

PHARMACEUTICAL STUDY OF JAYAPALA SEED (*CROTON TIGLIUM LINN*)**Pradeep Kumar Jain¹, Govind Prasad Mangal², Rajeev Kushwaha³**¹Lecturer & Head, Department of Rasa Shastra and Bhaishajya Kalpana,²Reader & Head, Department of Agad Tantra and Vyavharayurved,³Lecturer, Department of Dravyaguna,

Bundelkhand Govt. Ayurvedic College & Hospital, Jhansi, Uttar Pradesh, India

ABSTRACT

Jayapala is commonly known as *Jamalgota*. It is described in *Upavisha Varga* in Ayurved. Its botanical name is *Croton tiglium Linn.*. It is used in Ayurveda in various diseases. Its seeds are used in many formulations. The seed oil is purgative. It produces severe symptoms of toxicity when taken internally or applied externally to the skin. Seeds are having poisonous properties so it should be used carefully after proper *shodhana* according to Ayurvedic text. Pharmaceutical study of various steps of *shodhana* process of *Jayapala seeds* are described here along with its introduction.

Key Words : *Jayapala Seed, Shodhana, Godugdha, Svedana, Nimbu Svarasa, Bhawana*

INTRODUCTION

JAYAPALA (Seed) *Jayapala* consists of dried seed of *Croton tiglium Linn.* (Fam. Euphorbia-

ceae); a small ever green tree, 5-7 m high, found throughout tropical India.



(A)

(A) *Jayapala (Croton tiglium Linn.)*(B) Seed before *Shodhana***Synonyms**

Sanskrit: *Mukula, Tintidiphala, Jepala, Rechaka, Saraka, Vibhedani* and *Maladravi*

English: *Croton*

Hindi: *Jamalgota*

Description

a) Macroscopic: Seed albuminous, ovate, oblong, slightly quadrangular, convex on dorsal



(B)

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.

b) Flowering and fruiting time: Summer to winters¹

Identity, Purity and Strength²

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).

Chemical Compositions³ : 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 quarternylic 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.

Properties and Action -

<i>Rasa</i>	:	<i>Madhura</i>
<i>Guna</i>	:	<i>Guru, Snigdha</i>
<i>Virya</i>	:	<i>Sheeta</i>
<i>Vipaka</i>	:	<i>Madhura</i>
<i>Karma</i>	:	<i>Pittahara, Kaphahara, Rechana</i>

Part Used⁴

Seeds, Seeds oil

Important Formulations

Ichhabhedhi Rasa, Ashvakanchuki Rasa, Jalodarari Rasa, Jwarari Rasa, Anjanbharav Rasa, Vrashchik Vishahar Pralepa⁵

Therapeutic Uses: *Udara roga* (Diseases of Abdomen), *Vibandha* (Constipation), *Jvara* (Fever).

Dose: 6-12 mg. of the drug in powder form.⁶
1/8 to 1/4 *Gunja⁷*

Anupana⁸ Cold Water

Groups (Gana) *Guduchyadi (Bhavaprakash)⁹, Triphaladi (R.S.S.)¹⁰*

Adverse Effect of Impure Croton Seed: Croton seed is a strong purgative. If used without appropriate purification, it might cause exces-

sive purging leading to dehydration, cramps, burning sensation and excessive thirst.

Precautions: If there is excessive purgation then cold water should never be used to stop it. On the other hand, warm water will stop motions. Borax is an antidote of croton seed poisoning¹¹.

Importance of Shodhana: Some drugs are required to be used after *shodhana*. The literal meaning of the word “*Shodhana*” is “Purification”. But this is often misinterpreted to mean that the substance is rendered physically and chemically pure. *Shodhana*, no doubt, brings about physical and chemical purity to some extent. But at times, more impurities are added to the substance during certain stages of the processing. By such addition, the drug be-

comes less toxic and therapeutically more effective.

Methods of Purification (Shodhana): So many methods of *Jayapala shodhana* are available in the texts. Four types of purification methods are described into the *Vrihad Rasa Raja Sundara*¹² and three types of methods into the *Rasa Tarangini*¹³ according to them the seeds is treated with *Godugdha* (Cow's Milk) by *Svedana* into *Dola Yantra* for 3 Hours or other *Svedana* method is also described, 1/8 borax powder – mixed into *Jayapala seed* is treated with cow's milk into *Dola Yantra* for 6 Hours or kept with them buffalo's dung for 3 days, then washed with warm water and dried it. Residual oil is removed by pressed through two blotting papers or through

earthen pot or through triturated with lime juice.

General Method of Jayapala Shodhana: According to *Rasa Tarangini* croton seed are Soaked in water for one night, after that its outer coating are removed. From inside the kernel, leaf like cotyledons is to be removed. Then these are to be tied in a piece of cloth in the form of *pottali* for *Svedana* in *Dola Yantra* by adding cow's milk. Thereafter, these kernels are to be removed from the *pottali*, washed with warm water and dried in the sun. To remove the residual oil, these kernels are to be pressed through two blotting papers and stored in a dry and new earthen jar¹⁴.

*Jayapala Seed Shodhana*¹⁵

Process : *Svedana*

Apparatus : Steel container, Cotton Cloth and *Dola Yantra*, Earthen pot, Mortar & Pestle, Knife etc.

Materials

- | | | | |
|----|------------------------------|---|---------------------------------------|
| 1. | <i>Jayapala seed</i> | : | 1 Kg |
| 2. | <i>Godugdha</i> (Cow's Milk) | : | 5 Lit. |
| 3. | Hot water | : | Q.S. for <i>Prakshalana</i> (Washing) |
| 4. | Bloating papers | : | Q.S. for drying |
| 5. | <i>Nimbu Svarasa</i> | : | Q.S. for 3 <i>Bhavana</i> |

Procedure

- Required quantity of *Ashuddha Jayapala* seed is weighed. The testa of *Jayapala* seed is removed.
- A piece of cotton cloth is taken, dried *Ashuddha Jayapala* seed is kept in it and *pottali* is prepared.
- An Iron rod is introduced at the tip of the *pottali* and it was hanged in steel vessel, sufficient amount of *Godugdha* is added to immerse the *pottali* completely.
- The vessel is kept on gas burner.
- *Madhayamagni* is given for 3 Hours and then *pottali* is taken out and washed with hot water.
- Then the embryo (*Jihva*) of the seeds are removed with the help of knife and made paste in mortar and pestle.

- Then the paste of *Jayapala* is kept on earthen pot for reduce the oil. After drying the paste it was kept on bloating paper to minimize the quantity of the oil content.
- Then 3 *Bhawana* of *Nimbu Svarasa* are given.
- Then dried well and stored it.

Observation

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

Results (Quantitative measurements)

- Wt. of *Ashodhita Jayapala* seed : 1 Kg
- Weight of Testa : 58 gm
- Weight of Embryo (*Jihva*) : 3 gm
- Weight of *Shudha Jayapala* seed (dried) after *Svedana*: 747 gm



Fig: Jayapala Seed after Shodhana

Note: Here probability of 192 gm. weight loss is due to the loss of oil content and handling loss.

Table : Showing the results of *Jayapala* seed *Shodhana* after *Bhawana*

S.No.	Weight of <i>Jayapala</i> seed before <i>Bhawana</i> (gm.)	No. of <i>Bhawana</i>	Quantity of <i>Nimbu Svarasa</i> used in <i>Bhawana</i> (ml.)	Weight after <i>Bhawana</i> (In gm)	Weight gain (In gm)	Weight gain (In %)
1.	747	1 st	950	820	73	9.77
2.	820	2 nd	325	845	25	3.05
3.	845	3 rd	225	861	16	1.89

Table: showing the final results of *Jayapala* seed

Total weight of purified <i>Jayapala</i> seed after 3 <i>Bhawana</i>	861 gm
Total Weight Loss	139 gm
% of Weight Loss	13.9 %

Precautions

- Embryo (*Jihva* – poisonous parts) of the *Jayapala* seed must be removed by the help of knife.
- The *pottali* should be hanged just to avoid it to touching the bottom end inside of vessel.

CONCLUSION

In conclusion, we found in this study that *Jayapala* seed has 13.9 % weight loss after proper *Shodhana* and *Bhawana* of *Nimbu Svarasa*. The cause of weight loss is found here due to outer hard cover called as Testa 5.8 %, Embryo (*Jihva*) 0.3 % (tongue shaped thin layer present in between seed) and oil content which present in seeds. The main aim of *Shodhana* of *Jayapala* seed is to reduce the

oil content which has very purgative and harmful effect. Total 1.5 liter of *Nimbu Svarasa* was consumed in three *bhawanas* and *Jayapal* seeds becomes less sticky.

Acknowledgements-

We are thankful to Prof. Laxmi Kant Dwivedi, Professor & H.O.D. (Department of *Rasa Shastra and Bhaishajya Kalpana*) G.J. Patel Institute of Ayurvedic Studies and Research, New V.V. Nagar, Anand (Gujarat) for immense help during the course of the research at National Institute of Ayurveda, Jaipur (Rajasthan) in 2003 -2006.

REFERENCES

1. Dravya Guna Vijnana by Dr. Gyanendra Pandey, Published by Krishnadas Academy, Varanasi, Vol I, Edi. 2nd, 2002, Reprint 2004. Pg.860.
2. Ayurvedic Pharmacopoeia of India, Part I, Volume- 2. Pg.62, Published by Govt. of India, Ministry of Health and Family Welfare.
3. Dravya Guna Vijnana by Dr. Gyanendra Pandey, Published by Krishnadas Academy, Varanasi, Vol I, Edi. 2nd, 2002, Reprint 2004. Pg.860.
4. Dravya Guna Vijnana by Dr. Gyanendra Pandey, Published by Krishnadas Academy, Varanasi, Vol I, Edi. 2nd, 2002, Reprint 2004. Pg.862.
5. Rasa Tarangini of Shri Sadananda Sharma with Prasadini Sanskrit Commentary by Shri Haridatta Shastri and Rasavigyana hindi commentary by Pt. Dharmananda Shastri. Edited by Kashinath Shastri (reprint 1994), Published by Motilal Banarsidas, New Dehli, Tarang 24, Verse 321-339.
6. Ayurvedic Pharmacopoeia of India, Part I, Volume- 2. Pg.62, Published by Govt. of India, Ministry of Health and Family Welfare.
7. Rasa Tarangini of Shri Sadananda Sharma with Prasadini Sanskrit Commentary by Shri Haridatta Shastri and Rasavigyana hindi commentary by Pt. Dharmananda Shastri. Edited by Kashinath Shastri (reprint 1994), Published by Motilal Banarsidas, New Dehli, Tarang 24, Verse 320.
8. Ayurvedic Pharmacy (Bhaishajya Kalpana) by Dr. Anil Kr. Mehta & Dr. Raghu Nandan Sharma, Published by Chaukhambha Sanskrit Pratishtan, New Delhi, Edi Ist, 2005, Pg. 261.
9. Bhavaprakash of Shri Bhava Mishra, 10th Edition, 1995, commentary by Dr. K.C. Chunekar and edited by Dr.G.S. Pandey, Chaukhamba Bharati Academy, Varanasi, Guduchyadi Varg, Pg. 401.
10. Rasendra Sara Samgraha of Shri Gopal Krishna Bhatta. Edited by Shri Narendranath Mitra with Sarlakhya Hindi commentary by Pt. Vidhyadhara. 4th edition 1976. Published by Motilal Banarsidas, New Dehli, Pg. 90, Verse 319.
11. Bhaishajya kalpana Vijnana, Reddy Dr. Ramachandra, Chaukhamba Sanskrit Bhawan, Varanasi, first Edi., 1998, Pg. 537-538.
12. Brihat Rasa Raja Sundara by Pt. Dattaram Choubey, Gyan Sagar Press, Kishan Garh (Raj.), 2nd Edition, 1984, Pg. 225.s
13. Rasa Tarangini of Shri Sadananda Sharma with Prasadini Sanskrit Commentary by Shri Haridatta Shastri and Rasavigyana hindi commentary by Pt. Dharmananda Shastri. Edited by Kashinath Shastri (reprint 1994), Published by Motilal Banarsidas, New Dehli, Tarang 24, Verse 310-317.
14. Ayurvedic Pharmacy (Bhaishajya Kalpana) by Dr. Anil Kr. Mehta & Dr. Raghu Nandan Sharma, Published by Chaukhambha Sanskrit Pratishtan, New Delhi, Edi Ist, 2005, Pg. 261.
15. Ayurvedic Formulary of India, Part I. Edi. 2nd, Pg.364, Published by Govt. of India, Ministry of Health and Family welfare.

CORRESPONDING AUTHOR

Dr. Pradeep Kumar Jain

M.D. (Rasa Shastra and Bhaishajya Kalpana), Lecturer & H.O.D., Bundelkhand Govt. Ayurvedic College and Hospital, Jhansi, Uttar Pradesh, India

E-mail: drpradeepjain.md@gmail.com

Source of support: Nil

Conflict of interest: None Declared