

ROLE OF JAYPALA (*CROTON TIGLIUM* LINN.) IN INDRALUPT (ALOPECIA AREATA) –
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ABSTRACT

Croton tiglium, a plant species belonging to the Euphorbiaceae family, has been traditionally utilized in herbal medicine for various therapeutic purposes. Its potential for treating alopecia areata, a disorder marked by hair loss, has been investigated in recent studies. *Croton tiglium*, which has shown a number of pharmacological qualities, including anti-inflammatory and irritating actions, has many bioactive substances that make *Croton tiglium* famous. In alopecia, particularly androgenetic alopecia and alopecia areata, *Croton tiglium*'s bioactive compounds may stimulate hair follicles, enhance blood circulation to the scalp, and promote the regeneration of hair follicles. Clinical and experimental studies have yielded promising results, showing improvement in hair regrowth following topical applications of *Croton tiglium*'s seed extract or oil alone or with other formulations. However, the use of *Croton tiglium* requires caution due to its irritant nature, which can cause skin inflammation or sensitivity in some individuals. Further clinical trials are necessary to establish the safety, optimal dosage, and long-term efficacy of *Croton tiglium* in the management of alopecia. This review provides an overview of the current understanding of *Croton tiglium*'s potential in alopecia treatment, highlighting the need for controlled studies to evaluate its therapeutic value and adverse effects.

KEYWORDS: Croton, *Indralupta*, Alopecia Areata, *Ayurveda*, Irritant poison, *Jaypala*.

INTRODUCTION

Alopecia Areata (AA) is a common form of non-scarring alopecia involving the scalp and body, characterized by hair loss without any clinical inflammatory signs. AA is an autoimmune condition where the body's immune system mistakenly attacks hair follicles, leading to hair loss, often in patchy, coin-sized areas on the scalp or other parts of the body. It is one of the most common forms of hair loss seen by dermatologists and accounts for 25% of all the alopecia cases.^[1] About 1.7% of the population shall experience an episode of AA during their lifetime.^[2] It accounts for 0.7% of the new dermatology cases in India.^[3] It was first described by Cornelius Celsus, and the term AA was coined by Sauvages in 1760.^[4] The causative factors of AA are Autoimmunity, Genetic predisposition, Environmental Triggers such as stress, illness, infections, medications, lifestyle factors, nutritional deficiencies etc.

In *Ayurveda*, a similar condition is mentioned in *Kshudrarogas*, known as *Indralupta*. *Acharya Sushruta* has mentioned *Indralupta* as *Raktapradoshaja vikara*. *Pitta* associated with *Vata* gets lodged in *Romakupa* and

causes hair fall; later on, *Kaphadosha* associated with *Rakta* causes obstruction to the hair roots and restricts the hair growth. However, *Acharya Vagbhata* mentioned the same *samprapti* as *Sushruta*, but the only difference is that he said *Khalitiya* is the loss of hair, which occurs gradually, and *Indralupta* is the loss of hair, which occurs suddenly. Line of treatment includes *Shodhana* therapy, *Raktamokshana*, and *udgarshana* with *patra*, *churna*, or *lepa* is explained.^[5] *Jaypala lepa* and *Gunja lepa* are practiced in certain parts of India, which are effective yet sometimes may produce untoward incidents like rashes, itching, and loss of consciousness if proper precautionary measures are not taken.

MATERIAL AND METHODS

Agad Tantra is indeed a fascinating branch of *Ayurveda*, focusing on the identification, classification, and management of poisons (*Visha*). Along with it, it also focuses on the study of poisonous plants. It is essential not only for understanding the nature of poisons but also for ensuring the safety and well-being of individuals exposed to them.

In *Ayurveda*, **Visha** is classified mainly into three types:

1. **Sthavara Visha (Animate Poisons):** These are poisons derived from plant or non-living sources. They are categorized into:
 - **Maha Visha:** Highly toxic substances, often fatal or extremely harmful.
 - **Upavisha:** Poisons with a lower toxicity, which may not be lethal but still produce harmful effects. These can be treated with appropriate therapeutic interventions.
2. **Jangama Visha (Animate Poisons):** These are poisons originating from living beings, like snake venom or the venom of certain insects.
3. **Kritrima Visha (Artificial Poisons):** These are man-made poisons, often in the form of chemicals or synthetic substances.

The *Upavishas*, as we pointed out, are poisons with lesser toxicity, but they still cause notable symptoms. Their effects can be reversed with therapeutic interventions. One such *Upavisha* is *Jayapala*, commonly known as *Croton tiglium*, which belongs to the Euphorbiaceae family. It is found in Assam, Bengal, Brahma and all over India. Its tree is small and remains green all the year round. Its branches are hairy and small. Leaves are 5-10 cm long, broad oval, smooth, pointed, serrated and have 3-5 veins. Flowers come in the form of clusters of greenish yellow colour. Fruits are usually 2.5 cm long, oval and triangular. Seeds are almond coloured and are called *Jayapala (Jamalgota)*. Its seeds and seed oil are used in medicine.^[6] It is renowned in *Ayurveda* for its purgative properties. Though toxic in large amounts, *Jayapala* is used therapeutically under controlled conditions to manage certain health issues, particularly to induce purgation or eliminate toxins from the body.

Jayapala (Croton) has a significant place in *Ayurvedic* medicine, especially in cleansing and detoxification therapies. It is often employed in a very precise dosage because of its potential toxicity. The therapeutic use of this plant, like many other toxic substances in *Ayurveda*, highlights the importance of proper knowledge and dosage in preventing harmful effects while achieving the desired medicinal benefits.

The name *Jaypala* is not found in any of the *Vedas*, but we get plenty of references in the name of *Dantibeeja* in the *Brihatrayes* and most of the *Nighantus*. In the first chapter of the *Charaka Samhita Sutra Sthana*, *Jaypala* is mentioned among the drugs where the 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*.^[7] References are also found in the 7th and 8th chapters of *Vimana Sthana*. In the 7th, 13th, 27th, and 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 the 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*.^[6] *Vagbhata acharya* in his *Astanga hrudaya* mentions the drug *Jayapala* in the 15th chapter of the *sutra sthana*, the 15th and 19th chapters of the *chikitsa sthana*, the 2nd chapter of the *kalpa sthana*, and the 30th chapter of the *uttara sthana*.^[7] *Astanga nighnatu* explains the synonyms and qualities of *Jayapala*. *Nighantu Adarsha* mentions it under *Aamlakyadi Varga* and *Dhanwantari Nighantu* under *Guduchyadi Varga*. *Bhavaprakash nighantu* as well as states about *Jamalgota* but it called it as *dravantibeej*.^[7]

Classical Categorization^[7]

<i>Sharangdhara Samhita</i> <i>Rasendra Chudamani</i> <i>Rasasara Sangraha</i> <i>Ayurveda Prakasha</i> <i>Rasa Tarangini</i>	<i>Upavisha</i>
<i>Bhavaprakash Nighantu</i> <i>Dhanwantari Nighantu</i>	<i>Guduchyadi Varga</i>
<i>Kaiyyadeva Nighantu</i>	<i>Aushadi Varga</i>
<i>Raj Nighantu</i>	<i>Pippalyadi Varga</i>

Rasa Panchakas

	<i>Rasa</i>	<i>Guna</i>	<i>Veerya</i>	<i>Vipaka</i>	<i>Doshaghnta</i>	<i>Rogaghnta</i>
<i>Raaj Nighantu</i>	<i>Katu</i>		<i>Ushna</i>		<i>Kapha-vatahara</i>	<i>Krimighna, Agnideepan</i>
<i>Dhanwantri Nighantu</i>	<i>Katu</i>		<i>Ushna</i>		<i>Kapha-vatahara</i>	<i>Krimighna, Agnideepan</i>
<i>Kaiydev Nighantu</i>	<i>Katu</i>	<i>Laghu Vikashi, Tikshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kapha-pittahara</i>	<i>Vishahara, Raktavikaar Sophahara, Daham hanti</i>
<i>Nighantu Adarsh</i>	<i>Katu</i>		<i>Ushna</i>	<i>Katu</i>	<i>Kapha-vatahara</i>	<i>Krimighna, Jalodar</i>
<i>Ashtang Sangrah Nighantu</i>						<i>Anaha, Uadaramhanti, Sanyasa, Sirogada, Dhanustambha, Jwarahara,</i>
<i>Bhavaprakash Nighantu</i>	<i>Katu</i>		<i>Ushna</i>		<i>Kapha-vatahara</i>	<i>Virechan, Krimighna, Jalodarnashak</i>

Scientific Classification

Kingdom: Plantae
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Malpighians
Family: Euphorbiaceae
Subfamily: Crotonoideae
Tribe: Crotonaeae
Genus: Croton

Medicinal Parts—Seeds, leaves, roots, the outer bark of croton roots, and seed oil (also known as Crotonis oleum) are all considered medicinal parts.

Phytochemistry (Chemical Composition)—Currently, approximately 150 constituents have been successfully isolated and identified from this plant, including terpenoids, fatty oils, and alkaloids, as well as the plant's proteins and other types of components. *Jamalgota* (Croton tiglium) kernels contain approximately 50 to 60% croton oil. Croton seed oil contains about 17 fatty acids, accounting for 77.33% of the total oil. Some of the main components of oil are Crotonolic acid, Tiglic acid, Linoleic acid, Oleic acid, Eicosenoic acid, etc. Crotonol is also the component that does not have purgative properties but has irritant properties in it.

Crotonoside is a guanosine analog and a potent tyrosine kinase inhibitor with immunosuppressive effects, originally isolated from *Croton tiglium*.

Therapeutic Indications

Persistent and obstinate constipation

Hair Loss

Therapeutic dose— Seeds- 30-60 mg, Oil- ½-1 drop with butter

Toxic dose— Seed- >4 , Oil- >20 drops

Shodhana^[7, 8]

Shodhana is performed to decrease the toxicity of the seeds. As stated in *Rasa Tarangini*, the seeds are taken and sliced in half along the ridge. Then the seeds are boiled in cow's milk for 1 *yama* (3 hours) and dried under sunlight by keeping the seeds in an earthen plate. Earthen plate absorbs the oil from the seeds, thereby lowering its toxicity. As per *Astanga Sangraha*, *swedana* with *gomaya swarasa* and *gosheera* followed by a gentle fry diminishes the oil's toxicity. *Kriyakoumudi* has elaborately described many *shodhana* 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 dry it, boil in *ghrta* for some time, then remove the oil content and do *bhavana* for 3 days in *jambeera swarasa*.

Hair growth promotion study of Croton oil on mice^[9]

A study by Prakash Itankar et al on mice found that Formulation 3 (Croton oil + Coconut oil) promoted hair growth faster than Formulations 1 (Coconut oil) and 2 (Coconut oil + Olive oil). Formulation 3 and minoxidil showed better hair growth potential. In a testosterone-induced alopecia model, all three formulations showed significant hair growth promotion activity. Formulation 3 had the most potent activity, comparable to Minoxidil. Histopathological data showed more follicles in the tissue treated with Formulation 3. All three formulations have potential hair growth activity.

Management of Indralupta with Jaypalbeeja lepa^[10]

A case study by Nikita Damodar Bhoje et al found that the application of *Jaypala beeja* resulted in hair regrowth in a 37-year-old female patient with patchy hair loss. The treatment involved local application of *Jaypalbeeja lepa* once a week for 4 weeks, followed by *narikel tel* treatment if adverse effects occurred. The drug caused mild redness, itching, and blister formation over the bald patch of *Indralupta*, but these side effects subsided with *narikel tel* application. The application of *Jaypalbeeja lepa* with *Nidaanparivarjan* was found helpful in managing the disease and promoting hair regeneration.

Management of Indralupta by Icchabhedira lepa^[11]

A case study by Sunita M P found that a 36-year-old male with reported symptoms like hair fall and thinning in the right parietal region since a month. Treatment included *Ichchabhedi rasa lepa* with *Jambira rasa*, *Jyothismati taila*, and *Arogyavardhini vati*. *Ichchabhedi rasa lepa* with *Jambira rasa* to the afflicted parts once in 3 days for 2 sittings and patient was advised to come back after 15 days. *Jyotismati taila* is for head application for 15 days. After 15 days, hair growth was visible, and hair fall reduced. After 15 days, *Arogyavardhini vati* was prescribed twice a day for a month. Phorbol esters present in *Jayapala* have a skin irritant effect, and it regulates cell growth and cell differentiation, thus favoring the regrowth of hair.^[12] *Jambira swarasa* is a known antidote for *Jayapala*^[13]; it is used for *lepana* to prevent possible complications.

Jaypala Beeja churna and Jalaukavacharan in Indralupta^[14]

A case study by Dr. Komal Santosh Chavan found that a 3-and-a-half-year-old male patient developed thinning hairs in two patches over his scalp. He underwent treatment with *Jalouka* for *Jaloukavacharna*, *Shamana aushadhi*, *Ampachak vati*, *Mahamanjasthadi Kashaya*, *Arogyavardhani vati*, and *Pratisaran chikitsa*- *Jayapala beeja churna lepa*. After five months, the patch was completely covered with hairs, and the patient stopped internal medicines. *Ayurvedic* management with *Mahamanjasthadi kwath*, *Arogyavardhani vati*, *Ampachak vati*, and *Amalki* tablet was found effective in managing the case.

DISCUSSION

Jaypala is a plant mentioned in Ayurvedic texts, and its seeds are known for their purgative and medicinal properties. In *Ayurveda*, *Jaypala* is used in various formulations for its therapeutic effects, especially in conditions related to digestive health. However, the plant is considered to be potentially toxic due to its poisonous properties, and its use requires great caution. *Jayapala beeja* are classified as *visha dravyas*, which means that improper execution of *purva karma*, such as *snehapana*, may lead to toxic symptoms. *Indralupta*, as described by *Acharya Sushruta*, is a condition characterized by the imbalance of *Vata* and *Pitta*, which affects the hair roots, leading to sudden hair loss. Concurrently, the disturbed *Rakta* and *Kapha* in the affected area obstruct the pores, hindering new hair growth and regeneration. The overconsumption of *lavana*, *katu*, *kshara*, and *viruddha ahara*, as well as *pitta-varadhaka* and *abhishyandhi ahara*, are contributing factors that exacerbate *indralupta*. Various treatment modalities for *Indralupta*, such as *Pracchanna*^[15], *Jaloukavacharana*^[16], *Lepana*^[17], and *Shodhana*, are detailed in *Ayurveda*. *Jaypala* is a potent irritant and vesicant poison, leading to localized irritation. Its ability to enhance intracellular activities may be linked to the stimulation necessary for the resumption of the normal hair growth cycle, ultimately promoting hair growth. *Jaypalbeeja lepa* possesses properties that are *katu*, *tikta* and *bhedaniya*, which facilitate the removal of *kapha* and *pitta* obstructions from the hair follicles, thereby promoting the growth of new hair.

CONCLUSION

Application of *Jaypalbeeja Lepa* with *Nidaanparivarjan* like avoiding excessive intake of *kshara*(pickles, spices) and *lavan* (salted chips & paapads)^[18] and to stop *Diwaswapna* and *Ratrijagran* were found helpful in the management of *Indralupta*. On use of *Jaypalbeeja lepa*, regeneration of hair was observed to a significant level with non-serious, mild and minimal side effects. *Lepa karma* is also very effective in the management of *Indralupta* along with *Pittashamaka Chikitsa*. *Ichhabhedi rasa* with *Jambira Rasa* can also be ideal and safe. *Jaypal Beej* is a valuable herb in the management of *Indralupta*, offering various therapeutic benefits that can support hair health. However, while there may be evidence supporting the use of *Jaypal Beej* for hair health, more clinical studies are required to establish direct efficacy in treating alopecia areata.

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