside.

SHODHANA- Karveer is purified, if it is steamed with cow's milk for 3 hours by means of Dolayantra.

KARMA-

Kaphasham, Vatashama, Kusthanghna, Vranashodhana, Varanaropana, Chakshushya, Kandughna, Grahi, Mutralam, Arshoharam, Pramehaghnam.⁸

MODE OF ACTION

Cardiac glycoside exert a digoxin-like effect by inhibiting the sodium- potassium adenosine –triphosphate(ATP) enzyme system . The increased intracellular sodium concentration and the increased serum potassium concentration produce negative chronotropic and positive inotropic effect. The resulting toxic syndrome resembles digitalis poisoning with marked hyperkalemia Conduction abnormalities and ventricular arrhythmias.⁶

INDICATIONS

KrimighnamKustha, Kandu, Kotha, Visphota, Padma, Visarpa, Krumi, Arshas, Paalitya, Netrakopa, Indralupta, Dushtavarana, Prameha, Jvara, Shirashul.¹

THERAPEUTIC ACTION

The fixed oil of Karveer when pure is quite inert .Bark is bitter and powerfully cathartic, antipyretics in small doses ,2gm of powdered bark is being equal to an ordinary dose of cinchona. In longer doses (in 30-60min of the tincture) it is emetic and in still longer doses it is an arid poison. A watery solution of drug is readily absorbed from the tissue and does not setup any marked local irritation. All parts of plant are poisonous. Root and the root bark are powerful diuretic and cardiotoxic like Strophanthus and Digitalin. An infusion is given in cardiac systole as well as in dropsy.

Oleandrin, if hypodermically injected, cause the heart's beat to fall from 75 or 80 to 10 or 12, if continued for some time the heart ceases to beat and with it the respiration.

Milky juice of *Thevetianerifolia* is highly poisonous. Oil from seeds is emetic and purgative. In Gold coast, seeds are chewed as purgative. In Guiana, the seed is used as a purgative in Rheumatism and dropsy. It is also considered a good alexiteric. It is anthelmintic, antipyretic and antiseptic



pharmacological study has corroborated its cardiotoxic properties.

MEDICAL DOSE - Root Churn -30-125mg.

FATAL DOSE-

Seed 8-10.

Root churna 15 -20gm.

FATAL PERIODS-24 hr

ANTIDOTE

Specific (Modern)- Digoxin specific antibody fragment

Specific (Ayurveda)-

1 माहिष दधि-षर्करा युक्त

2 माहिषपय-षर्करा

IN UNANI SYSTEM OF MEDICINE-

The root is the bitter aphrodisiac tonic, good for chronic pains in the joints, very poisonous but an antidote to snake venom.

The flower has a bitter sharp taste, good for inflammation, chronic pain in the muscles and the joints, in headache, scabies, ringworm and other skin complaints.

Karveer is safe and promising drug i.e., effective against cardiac disturbance, particularly in improving the function of heart muscles.

POISONOUS SIGNS AND SYMPTOMS-

GIT- Burning sensation in mouth, Dryness of throat, Tingling & Numbness of Tongue,

Nausea, Abdominal pain, and Diarrhea may occur.

- **CNS-** Drowsiness, Dizziness, Tremors or Shaking of the muscles, Muscular Twitching, Titanic spasm, Lock Jaw, Dilated Pupils, Seizures, Collapse and even coma.

- **CARDIAC-**(A) Pulse-Rapid at first then slow, weak, irregular.(B) Atrial Fibrillation with AV block & Brady arrhythmia. (C) Cardiac Shock & Death

MANAGEMENT-

General principle: Admit the patients to a hospital immediately. In severe poisoning, admit to an intensive Care Unit for immediate cardiac monitoring. Treatment usually depends on the severity of poisoning and includes:

- ❖ Immediate gastric decontamination
- ❖ Correction of arrhythmias and electrolyte disturbance.
- ❖ Frequent electrocardiogram or continuous cardiac monitoring are necessary.
- ❖ Check electrolyte regularly particularly serum potassium levels.

BIOMEDICAL ANALYSIS-

- ❖ ECG is valuable for diagnosis, prognosis and treatment, and show change similar to those produced by digitalis glycoside.



❖ In moderate to severe poisoning check serum electrolyte (Especially serum potassium), and monitor renal function .Arterial blood gases should be determined.

TOXICOLOGICAL ANALYSIS-

❖ Digoxin immunoassay can be used to detect Thevetin poisoning.

Life supportive procedure and symptomatic treatment

❖ Prolonged repeated ECG monitoring is required in serious cases.

❖ Ensure adequate airway and ventilation.

❖ Give adequate oral or IV fluids and correct any electrolyte imbalance. If serum potassium level exceeds 6 mm/l 50ml of 50% glucose and initially 10 units of soluble insulin IV.

❖ Bradycardia may require atropine or electrical pacing.

❖ Treatment of hyperkalemia should aim at lowering the serum potassium level with insulin, glucose, NaHCO₃ and ion – exchange resin.

DECONTAMINATION-

If consciousness is not impaired, induce emesis or perform gastric lavage. After emesis or gastric lavage, give oral activated charcoal , which is highly effective in adsorbing plant toxins.

ELIMINATION-Forced diuresis, dialysis and hemo-perfusion are not helpful in the elimination of cardiac glycoside.

CAUSE OF DEATH-

The usual cause of death is ventricular fibrillation.

POSTMORTEM APPEARANCE-

Organs are congested, and haemolysis of red cells may be found. Renal tubules may be blocked by haemoglobin.

MEDICOLEGAL ASPECTS

Suicide is the common feature among villagers, especially girls in certain parts of India. The root is used as a decoction for this purpose. The root is commonly used both locally and internally for procuring action.

CONCLUSION

Karaveera is a toxic plant, without detoxification with different purificatory media one should not be used internally for medicinal purpose, if used it may be fatal. More and more researches should be conducted over this plant, so that science will be updated and people get awareness over this plant.



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