

A REVIEW OF JAYAPALA (*CROTON TIGLIUM LINN.*) – AN ORGANIC IRRITANT POISON

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ABSTRACT

The word *upavisha* means to nearer to *visha* i.e.drugs which possess the same qualities of *visha*, but not that much potent. *Jayapala* (*Corton tiglium*) is commonly known as *jamalgoti*. It is described in *upavisha* and a well known plant in Indian system of medicine as certain number of formulation include this drug as an ingredient after proper purification. It produces severe symptoms of toxicity when taken internally or applied externally to the skin. Also it is one of the known purgative drug in Ayurveda with huge therapeutic values. This review article includes overall information about the plant *jayapala*, its botanical description, toxicological aspect, treatment medicolegal aspects in both Ayurveda and modern toxicology and its *shodhana* (purification) processes.

KEYWORDS: *Visha, Upavisha, Jayapala* , Medicolegal Etc.

INTRODUCTION

Ayurveda is the science of health and healing. The word “Ayurveda” is a compound of Ayus “life” and *Veda* knowledge and this can be readily told as “the science of life”. In ancient classical literatures Ayurveda was known as the science of eight literature (*Astangas*) Agada tantra is one of the incredible branch among *Astangas* which is used for diagnosis of *visha* and their management. It is also used for medicolegal cases in court of law for justice. According to *Agadatantra* *Visha* is classified into three- *sthavara*, *jangama* and *kritrima*. *Sthavara visha* is further classified into *maha visha* and *upavisha* based on its toxicity.in Ayurveda *upavishsha* are those group of drugs whose toxicity is less in nature and which are not so lethal but produce certain toxic symptoms on consumption or administration which can be controlled by therapeutic measure. *Jayapala* is one among the eleven *upavisha* mentioned in Ayurvedic literature. Though the whole plant is considered as *visha*. Its *beeja* is highly toxic. It is used in many herbo-mineral preparation like *icchabhedirasa*, *Ashwakanchukirasa*.^[1]

Botanical Name- *Croton tiglium* linn.^[2]

Family- Euphorbiaceae.^[3]

Sanskrita Name- *Nepala, Jayapala Kanukaphala, Titteriphala*

Type of Poison- Irritant poison.^[4]

Classical Reference

The term *Jayapala* is found in many *nighantus* but its absence in *brihatrayee*. It does not mean that it is not known to the ancient physicians. The words *danti* and *drawanti* found in *brihatrayee*,^[5] are used as synonymous to *Jayapala* as they exhibit the similar purgative action of *Jayapala*. In the first chapter of *Charaka samhita Sutra sthana* *Jayapala* is mentioned among the drugs where root is used as the medicine. In the second chapter the purgative quality of *Jayapala* is explained in the event of subsidence of vitiated *doshas*.

Reference are also found in 7th, 13th, 27th, 33rd chapters of *chikitsa sthana*. 1st, 11th, and 12th chapters of *kalpa sthana* and 11th chapter of *sidhi sthana*.

Susrutha samhitha had also mentioned *jayapala* as *dantibeeja* in 11th, 39th, 42nd, 44th, and 45th chapters of *sutra sthana*. 2nd, 18th, and 31st chapters of *chikitsa sthana* and 42nd, and 52nd, chapters of *utara sthana*.

Acharya *vagbhata* in his *Astanga hridayam* mentions the drug *jayapala* in 15th chapter of *sutra sthana* 15th and 19th chapter of *chikitsa sthana* 2nd chapter of *kalpa sthana* and 30th chapter of *uthara sthana*.^[6]

Ashtaga Nighantu explains the synonyms and qualities of *jayapala*.

Properties And Uses^[7]*Rasa – katu**Guna – guru, snigdha, tikshana**Virya – ushna**Vipaka - katu**Doshagnata – kapha vata hara pitha janana**Karma – Teevra virechana, vishagna, swedajanana,**jwaragna Shothahara, krimigna, dipana***Ayurvedic formulations of Jayapala.**

Formulations	Indications
<i>Jvarari rasa,^[9]</i>	<i>Navajwara</i>
<i>Ichhabhedi rasa,^[10]</i>	<i>jalodara</i>
<i>Vrischikavishhara pralepa,^[11]</i>	<i>virschikdamsha</i>
<i>Anjanbairav rasa,^[12]</i>	<i>sannipathajjwara</i>
<i>Jalodarari rasa,^[13]</i>	<i>jalodara</i>
<i>Krimikastanal rasa,^[14]</i>	<i>krimiroga</i>
<i>Vidangloha,^[15]</i>	<i>Krimi, Arsha, Mandaghni, visuchika</i>
<i>Rukkeshee rasa,^[16]</i>	<i>malabaddata</i>
<i>Misrakasneham,^[17]</i>	<i>jalodara</i>
<i>Mahanarracha rasa,^[18]</i>	<i>jalodara</i>
<i>Bahushalaguda,^[19]</i>	<i>vatadara</i>

Toxic Part

Seeds and oil extracted from the seed is extremely toxic. Seed oil is commented to have tumour promoting phorbol diesters.^[20]

Active Principles

2 Active principles croton (Toxalbumin)

Crotonoside, oil contain powerful vesicating resin composed of crotonoleic acid, methyl crotonic acid, and several other fatty acids.^[21,22]

Mechanism of Action

The toxalbumin present in the seeds is a toxic protein that disable ribosomes and there by inhibit protein synthesis. It is antigenic in nature, it agglutinates red cell and causes hemolysis and cell destruction.^[23]

Signs and Symptoms

Burning pain from mouth to stomach

Severe gastro intestinal irritation

Severe griping pain in abdomen

Salivation

Vomiting

Purging

Vertigo

Irregular pulse collaps and death.^[24]

According to Ayurveda^[25]

Vanti

Bhranti

Atisara

Sula

Atopa

Daurbalya

Atisweda

The seeds and oil of *jayapala* are acrid, bitter, thermogenic, emollient, drastic purgative, digestive carminative, anti helminthic, anti inflammatory, vermifuge. detergent, diaphoretic, vesicant irritant and rubefacient and are useful in abdominal disorders, convulsions, ophthalmia, cough.^[8]

Fatal Dose**Seed**

1 seed -toxic symptoms

4 seed -death

Oil

3 drops- toxic symptoms for children

20-30 drops- for adults.^[26]

Fatal Perid

Death -4 to 6 hrs or may be delayed for 3 days or even more.^[27]

Treatment

1. Stomach wash
2. Administration of demulcent drinks, like milk or egg white
3. Morphin with atropine to ally pain and reduce intestinal secretions
4. Glucose and saline are given intravenously to combat collapse and dehydration
5. Maintenance of fluid and electrolyte balance
6. Supportive measure.^[28]

According to Ayurveda

According to *anupanamanjari* and *rasajalanidhi dhanyaka* pestled with curd and sugar removes troubles due to croton seeds.

Medico Legal Importance^[29]

1. Accidental poisoning resulting from swallowing croton oil by mistake / when taken in large dose as a purgative or by eating seeds or inhaling their dust.
2. Suicidal poisoning and homicidal poisoning are rare.

3. Seed oil is sometime taken internally as an abortifacient.
4. Oil is used as arrow poison
5. Mistaken for castor oil or castor seed, accidental poisoning

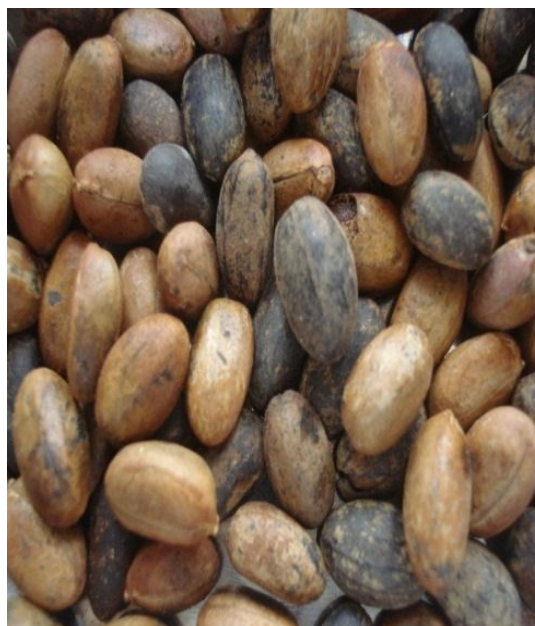


Photo 1: Leaf Fruit and Seeds.

Post Mortem Findings^[30]

The mucous membrane of the stomach and intestines is usually found red, inflamed and excoriated at places.

- Fragments of the seeds may be found in stomach and intestine.
- The spleen and liver gets congested.
- The kidneys may show cloudy swelling and congestion.
- Occasionally the post mortem findings are negative.

Shodhana

Shodhana is done to reduce the toxicity of the seeds for therapeutic purposes described by *Yogaratanakara* and *Rasatarngini*. For *shodhana* of *jayapala* Cow milk.^[31] (*Godugdha*), Cow dung (*Gomayasyodaka*) and cow milk mixed with 1/8th part of *tankana* are mentioned.

DISCUSSION AND CONCLUSION

Jayapala is described in *upavisha varga* in Ayurveda. It is used in Ayurveda in various diseases. As the seed oil is purgative. When taken internally or applied externally to the skin, it produces severe symptoms of toxicity. As the seeds are having poisonous properties it should be used carefully after proper *shodhana* mentioned various ayurvedic text.

There is no specific antidote for *jayapala beeja* poisoning, treatment is based only on general principal. Accidental, homicidal poisoning or overdose of medicinal preparation of *jayapala beeja* is seen, so it necessary to develop some *prativisha prayogas* (antidot formulation) to treat its poisoning.

Jayapala an ingredient by following respective procedure like *shodhana* some formulation are not widely used in clinical practice and hence there is scope of research in this area.

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