



## Research Article

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### PHARMACEUTICAL STUDY OF ERANDA TAILA EXTRACTED FROM ERANDA BEEJA WITH AND WITHOUT SHODHANA

Jayashree Ranjani <sup>1\*</sup>, Reshma M Saokar <sup>2</sup>, Sujatha K <sup>3</sup>

<sup>1</sup> UG Scholar, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

<sup>2</sup> Associate Professor, Department of Rasashastra and Bhaishajya Kalpana, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

<sup>3</sup> Professor and HOD, Department of Rasashastra and Bhaishajya Kalpana, Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Bengaluru, Karnataka, India

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#### \*Corresponding author

E-mail: jrranjani2003@gmail.com

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#### ABSTRACT

Eranda Taila (castor oil) is a widely used drug in Ayurveda. The classical texts Yogaratnakara and Rasatarangini have mentioned the shodhana process (purificatory procedure) of Eranda beeja (*Ricinus communis* Linn. seeds). Shodhana aims to nullify or reduce toxins and improve the therapeutic efficacy and potency of a drug. The shodhana of Eranda beeja (castor seeds) was performed as per the classics, using the method of swedana, which involves heating a pottali (cloth pouch) containing decorticated Eranda beeja immersed in narikelodaka (fresh tender coconut water) for 3 hours. Eranda Taila was extracted from shodhita (purified) and ashodhita (unpurified) Eranda beeja using the traditional method of castor oil extraction. The obtained shodhita Eranda Taila was light brown, had the characteristic odour of coconut and castor, was less nauseating, and was yielded in higher quantity than ashodhita Eranda Taila. The ashodhita Eranda Taila was creamish yellow and exhibited the characteristic odour of castor.

**Keywords:** Eranda beeja, Shodhana, Swedana, Shodhita Eranda Taila, Ashodhita Eranda Taila.

#### INTRODUCTION

Rasashastra and Bhaishajya Kalpana are inseparable branches of Ayurveda, focusing on the pharmaceutical science of preparing Ayurvedic medicines from various herbal, animal, metallic and mineral drugs. Although many drugs can be directly used in preparing various formulations, some, while being therapeutically valuable, contain toxic constituents. Ayurveda has known the methods of processing these drugs containing toxins for centuries, rendering them completely devoid of toxins or reducing them to the level where they do not cause any harm to the body. This process, known as shodhana (purification), is also employed to enhance the therapeutic efficacy of the drug. Eranda (*Ricinus communis* Linn.) is a widely used Ayurveda drug. Its leaf, root, and seed oil (castor oil) are commonly used in treatments, both externally and internally. According to Charaka Samhita, Eranda Taila (castor oil) is considered the best Taila (oil) for virechana (purgation).<sup>1</sup> Castor oil is also widely used in folk medicine, primarily as a purgative. According to contemporary science, castor seeds contain toxic components that are highly poisonous to humans and animals. The principal toxic substance is the albumin, ricin. A powerful allergen or a group of allergens more difficult to inactivate than ricin and a feebly toxic alkaloid ricinine are also present.<sup>2</sup> Research has found that cold-pressed castor oil has measurable toxin levels, estimated at  $35 \pm 13 \mu\text{g/l}$ .<sup>3</sup> The text Yogaratnakara mentions the shodhana (purification) procedure to be carried out on Eranda beeja (castor seeds), according to which swedana (boiling in a particular liquid) of the Eranda beeja using narikelodaka (tender coconut water) for 3 hours leads to its shuddhi (purification).<sup>4</sup> A similar shodhana method is also explained in the text Rasatarangini.<sup>5</sup> A study demonstrated that shodhana, a traditional purification process,

significantly increased the LD<sub>50</sub> value of Eranda beeja, indicating a notable reduction in their toxicity.<sup>6</sup> The present study was conducted to perform the shodhana procedure on Eranda beeja in accordance with classical Ayurvedic texts. Subsequently, Eranda Taila was extracted from shodhita (purified) and ashodhita (unpurified) Eranda beeja, and a comparative study was done.

#### MATERIALS AND METHODS

**Collection of drugs:** Eranda beeja was purchased from an established raw drug supplier and was authenticated by the experts from the Dravyaguna Department in SDM Institute of Ayurveda and Hospital, Bengaluru, India (Reference: SDMIAH/DG 24/03/DRY SAMPLE). It was then cleaned by handpicking and was decorticated manually. Coconut water was procured from tender coconut purchased from the local market of Bengaluru, India.

#### Methods

- Shodhana of Eranda beeja was performed according to the classical texts Yogaratnakara and Rasatarangini.<sup>4,5</sup>
- Extraction of Taila from Eranda beeja was done according to the traditional method of extracting castor oil.<sup>7</sup>

**Pharmaceutical processing:** The pharmaceutical processing was done in the Teaching Pharmacy of SDM Institute of Ayurveda and Hospital, Bengaluru, India.

#### Shodhana of Eranda beeja

**Equipment:** Steel vessel, stick, clean cloth, thread, gas stove, weighing machine, measuring jar.

**Procedure:** 1 kg of dehulled Eranda beeja was placed on a clean cloth and formed into a pottali (cloth pouch) by gathering and tying the edges of the cloth using a thread. The other end of the thread was tied to the centre of a stick. A steel vessel was filled with 10 litres of narikelodaka (fresh tender coconut water). The stick with the pottali was placed over the vessel, ensuring the pottali was fully immersed in the coconut water without touching the bottom or sides of the vessel. This setup, known as a dolayantra, was placed on a gas stove and heated over a low flame for 3 hours. Fresh coconut water was added intermittently to maintain the pottali's immersion, totalling an additional 3 litres. After 3 hours of heating, the flame was turned off, and shodhita Eranda beeja was removed from the pottali and spread on a tray.

**Observations**

- As boiling started, the thick whitish foam was collected on the surface of narikelodaka.
- A typical odour of coconut water was observed.
- An hour later, the coconut water had turned yellowish. Oil droplets were seen over the surface of narikelodaka.
- Before shodhana, Eranda beeja was whitish. After shodhana, Eranda beeja was a cream colour, relatively soft, and exhibited the typical odour of castor and coconut.
- It weighed 1236 g.

**Precautions**

- An adequately sized vessel was taken.
- It was ensured that the pottali wasn't touching the bottom and sides of the vessel.
- The tender coconut was opened on-site, and only the fresh coconut water was utilized.
- The pottali was immersed entirely in narikelodaka throughout the process.
- As the liquid level reduced upon heating, fresh narikelodaka was added.
- After 3 hours of swedana, the beeja was removed from the pottali and was cooled and dried in the shade.

- Clean equipment was used.

**Extraction of Taila**

**Equipment:** Mixer, grinder, steel vessel, gas stove, ladle, kadai, sieve, clean cloth, measuring jar.

**Procedure for Shodhita Eranda Taila:** Shodhita Eranda beeja was made into a paste using a mixer. 11 litres of water was taken in a steel vessel and was heated. The paste was added to the hot water and mixed thoroughly. The mixture was heated continuously until it thickened into a paste-like consistency. This paste was transferred to a kadai. Once the oil separated from the paste, the flame was turned off. The paste was then placed in a clean cloth and was squeezed to obtain the oil. The filtered oil was measured using a measuring jar.

**Procedure for Ashodhita Eranda Taila**

1 kg of dehulled Eranda beeja was taken. It was ground into a paste using a grinding machine. 11 litres of water was taken in a steel vessel and was heated. The paste was added to the hot water and mixed thoroughly. Once the oil began collecting on the surface, it was skimmed off along with the supernatant liquid and transferred to a smaller vessel. It was heated until the moisture content was reduced, and the oil visibly separated from the paste. The oil was filtered using a sieve. The filtered oil was reheated to evaporate the remaining moisture. The obtained ashodhita Eranda Taila was measured.

**Precautions**

- An adequately sized vessel was taken.
- The paste of Eranda beeja was added to the water when it was sufficiently hot and was mixed thoroughly to avoid lumps.
- Stirring was continuously done to prevent charring.
- The paste was squeezed well in hot condition to prevent excess loss of oil.
- Clean equipment was used.

**OBSERVATIONS AND RESULTS**

**Table 1: Observations during the process of Taila extraction**

Particulars	Shodhita Eranda Taila	Ashodhita Eranda Taila
Colour of water on adding Eranda beeja paste	Cream colour	Whitish colour
Odour observed during the entire process	Characteristic smell of coconut and castor	Characteristic smell of castor
Separation of oil	Oil separated after 11 hours of boiling	The oil started separating after 5 hours of boiling
Condition of Eranda beeja paste during oil separation	It turned into a thick brownish paste	Remained as a mixture of water
Colour of the oil obtained	Light brown	Creamish yellow
Quantity of the oil obtained	170 ml	120 ml

**Table 2: Change in Eranda beeja weight after Shodhana**

Procedure	Initial weight (g)	Final weight (g)	Gain in weight (g)
Shodhana of Eranda beeja	1000	1236	236

**Table 3: Quantities of Taila obtained**

Procedure	Quantity of Eranda beeja taken (g)	Quantity of Taila obtained (ml)
Shodhita Eranda Taila	1236	170ml
Ashodhita Eranda Taila	1000	120ml

**Table 4: Organoleptic examination**

Particulars	Shodhita Eranda Taila	Ashodhita Eranda Taila
Colour	Light brown	Creamish yellow
Odour	Mild coconut and castor odour, Less nauseating and sweetish odour	Strong characteristic castor odour, Nauseating odour
Taste	Mild astringent taste	Bland taste
Touch	Less greasy	More greasy
Consistency	Less viscous	More viscous



Figure 1: Decorticated Eranda beeja



Figure 2: Tender coconut water



Figure 3: Eranda beeja Pottali tied to stick



Figure 4: Narikelodaka turned yellowish



Figure 5: White foam collected during Shodhana



Figure 6: Shodhita Eranda beeja

Figure 1-6: The process of Eranda beeja Shodhana



Figure 7: Paste of Shodhita Eranda beeja



Figure 8: The paste added to hot water



Figure 9: Thick paste consistency attained



Figure 10: Oil started separating from the paste



Figure 11: Squeezing the paste to obtain the oil



Figure 12: Shodhita Eranda Taila

Figure 7-12: The extraction of Shodhita Eranda Taila



Figure 13: Grinding Ashodhita Eranda beeja



Figure 14: Paste of Ashodhita Eranda beeja



Figure 15: Mixture of the paste and water



Figure 16: Skimming the oil



Figure 17: Oil completely separated after reheating



Figure 18: Ashodhita Eranda Taila

Figure 13-18: The extraction of Ashodhita Eranda Taila

## DISCUSSION

The traditional Ayurvedic texts recommend shodhana of the Eranda beeja (castor seeds) through a process called swedana, using narikelodaka (tender coconut water). This ensures the Taila extracted is pure, free from toxic effects and more effective for medicinal purposes.

The commentator of Rasatarangini emphasizes the use of decorticated Eranda beeja for the shodhana procedure. Modern science also acknowledges the presence of toxic components in castor seeds. Ricin, sourced from the seeds of the castor oil plant (*Ricinus communis* Linn.), is a naturally existing toxin recognized for its potential as a chemical weapon. Its mechanism involves binding to cell surface carbohydrates, followed by internalization, ultimately leading to cell death by inhibiting protein synthesis.<sup>8</sup> This potent toxin primarily resides within the seed coat of castor seeds. Ricinine, an alkaloid that is comparatively less toxic, is also present in the seed coat of castor seeds. Consequently, this study employs decorticated seeds, wherein removing the seed coat serves to minimize the presence of ricin and other toxins and associated hazards.

Decorticated seeds yield a clear colourless oil, while in the case of oil from whole seeds, the pigment in the hulls passes into the oil, making the product darker. Despite the disadvantages, the preference for crushing undecorticated seeds by the oil crushing industry is reported to be due to factors such as the additional machinery and processing costs for decortication, the working difficulties presented by the decorticated seed meal in the machinery due to its high oil content, and the absence of adequate premium for cake from decorticated kernels though it has a better manurial value due to its higher mineral content.<sup>9</sup>

During the shodhana process, the formation of thick whitish foam was observed. This phenomenon may be attributed to the process

of saponification due to the alkalinizing property of tender coconut water, which is derived from its rich mineral and electrolyte content, including potassium, magnesium, calcium, and sodium. Saponification refers to transforming fat, oil, or lipid into soap through the reaction with an aqueous alkali.<sup>10</sup>

After the shodhana process, the weight of shodhita Eranda beeja was increased. This may be due to the absorption of components from the tender coconut water into the castor seeds.

Both shodhita and ashodhita Eranda beeja were ground into a paste before oil extraction, as it increases the surface area available for the extraction process. By breaking down the seeds into smaller particles, the oil-containing cells within the seeds are ruptured, allowing for easier access to the oil. This process might have enhanced the efficiency of oil extraction and improved the yield of oil obtained from the seeds.

Ashodhita Eranda Taila was extracted similarly to the traditional method of extracting castor oil, where the oil separated and collected on the upper surface of the water. In contrast, shodhita Eranda Taila did not follow this extraction method. Instead, the water had to evaporate completely before the oil separated. This needs to wait for complete water evaporation before the oil separation can be attributed to its reduced viscosity. This reduction in viscosity likely caused the oil to remain mixed with the water longer, indicating that shodhita Eranda Taila might be more easily absorbed and assimilated in the body than ashodhita Eranda Taila. This enhanced absorption potential supports the therapeutic advantages of the shodhana process.

The quantity of ashodhita Eranda Taila obtained was less than that of shodhita Eranda Taila. This could be attributed to the effect of swedana on Eranda beeja, leading to its softening. As a result, the softened oil-containing cells may have facilitated improved oil extraction. Although the actual extraction of oil was done using

water, the pre-treatment with coconut water may have enhanced the solubilization of certain oil components that might not be as efficiently extracted otherwise. The components in coconut water might have facilitated better breakdown and release of these oil components during the subsequent boiling and extraction steps, contributing to the higher yield of shodhita Eranda Taila.

The colour of shodhita Eranda Taila was slightly brownish as it was heated for a more extended time, during which the paste had also turned brownish, whereas the colour of ashodhita Eranda Taila was creamish yellow.

In a study comparing castor oil to sennosides, castor oil tended to cause abdominal cramping, nausea, vomiting, bloating, and dizziness. Evaluation of the taste of the two alternatives showed that most of the patients disliked castor oil and did not like to have this preparation again.<sup>11</sup> Compared to ashodhita Eranda Taila, shodhita Eranda Taila exhibited a diminished nauseating odour. This characteristic will likely aid in individuals' internal consumption of Eranda Taila.

According to Charaka Samhita, Eranda Taila is described as ushna (hot potency) and alleviates Vata and Kapha doshas. However, when processed with kashaya (astringent), madhura (sweet), and tikta rasa (bitter taste) dravyas, it also becomes Pitta shamaka (Pitta alleviating).<sup>1</sup> Hence, the swedana of Eranda beeja with narikelodaka, which is predominant in madhura rasa (sweet taste), might make the Eranda beeja attain Pitta shamaka properties, too.

## CONCLUSION

In this pharmaceutical study, shodhana of Eranda beeja was performed as per the classics, followed by the extraction of Taila from both shodhita and ashodhita Eranda beeja. Shodhana aims to nullify or reduce toxins and enhance the therapeutic efficacy of a drug. Shodhita Eranda Taila obtained comparatively higher amounts and exhibited a less nauseating odour. Further analytical, experimental and clinical studies can be conducted to evaluate the chemical composition and comparative therapeutic effects of shodhita and ashodhita Eranda Taila.

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