

**CRITICAL REVIEW ON JAYAPALA (CROTON TIGLIUM)****Dr. Priyanka S.*¹ and Dr. Rajendra Prasad M. L.²**

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ABSTRACT

In *Rasa Shastra*, almost all the drugs (right from mercury to poisonous herbal drugs) are advised to be processed with specific *Shodhana* methods before their internal use. Hence the *Shodhana* process is aimed to remove harmful substances / impurities present in the drugs. *Jayapala* (*Croton tiglium*) is one of the plant classified under the semi-poisonous medicinal plants by seers of *Ayurveda* termed as *Upavisha*. Though it is included in semi-poisonous group, it has been advocated with external and internal applications in various formulations for different ailments.

KEYWORDS: *Jayapala*, *Croton tiglium*, *Shodana*, *Swedana*, *Godugdha*.

INTRODUCTION

Rasa Shastra has propounded that use of *visha dravyas* in therapeutics. *Jayapala* (*Croton tiglium*) even it is mentioned under *Upavisha*. If it is used after *Shodhana* it has its own importance in therapeutic action. It is a drug used in various *Kalpana* (formulations) both Herbal and Herbomineral formulations of Ayurvedic Pharmaceutics. Though *Jayapala* is not mentioned in Samhita granthas most of the Nighantus have quoted it as Purgative. Mainly seed and seed oil are used in the plant. This paper is to highlight the importance of *Jayapala* as a medicinal drug and as an ingredient in various formulations.

JAYAPALA- (*Croton tiglium*)

Varga- *Upavisa*

Sanskrit name- Jayapala

English name- purging croton

Hindi name- Jamala gota

SCIENTIFIC CLASSIFICATION^[1]

Kingdom- Plantae

Order- Malpighiales

Family – Euphorbiaceae

Sub family- Crotonoideae

Tribe- Crotonae

Genus- Croton

Species- Croton tiglium

DESCRIPTION^[2]

Macroscopic- Seed albuminous, ovate, oblong, slightly quadrangular, convex on dorsal and somewhat flattened on ventral surface, about 12 mm 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, raphe runs along ventral surface of seed, terminating in a dark chalaza at opposite extremity, kernel yellowish and oily, consisting of a large endosperm, enclosing papery cotyledons and a small radicle, no marked odour; kernel gives at first oily taste followed by an unpleasant acidity.

Microscopic- Seed shows a hard testa, consisting of an epidermal layer, covered externally with a thick cuticle and composed of oval and tangentially elongated cells, filled with brownish content; epidermis followed by a layer of radially elongated cells, slightly bent at middle, upper half portion filled with reddish-brown and lower half filled with yellow contents; inner most zone consists of tangentially elongated, thin-walled cells; endosperm consists 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.

Powder – White with black particles of testa; under microscope shows elongated cells containing reddish-brown and yellow contents, oil globules and a few rosette crystals of calcium oxalate.

IDENTITY, PURITY AND STRENGTH

Foreign matter Not more than 2 per cent

Total Ash Not more than 3 per cent

Acid-insoluble ash Not more than 0.5 per cent

Alcohol-soluble extractive Not less than 15 per cent

Water-soluble extractive Not less than 7 per cent

T.L.C.

T.L.C. of alcoholic extract of the drug on Silica gel 'G' plate using n-Butanol : Acetic acid : Water (4: 1 :5) shows under U.V. (366 nm) three spots at Rf. 0.34, 0.54 and 0.84 (all violet). On exposure to Iodine vapour six spots appear at Rf. 0.10, 0.29, 0.39, 0.49, 0.63 and 0.90 (all yellow). On spraying with 5% Methanolic-Sulphuric acid reagent and heating the plate at 105°C for ten minutes three spots appear at Rf. 0.34 (grey), 0.54 (yellow), 0.84 (brown).

CONSTITUENTS

Seeds kernel contain 55-57% croton oil. The poison occurs to the extent of 2-5% in the fatty acids, purgative effect may also follow the applications of oil on the skin: oil contains a toxic resin. In addition to the vesicant and purgative principle which pass into the oil, the seed kernels contain 2 toxic proteins, croton-globuline and croton albumin, sucrose-glycoside and a glycoside-crotonoside. Seeds yield a fixed oil, tiglic acid, crotonic or tiglinic acid, crotonic or quartenylic acid and croton oil. Major contents of croton oil include croton – oleic acid, mainly activating principle; tiglic acid or methyle crotonic acid; crotonol, non purgative but corrosive for skin; some volatile oil and fatty acids.

***Jayapala* – synonyms**

Jayapala, Jepala, Rechaka, Saraka, Vibhedana, Maladravi, all these are the synonymous words used for “*Croton tiglium*”.

Properties and Action^[3]

Rasa : Katu

Guna : Guru, Snigdha, Tikсна

Virya : Usna

Vipaka : Katu

Doshagna : Kapha- vathahara,

Kapha - pittahara

Karma: Rechana, Vishagna

Indications- *jalodara, kustha, sotha, krimi*

Part Used-

seed, seed oil

Signs and symptoms^[4]

There is hot burning pain from mouth to stomach, salivation, vomiting, purging, vertigo, prostration, collapse and death. Applied to skin, the oil produces burning, redness and vesication.

Fatal dose – four seeds, 1-2 ml of oil.

Fatal period- six hours to three days.

SHODHANA^[5]

1st method

The seeds of a well grown fruit of *Jayapala* tree are selected. The external covering of the seeds is removed. The testa (greenish tongue like structure inside the seed) of these selected seeds is removed and the cotyledons are tied in a *pottali*.

This *pottali* is hung in *dolayantra* having *godugdha* as liquid media and subjected to *swedana* for three hours (one *yama*). It should be repeated for three times. Each time fresh milk has to be taken.

After 3rd *swedana* procedure, when the drug is cool on its own, it is collected from the *pottali* and dried under hot sun. Later the dry powder obtained is triturated well and stored in suitable air tight container.

2nd method

The seeds of a well grown fruit of *Jayapala* tree are selected. The external covering of the seeds is removed. The testa of these selected seeds is removed and cotyledons are tied in *pottali* along with 1/8 th part of '*shuddha tankana*'.

This *pottali* is hung in *dola yantra* having *godugdha* as liquid media and subjected to *swedana* for six hours (two *yama*). when the drug is cool on its own, it is collected from the *pottali* and dried under hot sun. Later the dry powder obtained is triturated well and stored in suitable air tight container.

3rd method

The seeds of a well grown fruit of *Jayapala* tree are selected. The external covering of the seeds is removed. The testa (greenish tongue like structure inside the seed) of these selected seeds is removed and the cotyledons are tied in a *pottali*.

This *pottali* is hung in *dolayantra* having *godugdha* as liquid media and subjected to *swedana* for three hours (one *yama*). When the drug is cool on its own, it is collected from the *pottali*, taken in a clean *khalva yantra* and triturated to obtain the paste of the same.

This paste is thinly applied over the top of a new mud pot and left for a while. when all the oily content in the drug is lost through the pores of the new mud pot, the dry paste on the pot is scraped airtight container.

Observation - Before *Svedana*, the colour of *Jayapala* seed is Blackish Red. After *Svedana* it is changed to Brownish Red. After the *Bhavana* with *Nimbu Rasa* the paste became less sticky.

Precautions

Embryo (*Jihva* – poisonous parts) of the *Jayapala* seed must be removed by the help of knife. The *pottali* is made hung just to avoid touching the bottom of the vessel.

THERAPEUTIC DOSE^[6]

1/8th to 1/4th *gunja*.

VISHISHTA YOGAS OF JAYAPALA

SL.NO	NAME	INGREDIENTS	INDICATION	DOSE& ANUPANA
1	<i>Ichabedi rasa</i> (R.S.S) ^[7]	<i>Parada, Gandhaka, Tankana, Shunti, Maricha, Jayapala</i>	<i>Udararoga, Virechaka</i>	250 mg Cold water
2	<i>Jalodhari rasa</i> (R.S.S) ^[8]	<i>Tamarabasma, Kajjali, Haridra, Pippali, Marica, Jayapala, Tamra, Snuhi ksheera</i>	<i>Virechana, Jalodhara</i>	125mg <i>Jala</i>
3	<i>Jwarahari rasa</i> (R.S.S) ^[9]	<i>Parada, Gandhaka, Naga, Sila, Haratala, Tamra, Visha, Pippali, Shunti, Maricha, Jayapala, Dhatura, Arka, Ardraka, Rohita matsya pitta</i>	<i>Jwara</i>	125mg <i>Jala</i>
4	<i>Jwarakesari rasa</i> (R.S.S)	<i>Jayapala, Visha, Pippali, Marica, Shunti, Triphala, Parada, Gandhaka, Bhrungaraja swarasa</i>	<i>Jwara</i>	125 mg <i>Madhu</i>
5	<i>Jwaramurari rasa</i> (R.R.S)	<i>Visha, Pippali, Marica, Shunti, Nagara, Abhaya, Hingula, Tankana,</i>	<i>Jwara</i>	250 mg <i>Adaraka swarasa</i>

		<i>Jayapala</i>		<i>Madhu</i>
6	<i>Panchanan vati(B.R)</i>	<i>Parada, Gandhaka, Tuttha, Abaraka, Jayapala, Pippali, Aragvadha, Snuhi ksheera</i>	<i>Pandu</i>	250mg <i>Punarnavastaka kwatha</i>
7	<i>Virechana gutika(S. yog)</i>	<i>Trivrit, Trikatu, Jayapala.</i>	<i>Samyak Virechaka</i>	250 mg <i>Ardraka swarasa, Guda</i>
8	<i>Plihasardula rasa (B.R)</i>	<i>Parada, Gandhaka, Pippali, Shunti, Maricha, Tamra, Manasila, Tuttha, Hingu, Loha, Tankana, Tamra, Varata, Jayapala, Jayanti, Rohitaka, Yavaksara, Saidhava, Vida, Citraka,</i>	<i>Gulma, Jwara, Sotha, Vidradhi</i>	250mg <i>Madhu</i>
9	<i>Krimikasthanala rasa (B.R)</i>	<i>Kajjali, Vanga, Haratala, Manahsila, Vidanga, Danti, Jayapala</i>	<i>Krimi Roga</i>	125mg <i>Madhu</i>
10	<i>Sarvanga sundara rasa(R.S.S)</i>	<i>Visha, Pippali, Shunti, Maricha, Triphala, Jayapala, Parada, Gandhaka, Tankana</i>	<i>Jwara</i>	125 to 250 mg <i>Madhu</i>
11	<i>Draksasava (B.R)</i>	<i>Draksa, Kankola, Pippali, Citrakamula, Lavanga, Jayapala, Twak, Ela, Patra, Nagakesara, Candana, Dhataki, Jati</i>	<i>Arsas, Raktaja Vikara</i>	12-24ml <i>jala</i>
12	<i>Dadimavaleha (Y.R)</i>	<i>Dadima, Javanti, Marica, Shunti, Jayapala</i>	<i>Aruci, Amlapitta, Atisara, Netraroga</i>	12gm <i>Ushna jala</i>
13	<i>Yakritplihara lauham (B.R)</i>	<i>Parada, Gandhaka, Abhraka, Tamra, Silajatu</i>	<i>Jwara, Pandu, Sotha, Halimaka,</i>	250mg <i>Jala</i>
14	<i>Chintamani rasa (R.Chi)</i>	<i>Vatsanaba Jayapala</i>	<i>Jwara, Vataroga</i>	125 mg <i>Trikatu churna</i>
15	<i>Yakrtplihari loha(A.F.I)^[10]</i>	<i>Parada, Gandaka, Lauha, Abraka, Tamara, Manasila, Haridra, Jayapala, Tankana, Silajatu, Danti, Nishotha, Shunti, Pippali, Bhrungaraja</i>	<i>Udararoga, Jwara, Pandu</i>	250 mg <i>Jala</i>
16	<i>Pratapa martanda rasa (R.S.S)</i>	<i>Visha, Hingula, Jayapala, Tankana</i>	<i>Jwara</i>	60-125mg <i>Ardraka swarasa Madhu</i>
17	<i>Rechani vati (B.B.R)</i>	<i>Haritaki, Jayapala, Snuhidugdha</i>	<i>Vibhandha</i>	500mg <i>Jala</i>
18	<i>Soolakuthara rasa (S. Yo)</i>	<i>Parada, Gandaka, Triphala, Jayapala Etc</i>	<i>Sarva Shoola</i>	125 mg <i>maricha churna</i>
19	<i>Raja virechana gutika (S. yo)</i>	<i>Triphala, Trikatu, Gandaka, Jayapala</i>	<i>Purgative</i>	250mg <i>Jala</i>
20	<i>Shotari rasa(B.R)</i>	<i>Hingula, Jayapala, Marica, Tankana, Pippali</i>	<i>Sotha</i>	250mg <i>Ghrita</i>

JAYAPALA USED IN EXTERNAL APPLICATION

Sl.no	Formulations	Part used	Bhavana dravya	Indications	Dosage forms
1	<i>Jayapala beeja lepa(R.T)</i>	seed	<i>jala</i>	<i>visha</i>	<i>Lepa</i>
2	<i>Jayapalapatra vati(B.Bh.R)</i>	Leaf	<i>jala</i>	<i>visha</i>	<i>Lepa</i>
3	<i>Naracha rasa(B.R)</i>	seed	-	<i>Virechana</i>	<i>Lepa</i>
4	<i>Naracha rasa(R.Y.S)</i>	seed	<i>Snuhi ksheera</i>	<i>Udavarta, Anaha</i>	<i>Lepa</i>
5	<i>Dantyadi lepa(B.Bh.R)</i>	seed	<i>jala</i>	<i>pitika</i>	<i>Lepa</i>
6	<i>Chintamani rasa –Taila (R.Y.S)</i>	seed	-	<i>Vibandha</i>	<i>Lepa, Nasya</i>
7	<i>Anjanabhairava Rasa(R.Y.S)</i>	seed	<i>Nimbu swarasa</i>	<i>Jwara</i>	<i>Anjana</i>
8	<i>Ardhanarinatechwara rasa(R.Y.S)</i>	seed	-	<i>Jwara</i>	<i>Nasya</i>
9	<i>Ardhanarishwara rasa(R.Sambhava)</i>	seed	<i>Triphala swarasa- 5 times</i>	<i>Jwara</i>	<i>Nasya</i>
10	<i>Bindhu ghrita(Sh.S)</i>	fruit	-	<i>Udara roga</i>	<i>Lepa</i>
11	<i>Bhairava anjana(B.Bh.R)</i>	seed	<i>Nimbu swarasa – 8 day</i>	<i>Jwara</i>	<i>Anjana</i>
12	<i>Ashwakanchuki rasa(R.Y.S)</i>	seed	-	<i>Sarvaroga</i>	<i>Anjana, Lepa</i>
13	<i>Rasadi lepa(B.Bh.R)</i>	seed	<i>kanji</i>	<i>shoola</i>	<i>lepa</i>
14	<i>Sanjeevakarana rasa(R.Y.S)</i>	seed	<i>Vatsanabha kwatha- 3 days</i>	<i>Sannipata</i>	<i>Udharshana</i>
15	<i>Soochimukha rasa (R.Y.S)</i>	seed	<i>Sarpa pita</i>	<i>sannipata</i>	<i>Lepa</i>
16	<i>Taila(R.R.M)</i>	Root	-	<i>Kushta</i>	<i>Abhyanga</i>
17	<i>Trayushanadi vati(R.Y.S)</i>	seed	-	<i>Rasayana</i>	<i>Anjana</i>
18	<i>Vishamrita rasa(R.Y.S)</i>	seed	<i>Narikelodaka</i>	<i>Jwara</i>	<i>Anjana</i>
19	<i>Vishari varti(B.Bh.R)</i>	Endosperm	<i>Nimbu swarasa – 21 times</i>	<i>Visha</i>	<i>Lepa</i>
20	<i>Yonivarti yoga(B.R)</i>	seed	-	<i>yoniroga</i>	<i>varti</i>

Research Articles Related To Croton Tiglium

Anti- helminthic activity- the objective of the study was to test the antihelmintic activity of aqueous and petroleum ether extracts of croton tiglium seeds. The activity was checked in aqueous and petroleum ether extracts at three different concentration (25, 50 and 75 mg / ml) and results were expressed in terms of paralysis time and death time for worms. The results were compared with standard solution, Albendazole (20mg/ml & 40 mg/ml). Both the extract showed significant antihelmintic activity.

Gastro intestinal effect- *Croton tiglium* used as a cathartic in ayurvedic system of indigenous medicine. The extract exhibited a dose dependant cathartic effect in albino rats, the extract also showed an increase to gut movement with an increased contractile movement on rabbit jejunum, partially blocked by atropine these preliminary findings suggest that the ethanol extract of the croton dried nuts elicit a purgastive effect by increasing the gut motility.

Anti-dermatophytic activity- the anti- dermatophytic activities of the extracts were evaluated by disc diffusion and microdilution susceptibility assays against *Trichophyton mentagrophyton floccosum*. The ethanolic extracts of stem or seed of *C. tiglium* exhibit strong anti – dermatophytic activities and, thus, could be considered for application on treating skin fungal infections after appropriate processing.

DISCUSSION

Jayapala Shodhana was done as per the reference of *Rasa Tarangini*. The crotonalic acid present in *Jayapala* is an irritant to the skin, gloves were used while removing seed coat and radicle. Milk is used for the *swedana* to reduce the *tikshna* and *ushna guna* of *Jayapala*. The colour change is noticed in milk may be transfer of chemical constituents from the *Jayapala* seeds. After grinding, the paste of the *Jayapala* seeds was applied to the earthen plate and dried in sunlight to remove the moisture content from seed and to reduce the toxic effect of it. When seeds are subjected to *swedana* with milk, the free crotonolic acid may get bound with fatty acids of milk resulting in therapeutic property rather than poisonous effect and milk may also helps in reducing the *teekshna* and *ushna guna* of *Jayapala* seeds by its *mridu* and *sheetha* properties. *Jayapala* is administered in various forms both internally and externally. Externally *Jayapala* is administered in different forms like *Nasya*, *Anjana*, *Dhumapana*, *Lepa*, *Abhyanga* etc.

CONCLUSION

Shodhana is a *Samskara* adopted to *Visha dravyas* to reduce the toxicity of the drug and bringing about the therapeutic action. The plant contains some poisonous compound, therefore safety measures should be taken before administration to human. *Jayapala* is used both internally and externally in many formulations as per *ayurvedic* classics.

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