

## A REVIEW OF GUNJA (*Abrus Precatorius* Linn.) – AN ORGANIC IRRITANT POISON WITH RESPECT TO AGADTANTRA

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### ABSTRACT

*Gunja* is one of the poisonous drug described in *Ayurveda* under *Upavisha* category which is one of the irritant organic vegetable poison. The botanical name of *Gunja* is *Abrus Precatorius* Linn. belongs to family *Fabaceae*. The most toxic part of plant is seed but root leaves are also among the toxic part's. Seeds contain toxic substance toxalbumins having active principle "*Abrin*". In *Ayurved* poisonous plant used in various diseases after complete *sodhana* which acts as *uttam aushadhi*. The objective of this study is to collect the information about toxic parts, clinical features, sign & symptoms, fatal dose, fatal period, post mortem appearances & their medico-legal importance.

**KEYWORDS:** *Gunja, Visha, Toxicity, Abrin, Sodhana, Aushadhi*

### INTRODUCTION

In Ashtanga *Ayurveda* i.e the 8 specialized domains of *Ayurveda*. Agadtantra is one special field of science which draws a parallel connection with modern toxicology and carries its own importance in the clinical practice. *Agadtantra* deals with natural and artificial toxic substances with the management of poisoning resulting from snake bites, insect bite, rodent's (*Jangama visha*) poison as well as from the combination of other poison in reference to their source, character, properties, mechanism of action, sign & symptoms, lethal dose, treatment, cause of death, detection, estimation and postmortem finding<sup>1</sup>. It also deals with wide range of natural toxin originated from the *Jangama*

*Visha and Sthavara visha* as well as minerals (Pb, Hg,As etc) and also artificial poison prepared from various poisonous drugs. *Gunja* is a toxic climber plant described in *Ayurveda* under *Sthavara Vanaspathic Visha* with sub title *Upvisha dravya*. The botanical name of *Gunja* is *Abrus precatorius* linn. It is a perineal climber bearing pink or purple white flower. Seed is the most toxic part of the plant which contains the active principle "*Abrin*." The seed of *Gunja* is also called **Ratti** which was used in ancient India for the measurement of weight. One **Ratti** is roughly equal to 125mg. or 0.125gm.

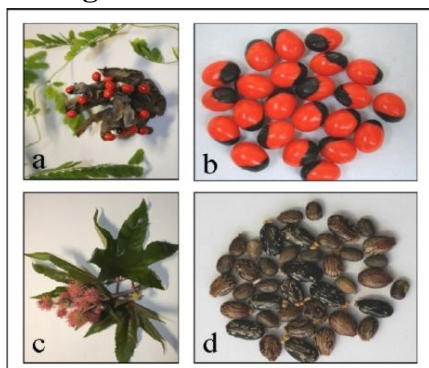
**General Description:** *Abrus precatorius* is green climbing vine bearing mostly alternate compound leaves with or without stipules.

Flowers are usually perfect regular or irregular mostly five to numerous. The stamens numerous to ten or less and often monadelphous or diadelphous.<sup>2</sup> The flowers are pinkish and seed are present in seed pod. Each seed pod contain's 3-5 seeds. The pod's split open when ripe, the pod legume is about 3 cm long. The seeds are egg shaped with 5mm in diameter and having weight of 105mg. Seed has an attractive hard glossy outer shell. The seeds are of three types: scarlet red seeds with a black spot at one end, Black seed with a white spot at one end, White seeds with Black spot at one end<sup>3</sup>.

Bhavaprakasa<sup>4</sup> mentioned two varieties of Gunja found i.e white & red color. The synonyms of white varieties are uchchata and krishnala and that of red varieties are kakachincha, kakadani, kakapilu.



**Fig 1: *Abrus Precatorius***



**Fig 2: *Gunja* Seeds**

**Vernacular Names<sup>5</sup>**

Hindi – Chirmiti, Gunja, Gunchi

English – Indian liquorrice root, Rosary pea, Weather plant

Telugu – Gurivenda

Tamil – Gundumoni

Malayalam - Kunni

**Type of Gunja:- It is two type**

(i) Rakta gunja (Red color of seed)

(ii) Sweta gunja (White color of seed variety)

**Classical Categorization**

Susruta – *Moola Visha*

Shaligram Nighantu – *Guduchayadi varga and visha varga*

Madanpala Nighantu – *Abhayadi varga*

Bhavprakash Nighantu, Dhanvantari

Nighantu & Raj Nighantu – *Guduchayadi varga*

Rasarnava – *Dravak Gana*

**Pancha Bhautik Sangathan:-**

*Rasa – Tikta Kasaya Virya – Usna*

*Guna – Laghu Ruksa Vipaka – Katu*

*Karma – Kapha-Vatahar, kesya*

**Note** – Root is madhur and snigdha

**Toxic Part:-** Seed, root, leaves, but most toxic part is seed

**Chemical Composition:-**

The seed contain an active principle abrin, a **toxalbumen** which is similar to **viperrine snake venom**<sup>6</sup>. It also contains **N-methyl tryptophan** an amino acid, haemoglutinin in the cotyledons, a lipolytic enzyme and a glucoside Abrialin.

**Machanism of action<sup>7</sup>**

**Abrin** is composed of two polypeptide chain (A & B). These two chains are connected by a disulphide bond. Chewing or crushing of seed release abrin. The “B” polypeptide chain (called as heptomer) bind to intestinal membrane while A polypeptide chain (called as effectomer) enter the cytoplasm. In cytoplasm “A” polypeptide chain act on 60 S ribosomal subunit and prevent's binding of

elongation factor EF-2 thus inhibiting protein synthesis causing cell death.

### Clinical Feature<sup>8</sup>

Oral ingestion:- when seeds are swallowed either raw or after the cooking they are not poisonous (Abrin loses its activity on boiling). Seed must be chewed or crushed for harmful effect to occur.

### Sign & Symptoms –

Symptoms may be delayed from few hours to two or three days. It includes

- Severe irritation of upper GI tract, abdominal pain, nausea, vomiting, bloody diarrhoea rectal bleeding.
- Weakness, cold perspiration and trembling of hands.
- Weak rapid pulse, and miosis (constriction of pupil).
- Faintness, vertigo, vomiting, dyspnea and general prostration

### (i) Injection of extract under skin – develop following symptom

- Painful inflammation, odema, oozing of haemorrhagic fluid from the site of the puncture
- Tetanic convulsion and cerebral oedema.
- Cardiovascular manifestation akin to a viperine bite . Cardiac arrhythmias, convulsion, cerebral oedema and CNS depression.

**Fatal dose<sup>9</sup> :-** Inj. Abrin 90 to 120 mg/IM or SC or IV.

Gunja Suchi 1 to 2 seeds

Oral- uncertain

**Subcutaneously abrin** is 100 times as toxic as by the oral route.

**Fatal period** – 3 to 5 days

**Sign and symptoms:-** As per *Ayurveda*<sup>10</sup>.

*Daurbalya* (Weakness)

*Rakta srava* (Bleeding)

*Tandra* (Fatigueness)

*Moha* (Stupor)

### *Gatravrana* (Ulceration)

### Table No. 01:-

### Differential diagnosis of injection Abrin and viper bite<sup>11</sup>

S.no.	Feature	Abrin	Viper bite
A	History of	Inj. Abrin or Gunja suchi	Viper bite
B	Fang mark (Bite mark)	-	Two fang mark at the site of bite
C	Fragment of abrin/sui	++	-
D	Local hemorrhagic oozing	Mild	Severe
E	Oozing	Coagulable	Incoagulable
F	PT/PTT	Average	Increase
G	Systemic bleed	-	++++
H	Sub conjunctival bleed	-	Often +

### Toxicity Management

According to *Ayurveda*

(i) Meghanada swarasa mixed with sarkara (Sugar) and followed by gulping of cows milk this is specially indicated for gunja poisoning<sup>12</sup>.

(ii) Use of antidote- madhu sarkara mixed with ghrit.

(iii) Cow milk with sugar.

### Modern Treatment<sup>13</sup>

(i) Resuscitation – Monitor and maintenance of airway, breathing and circulation.

(ii) Removal of unabsorbed poison:- If patient is conscious oriented & having stable vital – emesis must be induced.

If patient is unconscious, disoriented & having unstable vital – mild purgation, and stomach wash with kmno4 solution – 1: 1000.

(iii) Removal of absorbed poison – not necessary.

(iv) Excision of local part containing sui or sutari lead to fast recovery of patient<sup>14</sup>.

(v) Injection of anti- abrin.

(vi) Rehydration therapy.

(vii) Sodium bicarbonate 10gram orally per day help in maintaining alkalinity of urine and prevent agglutination of red cell and blocking of renal tubules with haemoglobin G<sup>15</sup>

(viii) Occular exposure necessitate copious irrigation with running water for at least 15 minutes.

(ix) Other symptomatic treatment will be taken as per requirement.

### Post Mortem Apperence<sup>16</sup>

#### External:-

Injected poison – Fragments of needle or sui is found in the wound. There is edema at the site of injection & petechial haemorrhages under the skin, pleura, pericardium and peritoneum.

Ingested poison – Not specific.

#### Internal poison:-

Injected poison – Not specific.

Ingested poison – GIT shows edematous bowel with hemorrhage, cerebral edema, and congestion of liver, spleen, kidney.

### Medicolegal Importance<sup>17</sup>

(i) Accidental poisoning may occur in children while exploring the attractive seed.

(ii) The seeds are used for killing cattle and rarely for homicide. The seeds are decorticated, and alone or mixed with dhatura, opium and onion are made in to paste with spirit & water and small sharp pointed spikes or needles or sui's are prepared, which are then dried in to sun. The needle are 15 mm along and its weight's about 90 – 120mg. Two needles are inserted by their base in to hole in a wooden handle.

A blow is struck to the animal with great force which drive needle in to flesh.

(iii) For homicide, the needle or sui's kept between two fingers, and the person is slapped which drive needle in to the body.

(iv) Powdered seed are used by malingeres to produce conjunctivitis.

(v) The seed when taken internally they disturbed uterine function and prevent conception.

(vi) The seeds are use as an abortifacient.

(vii) Gunja seeds are used as arrow poison.

### DISCUSSION

Plants and vegetables are useful food for humans and animals. Some plants are toxic for humans and animals causing serious toxic effects or even death. *Gunja* is well known toxic plant which is commonly found in many regions of India. There are mainly two varieties of *Gunja* viz *Rakta Gunja* (Redvariety) and *Sweta Gunja* (White Varithey). Both varieties used in medicine for different purposes. The plant *Gunja* also have forensic importance. The seeds are used for cattle poisoning, for homicidal purposes and as an abortifacient. Besides toxic impacts of this plant it is a famous drug used in Indian system of medicine.

### CONCLUSION

*Abrus Pecatorius* is an organic irritant vegetable poison which is mentioned in various *Ayurvedic samhitia's* under *Sthavar Visha* and *Upvisha varga*. All parts are toxic but seeds are most toxic. *Gunja* seeds are of two types scarlet red and black. Due to its easy availability in most of village and attractiveness its causes accidental poisoning commonly occur. After proper *Sodhana* it is used in *Gujnjadi tailam*, *Gunjabhadra rasa* which are indicated for darunaka, krimidanta, visharpa. So there is necessity to have more knowledge regarding its toxic

properties, adverse effects, postmortem appearances, Medicolegal aspects and its *Sodhana* processes which plays an important role to reduce its toxicity i.e. beneficial for therapeutic purposes.

## REFERENCES

1. Prof. Dr. S.K.Singhal, Toxicology At A Glance, National Book Dept. Mumbai 9<sup>th</sup> Edition, 2020 Page No. 3
2. Banjare Nitu, Inchulkar SR, kaushik Yuvraj Gunja (*Abrus Precatorius* Linn) A Precious Toxic Plant, A Review
3. Rajesh Bardale, Principle of Forensic Medicine and toxicology (2nd) 2017 Chapter 38 Page No. 524
4. Dr. Bulsu Sitaram. K.C. Chuneekar, Dravaguna - Vijnana Chaukhambha Orientalia Varanasi Bhavaprakasa of Bhavamisra Guducyadi Varga Page No. 260
5. Dr. J. L. N. Sastry Foreword by Prof. K.C. Chuneekar, Dravaguna – Vijnana Page No. 691 Vol. II
6. Dr. K.S. Narayan Reddy and Dr. O.P. Murty, The Essentials of Forensic Medicine And Toxicology, Jaypee New Delhi 34 Ed. 2017, Page No. 516.
7. Dr. K.S. Narayan Reddy and Dr. O.P. Murty, The Essentials of Forensic Medicine And Toxicology, Jaypee New Delhi 34 Ed. 2017, Page No. 516.
8. Praveen Kumar, Manish Kumar, Jai Kumar Singh A Review on Toxicity of Gunja (*Abrus Precatorius*).
9. Dr. Shard. M. Porte, Agada Tantra (Visha Chikitsa Vigyan), Ayurved Sanskrit Hindi Pustak Bhandar Jaipur 2016 Page No. 123.
10. Dr. Ayodhya Prasad Achal, Tex book of Ayurvedic Toxicology Varanasi Chaukhambha Surbharti Prakashan 2016 2<sup>nd</sup> Ed. Page No. 96.
11. Dr. Shard. M. Porte, Agada Tantra (Visha Chikitsa Vigyan), Ayurved Sanskrit

Hindi Pustak Bhandar Jaipur 2016 Page No. 124.

12. Dr. Ayodhya Prasad Achal, Tex book of Ayurvedic Toxicology Varanasi Chaukhambha Surbharti Prakashan 2016 2<sup>nd</sup> Ed. Page No. 96.
13. Dr. Shard. M. Porte, Agada Tantra (Visha Chikitsa Vigyan), Ayurved Sanskrit Hindi Pustak Bhandar Jaipur 2016 Page No. 124.
14. Praveen Kumar, Manish Kumar, Jai Kumar Singh A Review on Toxicity of Gunja (*Abrus Precatorius*).
15. Dr. K.S. Narayan Reddy and Dr. O.P. Murty, The Essentials of Forensic Medicine And Toxicology, Jaypee New Delhi 34 Ed. 2017, Page No. 516.
16. Dr. K.S. Narayan Reddy and Dr. O.P. Murty, The Essentials of Forensic Medicine And Toxicology, Jaypee New Delhi 34 Ed. 2017, Page No. 517.
17. Dr. K.S. Narayan Reddy and Dr. O.P. Murty, The Essentials of Forensic Medicine And Toxicology, Jaypee New Delhi 34 Ed. 2017, Page No. 517.

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