International Journal of Applied Ayurved Research ISSN: 2347- 6362

THE THERAPEUTIC AND TOXICOLOGICAL EFFECT OF GUNJA (Abrus precatorius Linn.) - REVIEW ARTICLE

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ABSTRACT :

Gunja (*Abrus precatorius* Linn. family-Leguiminoceae) is a poisonous herbal plant, also known as *Kakananti* in *Ayurvedic samhitas* and has been commonly used in Ayurvedic pharmacopoeia. It is also described in *Upavisha* in *Rasatarangani and Sthavar Visha gana* of *Sushruta* and *Guduchyadi Verga* of *Bhavprakasa*. It is a deciduous plant which is widely distributed in India and found throughout tropical areas of India at sea lvel 1050 meter. In this review, an endeavor has been made to explore the therapeutic utilities of *Abrus precatorius* Linn. and its poisoning effect as mentioned in *Ayurveda*. It is observed that *Gunja (Abrus precatorius* Linn.),are used as an ingredient of compound formulations of *Ayurvedic* medicine, indicated for fungistatic, anticancer, antibacterial, CNS depressant, analgesic, antimuscarinic, abortifacient, antispasmodic, uterine stimulant. Additionally, it is employed in the treatment of antifertility antitumour, oxytocic antisperatogenic, antimicrobial, etc in a specific therapeutic dose. In higher doses (seeds giving orally 25 mg/kg) causes death and if seed powder is given in overdose it causes vomiting/diarrhea. *Gunja* has been described as a toxic plant in *Ayurveda* so certain *Shodhan* process of the seeds are considered mandatory before its administration.

Key words: *Gunja*, (*Abrus precatorius Linn.*),Abrin, Toxic effect, Treatment.

INTRODUCTION:*Gunja* (*Abrus precatorius* Linn.), a well-known plant in *Ayurveda* since long time, is being used extensively, now a days. We have a number of classical formulations with great therapeutic significance. This plant is described under the "*Upavisa* Vargas" of *Rastarangani.*[1] *Rasratna Samuchya* [2] and *Raj-Nighantu* [3]etc. It has been used successfully in the management of several diseases after proper *Shodhana* process. *Gunja* was not mentioned in the "*Brihat Trayee*" texts of *Ayurveda* but later it was mentioned in different *Nighantus* with a number of synonyms. Later different authors mentioned it with a number of synonyms like *Chakrika*, *Chuda*, *Durmukha*,[4], *Kakadani*, *Kakpilu*, *Vakra*,

Shalya, *Chakrika*,[5] *Shewt Kambhojee*, *Shewt Gunja*,[6] *Kakadani*, *Kakpilu*[7]etc, indicate the toxic nature of this creeper. On the other hand, it was not abundantly utilized in drugs but was chiefly utilized to poison animals[8]. The ancient texts of *Ayurveda* quoted that the *Visha* (poison) act as an *Amrita* (nectar) if utilized legitimately[9]. *Ayurvedic* physicians successfully employed this drug in a series of illnesses after proper *Shodhana* through a few particular media like *Godugdha*, or *Kanji*[10]. *Shodhana* procedures not only represent a process of purification, but also in addition to a process of detoxification and the ultimate objective of *Shodhana* is to enhance the biological efficacy of the drug.[11]

The seeds are mainly used as an abortifacient, purgative, toxic aphrodisiac, trichogenous, alopecia, asthma, tubercular glands, etc. They are also used in cough, stomatitis, hyperdipsia, fever, diuretic and homicidal purpose[12]. Some scattered references are there regarding different therapeutic utilities as described in Indian medicine. Hence, an attempt has been made to compile them and present in a systemic manner.

PHARMACOLOGICAL PROPERTIES OF GUNJA:*Gunja* has been attributed different pharmacological properties. Its seeds possess *Tikta, Kashaya Rasa; Laghu, Ruksha, Teekshna Guna; Ushna Virya* and *Katu Vipaka*.Leaf and Roots possess *Tikta,Madhur Rasa;snigdha Guna; Ushna Virya; and Katu Vipaka.*[13]

CHEMICAL COMPOSITION: The dried seeds of *Gunja* (*Abrus precatorius* Linn.) contain abrin A , B, and C, abralin,hypaphorine, choline, 5 cholinic acid, trigonelline, and its gallic acid ester, precatotrine, methyl ester of N, N-dimethyltryptophan-methocation and several amino acids, new steroids abricin, abridin, abrectorin. The seeds oil contains palmitic stearic, arachidic, behenic, ligroceric, oleic, linolenic, acids. Leaves contain glycyrrhizin and pinitol. Roots contain glycyrrhizin, precol, abrol, two alkaloids-abrasine, and isoflavanhulquinones.[14 & 15]

THERAPEUTIC USES OF GUNJA: On going through many *Ayurvedic* as well as modern text books, it has been revealed that different parts of this plant have a broad spectrum of activities in a number of diseases. Classical *Ayurvedic* literatures mentioned the pharmacological actions of *Gunja* such as *Kustaghna,Vrana, Khalitya, Palitya, Indralupta, Vatavyadhi, Varnashotha Mukhapaka, Shirashula Hridayottejaka, Vatapittaghna , Kaphanisarka, , Garbhanirodhaka, Mutral* etc.[16] And it also acts as *jwaranaghna, pakshaghata, swarabheda,*[17]etc. *Gunja (Abrus precatorius* Linn) is specially

recommended for sciatica ,and indralupta. It is also useful in the treatment of *Sigrapatanam* and *Dhwajabhanga*.[18] Various text books of medicinal plants also mentioned the therapeutic uses of different parts of *Gunja* as below:

SEEDS: Seeds are bacterial toxin**,** purgative, emetic, tonic, antiphlogistic,aphrodisiac, anti-ophthalmic,reduce pain and swelling, alopecia sciatica, stiffness of the shoulder joint, paralysis, eczema, scabies, leucoderma, headache.[19]

LEAVES: Juice of fresh leaves used in painful swelling, leucoderma, stomatitis, wounds, gonorrhea,hoarseness.

ROOT: The root is use for cough of children, Goiter, cervical lymph node, horseness of voice, diuretic, abortifacient, [20]

CERTAIN COMMON THERAPEUTIC USES IN AYURVEDA:

Shudha Gunja(Abrus precatorius Linn) seeds powder are generally used in a dose of 60-180mg, and roots/leaf powder is 1-3 gm in different disease conditions[21] and a few of its specific indications are given below.

Leucoderma: Juice of *Gunja leaves (Abrus precatorius* Linn.),*Chitrak Mul(plumbago zyelenica)* rubbed daily on leucoderma spot for about a month will remove them to a large extent.

Painful swelling: Juice of fresh leaves mixed with some bland oil is applied to painful swelling.

Hoarsenss and Stomatitis: Leaves of gunja (*Abrus precatorius* Linn.) *chewed separately or with cubeb and sugar and their juice swallowed in case of* Hoarseness and Stomatitis[22]. **Criminal abortion**:Seeds of gunja (*Abrus precatorius* Linn.) are ground into a paste and made into needles which are inserted into vagina which produce criminal abortion.

Alopecia: *Sudha* (purified) Seeds of gunja (*Abrus precatorius* Linn.) are ground into a paste and applied to the bare skin in alopecia.

Scabies: *Sudha* (purified) Seeds of gunja (*Abrus precatorius* Linn.) are ground into a paste mix with *bhrungraj* (*Eclipta alba*) leaves juice and apply on scabies region.[23&24]

Paraplegia: Take a root of gunja (*Abrus precatorius* Linn.), black sulphide of mercury,fruit of *neem*, cannabies indica and croton seed each two parts. Rub them together and make a paste in lime juice and then apply on affected parts.[25]

SOME COMPOUND FORMULATIONS OF GUNJA:

Classical pharmacopoeias of *Ayurveda* prescribe certain compound formulations of *Gunja* (*Abrus precatorius* Linn.) as an ingredient for the treatment of so many

disease conditions. Some of them are *Gunjadi Taila, Gunja pralepa, Gunjabhadra rasa, Mahalaxminarayana taila, Gunjaphalagni churna, Mritasanjivani gutika*[26]

CONTRAINDICATION:*Gunja* (*Abrus precatorius* Linn) is contraindicated in pregnancy and breast feeding mother. No drug interaction with *Gunja* has yet been reported .[27]

LETHAL DOSAGE: The smallest dose, which is known to produce death in humans, is 1-3 seeds. The minimal oral dose of abrin in an adult is 0.01mg/kg. The lethal dose in children is 15 mg. If strychnine is given parenterally, the lethal dose is again lowered [28].

ABRIN TOXICITY (LD100 VALUES)[Animal	**Body Weight (mg/kg)**
Rabbit	0.6
Rat	60
Human	Seeds 1-3 Abrin-0.OOO1-O.OOO2 Mg/Kg by S.C. route
Mice	0.02 mg/kg (Oral), 0.07mcg/kg (Intravenous)

TOXICOLOGICAL EFFECTS: When the seeds are swallowed as such, they are not poisonous because the outer covering is so hard that it escape disintegration in the gut. If chewed before swallowing, they cause toxicity. They are also not poisonous after cooking because the abrin loses its toxicity on boiling. If the extract is injected under the skin or into a wound, death may be produced depending upon the amount administered. Symptoms may be delayed from a few hours to 2-3 days when taken by mouth. They include abdominal pain, nausea, vomiting and diarrhea followed by a circulatory collapse.

When the extract of the seeds is injected under the skin of an animal, inflammation, oedema, oozing of hemorrhagic fluid from the site of puncture and sometimes necrosis occurs surrounding the site of injection. The animal does not take food and drops down after 3-4 days and cannot move, becomes comatose and dies. Convulsion may precede death. These manifestation resemble those of viper snake bite, for which they may be is mistaken. In human, painful swelling and ecchymosis develops with inflammation and necrosis at the site of injection. There is faintness, vertigo, vomiting, and general prostration. Convulsion may precede death from cardiac failure.[29]

TREATMENT OF TOXICITY:

1) Gastric decontamination (lavage, charcoal)

2) Whole bowel irrigation is said to be helpful, but dome investigation dispute this.

3) Supportive measures with special emphasis on rehydration. Close attention should be taken to hematological parameters.

4) Alkalinisation of the urine probably has a role in preventing crystallization of hemoglobin and should be considered in sever poisonings.

5) Treat convulsion in the usual manner with diazepam.

6) Renal failure can be managed by haemodialysis.

7) Ocular exposure necessitates copious irrigation with running water for at least 15 minutes.[30]

CONCLUSION: From the birth of humans, the plants are being employed by the people for their therapeutic uses and still we tend to have faith in their disease curing properties. Though *Gunja* (*Abrus precatorius* Linn.) is taken into account as a toxic plant, it has been used for thousands of years in *Ayurvedic* medication after purification. *Gunja* (*Abrus precatorius* Linn.) was introduced in Europe during sixteenth century; however it was chiefly used as animal poison at that time. Later, the European countries discovered its medicinal actions and *Gunja* (*Abrus precatorius* Linn.) became a wonderful medication to treatment of many diseases. It also possesses analgesic and anti-inflammatory, nephro-protective, wound-healing properties. It is additionally used as an aphrodisiac, nerve tonic. However, only a few works has been done on this plant and there is a large scope of investigation for researchers. Hence, it is required to explore its potential in the field of medicinal research and pharmaceutical sciences for novel and fruitful applications of this plant

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Source of support: Nil

Conflict of interest:None Declared