



Review Article

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A critical review on Upavisha- Jayapala (*Croton tiglium*)

Neethu.P.¹, Vijitha Vijayan¹, Athulya C.M¹, Arathi Rajesh²

¹ PG Scholar, Department of Agada Tantra, MVR Ayurveda Medical College, Kannur, Kerala, India

² Associate Professor, Department of Agada Tantra, MVR Ayurveda Medical College, Kannur, Kerala, India

ABSTRACT

The word Upavisha means nearer to visha i.e. drugs which possess the same qualities of visha, but not that much potent. Jayapala (*Croton tiglium*) is one among the upa vishas and a well-known plant in Indian System of Medicine as certain number of formulations include this drug as an ingredient after proper purification. 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, its shodhana (purification) processes.

Keywords: Upavisha, *Croton tiglium*.

INTRODUCTION

Ayurveda is the science of health and healing. In ancient classical literatures Ayurveda was known as the science of eight literatures (Astangas). Agada Tantra is one of the incredible branches among astangas which is used for diagnosis of visha (poisons) and their management. It is also used for medicolegal cases in the court of law for justice. Generally, visha is classified into Sthavara (inanimate poisons) Jangama and kritrima visha (artificial poisons). Sthavara visha (inanimate poison) is further classified into maha visha and upavishas based on its toxicity. In Ayurveda upavishas 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 the therapeutic measures. The upavisha Jayapala which belong to Euphorbiaceae family commonly known as croton is one of the known purgative drugs in ayurveda with huge therapeutic values

BOTANICAL NAME: *Croton tiglium* Linn.

FAMILY: Euphorbiaceae

VERNACULAR NAMES^[1]

English - Croton

Hindi - Jamalgota

Malayalam - Neervalam

Tamil - nervalam

Kannada - Nepal ,Japalbeej , Japala

Telugu - Nepalamu

CLASSICAL REFERENCE²

The name jayapala is not found in any of the vedas but we get plenty of references in the name of dantibeeja in Brihatrayes and most of the nighantus. 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 jayapala is explained in the event of subsidence of vitiated doshas.^[2]

References are also found in 7th and 8th chapter of vimana sthana. In 7th 13th, 27th, 33rd chapters of chikitsa sthana. 1st, 11th, and 12th chapters of kalpa sthana and 11th chapter of sidhi sthana.

***Corresponding author:**

Dr. Neethu.P

PG Scholar, Department of Agada
Tantra, MVR Ayurveda Medical
College, Kannur, Kerala, India
Email: pneethu7[at]gmail.com

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 uthara sthana^[2]

Vagbhata acharya in his Astanga hrudaya mentions the drug Jayapala in 15th chapter of sutra sthana 15th and 19th chapters of chikitsa sthana, 2nd chapter of kalpa sthana and 30th chapter of uthara sthana.^[2]

Astanga nighantu explains the synonyms and qualities of Jayapala. Nighantu adarsha mentions it under Aamlakyadi varga and Dhanwantari nighantu under Eranda kula. Bhavaprakasa nighantu as well states about Dantibeeja.^[2]

CLASSICAL CATEGORIZATION^[2]

Sharngadhara samhita Rasendra chudamani Rasa sara sangraha Ayurveda prakasha Rasa Tarangini	Upavisha
Bhavaprakasha nighantu Dhanwantara nighantu	Guduchyadi varga
Kaiyyadeva nighantu	Oushadi varga
RajaNighantu	Pippalyadi varga

Distribution³ : Croton plant grows all over India, especially in the waste lands

of North India. grown in many varieties for their brightly coloured foliage, It is widely cultivated as a house plant.

Morphology:

The Plant is a small evergreen tree of almost 4.5-6m in height with ash coloured smooth bark and young shoots sprinkled with stellate hairs. Leaves are oblong to ovate- lanceolate, obtuse or rounded at the two glanded base, acuminate membranous, yellowish green in colour and minutely toothed. Flowers are small, unisexual, males on slender pedicels, females larger on short thick pedicels. Fruits are ovoid or oblong, 3 gonous capsules, seeds are smooth, testa is black, enclosing reddish brown oily endosperm.^[1,3]

Part used^[1] : Seeds, Oil.

DESCRIPTION

Macroscopic: Seed are albuminous, ovate, oblong, slightly quadrangular, convex on dorsal and somewhat flattened on ventral surface, about 12mm in length and resemble castor seed in shape, dull cinnamon brown, often mottled with black due to abrasion in testa, caruncle easily detached and usually absent, hilum on ventral side less distinct than that of castor seed, its raphe runs along ventral surface of seed terminating in a dark chalaza at opposite extremity, kernel is yellowish and oily, consisting of a large endosperm, enclosing papery cotyledons and a small radicle, it has no marked odour Kernel gives at first oily taste followed by an unpleasant acidity.^[4,5]

Microscopic: Seeds show a hard testa, which consist an epidermal layer, covered externally with a thick cuticle and composed of oval and tangentially elongated cells, it is filled with brownish content and epidermis.

Properties and uses^[1,3]

The seeds and oil of jayapala are acrid, bitter, thermogenic, emollient, drastic purgative, digestive carminative.^[3] anti helminthic, anti inflammatory, vermifuge. detergent, diaphoretic, expectorant, vesicant irritant and rubifacient and are useful in abdominal disorders, convulsions, ophthalmia, cough, catarrh, a layer of radially elongated cells, slightly bend at middle, its upper half portion filled with reddish brown contents and lower half filled with yellow contents, inner most zone consist of tangentially elongated, thin walled cells, and endosperm consist of polygonal parenchymatous cells filled with oil globules, a few cells having rosette crystals of calcium oxalate central region of endosperm shows a dicotyledonous embryo consisting of thin walled parenchymatous cells.^[4,5]

Rasa panchakas^{1,5,6,7}

	Rasa	Guna	Veerya	Vipaka	Doshag hnata	Rogagnata
R.N	Katu	ushna	ushna	katu	Kapha vata hara	Krimihara, jataramaya nasana
D.N	Katu	ushna	usna	katu	Kapha vata hara	Krimihara, jataramaya nasana
KAI.N	Madhura	Laghu, snigdha	seeta	Madhura	Pitha kapha hara	Gara, sophahara, kasahara, daham hanti
B.P		Guru, snigdha			Pitha kapha hara	
A.SN						Anaha, udaram hanti, sanyasa, sirogada, dhanusthambha, jwarahara, amavatahara

SYNONYMS

Rechaka (That which causes purgation), *Beeja rechaka* (seeds causes purgation), *Jayapala* (that which wins over diseases), *Dantibeeja* (seeds resemble that of danti), *Maladravi* (that which causes liquid defecation), *Nikumba* (globose fruit), *Beeja rechaka* (seed causes purgation), *Kumbibeeja* (pot shaped seed), *Chitramoola* (root resembles that of chitraka), *Sheegra* (fast acting drug), *Tindidephala*^[1]

TOXIC PART

Seed and oil extracted from the seed is extremely toxic. Seed oil is commented to have tumour promoting phorbol diesters.^[9]

ACTIVE PRINCIPLES

2 Active principles Croton (Toxalbumin)

Crotonoside (glycoside), oil contain powerful vesicating resin composed of crotonoleic acid, methyl crotonic acid, and several other fatty acids.^[10,11]

Mechanism of action

The toxalbumin present in the seeds is a toxic protien that disable ribosomes and thereby inhibit protien synthesis. It is antigenic in nature, it agglutinates red cells and causes hemolysis and cell destruction.^[12]

SIGNS AND SYMPTOMS^[10,11,13]

On ingestion: There is hot burning pain from mouth to stomach, salivation, Nausea, vomiting, purging, and bloody stools with griping pain followed by tachycardia, vertigo, great prostration, circulatory and respiratory collapse and death.

Applied to skin: croton oil produces burning sensation, redness and vesication^[11]; the vesicles may later suppurate and cause scarring.

FATAL DOSE^[10] : 1-2ml of oil or 4-5 crushed seeds

FATAL PERIOD^[10] : 4-6 hours to 3-6 days

TREATMENT^[10]

- Stomach wash
- Administration of demulscent drinks, like milk, or egg white
- Morphine with atropine to allay pain and reduce intestinal secretions.
- Glucose and saline re given IV to compact collapse and dehydration.
- Borax is an antidote of croton seed poisoning.

As per Ayurveda - According to Anupamanjari and Rasajalanidhi Dhanyaka (coriander seeds), pestled with curd and sugar removes troubles due to croton seeds.

In Kodasseri marga, a traditional malayalam textbook it has been explained that ingestion of Jayapala seeds result in acute diarrhoea and vomiting and for that 16g (4 kazhanju) lavanga and 8g (2 kazhanju) sundi and musta is made to kahayam and when cooled is given with honey, which is considered as the best medicine for jayapala poisoning.

PM Findings^[10]

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.

Medico legal importance^[10]

- Accidental poisoning results from swallowing croton oil by mistake, or when taken in large doses as a purgative or by inhaling their dust
- Suicide and Homicide is rare
- Root and oil are taken internally as an abortifacient.
- Oil is used as arrow poison.

SHODHANA^[2,14]

Shodhana is done to reduce the toxicity of the seeds. According to Rasa Tarangini the seed are taken and cut onto two along the ridge. Then the seeds are boiled in cows milk for 1 yama (3 hours) and dried under sunlight by keeping the seeds in earthen plate. The earthen plate absorbs the oil content from the seeds thus reducing its toxicity.

According to Astanga sangraha swedana with gomaya swarasa and goksheera and then mild fry reduces toxicity of oil. Kriyakoumudi has elaborately described many sodhana procedures for jayapala.

- Boil Jayapala seeds in Tandulodaka of brown rice with buffalo dung, remove its outer cover and bud, then it becomes purified.
- Boil in dung milk and Kumari swarasa, Wash it with sudha jala and dried, boil in ghrta for sometime, then remove the oil content and do bhavana for 3 days in jambeera swarasa

PRAYOGAS IN VISHA CHIKITSA^[15,16]

- **NEERVALA TAILAM** ; indicated in cobra poisoning
- In prayoga samuchaya dviteeya paricheda Moorkha visha chikitsa (cobra poisoning) : Swetha arka patra swarasa and Jayapala beeja is indicated for pana cures sarva visha.
- Jayapala, saanamoola and mandooka vasa is made bhavana in salt water and is made to pills for nasya cures poison
- vishahara lepa for vruschika (r.t) paste of jayapala beeja on site of scorpion sting relieves pain of the sting

OTHER FORMULATIONS^[2]

- Ichabhedi rasa
- Aswakanchuki rasa
- Prana vallabha rasa
- Maha mrityunjaya rasa
- Shula kutara rasa
- Sleepadantaka gutika
- Punarnavadhi mandoora
- Draksasava
- Dadimavaleha
- Sarvanga sundara rasa
- Yakritplihara lauham
- Vaidyanatha vati

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 in various Ayurvedic text.

There is no specific antidote for Jayapala Beeja poisoning, treatment is based only on general principles. Accidental, Homicidal poisoning or overdose of medicinal preparations of Jayapala Beeja is seen, so it necessary to develop some prativisha prayogas (anti dotal formulations) to treat its poisoning

In ayurvedic classical references there are many medicinal herbs indicated in different diseases. Upavisha like Jayapala is the one used with a medicinal combinations to prepare formulations. It is better to

treat various diseases with a herbal drug like Jayapala as an ingredient by following proper procedures like Shodhana Some formulations in visha chikitsa are not widely used in Clinical practice and hence there is a scope of Research in this area.

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