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Research Article

An Analytical Evaluation of *Bhallataka Phala* (*Semecarpus Anacardium* Linn) Before and After *Shodhana* – A Comparative Study

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ABSTRACT

Bhallataka (*Semecarpus anacardium* Linn.) has long been used for both therapeutic and non-therapeutic purposes. Anacardic acid, which contains uruseiol, a poisonous substance that causes blisters upon contact, is contained in the tarry oil found in the fruit's pericarp. The only method to connect visha with medicine is through the detoxifying process known as "shodhana," which allows hazardous drugs to be utilized medicinally. According to Acharya Charaka; if Bhallataka is used properly, it is beneficial as amrit and medha-agnivardhak. Different shodhana methods are mentioned in Ayurvedic classics for the Bhallataka, but shodhana process mentioned in Rasamrita was adopted. The procedure is rubbing of Bhallataka fruits with brick powder. Then swedana is done with cow milk with the help of dolayantra for one prahar. After completion the process again washed with the warm water and dried. Bhallataka is an irritant organic poison and comes under the upavisha. It has many therapeutic applications in Indian system of medicine. Misuse of Bhallataka produces burning, edema and itching. Even the blisters are produced. After shodhana processes the many physico chemical, phytochemical parameters changes are seen in analytical study. The present article is studied to compare the impact of Ashodhita Bhallataka with Shodhita Bhallataka.

INTRODUCTION

The plant Bhallataka, also known as marking nut, dhobi nut, bhilava, bilba, and bhela, is a member of the Anacardiaceae family (*Semecarpus anacardium* Linn.) [1]. During the Vedic era, the plant Bhallataka is mentioned. The Panini Suta has

the earliest allusions to Bhallataka [2]. In Indian medicine, it has numerous therapeutic uses. Ayurvedic scriptures and text books state that Bhallataka has typical properties and is used in various diseases that are described in Ayurveda medicine.

However, there are differing opinions regarding the properties of this nut and how to prepare it for use in indigenous medicine. Because a blister caused by Bhallataka causes tissue damage that results in a toxic consequence, it differs from other types of wounds [3]. Bhallataka is employed in "Annapaana raksha adhyaaya" as an antidote for drug poisoning [4]. Because of its Swabhava, the word Visha is self-explanatory [5]. Acharyas advise exercising caution when utilizing harmful substances in medical formulations. The adverse effects of dangerous medications that were once taken without incident may have inspired the following generation to come up with a better way to increase the drug's effectiveness. For the poisonous medication to be more effective, dravya Shodhana is therefore required. Thus, specific purifying techniques called as Shodhana processes are explained to Acharyas [6]. Samskara mentions a variety of drug manufacturing techniques [7]. It appears that the Acharyas learned how to effectively use these toxic medications to cure a variety of illnesses, including Bhallataka Rasayana, thanks to this Samskara [8]. As a result, the Samskara is converting hazardous medications into less toxic and therapeutically effective medications known as Shodhana Samskara [9]. Ayurveda places a strong emphasis on choosing safe, effective medications for medical purposes. The selection standards for each type of herbal medicine vary [10]. According to reports, Bhallataka fruits that sink in water ought to be chosen for medicinal purposes [11]. It is recommended that Bhallataka fruit Shodhana be performed prior to internal administration. The sole link bridging visha and medicine is the shodhana process.

MATERIAL AND METHODS

Collection & Identification of Drug

Matured fruits of Bhallataka were collected in month of June 2019 from the trees growing in Chhattisgarh, India. The fruits were identified from the experts of Rasashastra & Bhaishajya kalpana and Dravyaguna department of Government Ayurved College, Raipur (C.G.).

Authentication of Drug

The fruits of Bhallataka were authenticated by Dr. Sunita Garg in the Raw Material Herbarium & Museum, Delhi (RHMD), National Institute of Science Communication and Information Resources (CSIR-NISCAIR) Dr. K.S. Krishna Marg, New Delhi, vide Ref. No.: NISCAIR/RHMD/Consult/2019/3563-64-4.

Materials Required For Shodhana

Ishtika churna (Brick powder), Godugdha (Cow milk), Angardhanika, Cutter, Jute bag, Water, Measuring cylinder, Stainless steel vessels, Weighing machine, Gloves, Mask, Cloth.

Chemical Used For Analytical Study

Distilled water, Ethanol, Hydrochloric acid, Chloroform, Methanol, Petroleum ether, Ethyl acetate, Formic acid, Anisaldehyde sulphuric acid reagent (ASR).

Shodhana of Bhallataka

Shodhana was done under the guidance of Rasashastra & Bhaishajya Kalpana Department of Government Ayurved College, Raipur (C.G.).

Procedure

- I. At first mature fruits of Bhallataka were taken. After doing grahya-agrahya pariksha, usable grahya bhallataka were dried properly in the sunlight (Table 1) [12].
- II. Then thalamus part of Bhallataka was removed and chopped into two pieces with the help of cutter.
- III. It was then kept with dry brick powder (ishtika churna) for 7 days and mixed 2-3 times in a week, so that strong pungent oil of Bhallataka is adsorbed properly by brick powder.
- IV. After completion of this process on 8th day the Bhallataka fruit was taken out and washed in warm water and again kept in sunlight for drying.
- V. Next day pottali was made of Bhallataka for swedan in dolayantra with cow milk till one prahar (3 hours).
- VI. Afterwards, it was again washed, dried properly and stored [13]. (Figure 1)

Fig. 1. Detail procedure of fruits of Bhallataka.



Table 1: Bhallataka Shodhana.

Amount of Ashodhita Bhallataka	Ishtika churna (Brick powder)	Godugdha (Cow milk)	Water	Obtained Shodhita Bhallataka	Total loss
1000 gm	Quantity: 5 Kg Duration: 7 days	Quantity: 4 liter Duration: 1 prahar	As per the requirement	840 gm	16%

Precaution

- All equipments were cleaned and dried before carrying out the procedure.
- Only mature fruits which sink in water were selected.

- Extreme precautions were taken while handling the Ashodhita Bhallataka fruits.
- Goghrit or Coconut oil was applied over hands, face and exposed parts of body before the procedure [14,15].

- During the procedure, the body parts were kept covered using gloves, mask, scarf and apron as much as possible.
- At the end of the treatment, the fruits were gently removed and rinsed with hot water [16].

Observation During Shodhana

Before The Process of Bhallataka Shodhana

After 1000 gm of Bhallataka fruits were chopped, the surface of the chopped pieces revealed an oily discharge. Bhallataka was blackish in color, had a firm texture, and had a slight odor. Brick powder had a vivid red hue and was created by crushing bricks into a coarse powder.

During The Process of Bhallataka Shodhana

The Bhallataka fruits were found to be secreting more oil when they were rubbed with an ishtika churna at a moderate pressure. Both the bag and the gloves had oil stuck to them. Ishtika churna absorbed oil from Bhallataka fruits, causing a small shift in color to a reddish-black hue. Ishtika Churna turned brownish-black as well. The texture of Bhallataka fruits softened. Next, with the assistance of a dolayantra, one prahar is swedan in cow's milk. While this process, the cow milk color is changed and its quantity decreases. Even though the treatment was done with caution, the person performing it nevertheless suffered little blisters. So, the person doing this has coconut oil applied to the exposed body regions.

After The Process of Bhallataka Shodhana

Following the Shodhana procedure, it is removed from the potli, cleaned with warm water, and dried well. It was discovered that bhallataka had an oily smell, a velvety texture, and a blackish tint. After the Shodhana process, 860 grams of fresh Bhallataka were obtained out of 1000 grams. As a result, 140 grams were lost throughout the Shodhana procedure.

Siddhi Lakshana [17]

- I. The brick powder fully adsorbs oil from Bhallataka fruits and turns into grayish black color.
- II. Pungent smell comes from cow milk during swedan.
- III. Bhallataka fruits became softer in texture.
- IV. Bhallataka turns into blackish in color.

RESULTS

Observation of Organoleptic Evaluation

Comparison between Ashodhita and Shodhita Bhallataka. Similarity in color and odor, Texture was different (Table 2).

Table 2: Showing the Results of Organoleptic Evaluation.

Parameters observed	Before Shodhana	After Shodhana
Color	Black	Black
Odor	Faint	Faint
Texture	Hard	Soft

Observation of Physico-Chemical Evaluation

Comparison between Ashodhita and Shodhita bhallataka

The data comparison indicates that there is a slight variation between Ashodhita and Shodhita Bhallataka in terms of characteristics such as total ash, acid insoluble ash and water soluble extract, and alcohol soluble extract. In comparison to Shodhita Bhallataka, Ashodhita Bhallataka has higher moisture contents (4.50), water soluble extract (7.06), alcohol soluble extract extractive (29.54), and fixed oil content (30.24). In both samples, there is no foreign stuff (Table 3).

Table 3: Showing the results of physical analysis of Ashodhita & Shodhita Bhallataka.

Parameters	Ashodhita	Shodhita
Foreign matter (%)	Nil	Nil
Loss on drying (%)	4.50	3.35
Total ash (%)	3.16	4.56
Acid insoluble ash (%)	0.16	2.03
Water soluble extract (%)	7.06	4.00
Alcohol soluble extract (%)	29.04	19.36
Fixed oil content (%)	30.24	19.8

Phytochemical Screening

Following a phytochemical examination of the alcoholic extracts of Bhallataka (*Semecarpus anacardium* Linn.), the findings were reported in Table 4.

Table 4: Showing the Components Present in alcoholic extracts of Ashodhita Bhallataka & Shodhita Bhallataka.

Test Name	Bhallataka	S. Bhallataka
Alkaloids	-	-
Dragendroff's Test	-	-
Mayer's Test	-	-
Glycosides		
Killer Killani	-	-
Carbohydrate		
Molish Test	+	+
Proteins		
Millons Test	-	-
Ninhydrine test	-	-
Sugar		
Benedict Test	+	+
Fehling Test	+	+
Phenols		
Ferric Chloride Test	+	+
Lead acetate Test	+	+
Triterpenoids		
Salkowaski Test	+	+
Tannins		
Ferric Chloride Test	+	+
Saponins		
Foam Test	+	-

Observation of Components Present In Alcoholic Extracts of Ashodhita and Shodhita Bhallataka

Both the Ashodhita Bhallataka and Shodhita Bhallataka gave the same positive result in alcoholic extract test like Carbohydrate, sugar, phenols, triterpenoids, tannins, and alkaloids, glycosides, proteins, test gave the same negative result of both Bhallataka. Saponins, are positive in Ashodhita Bhallataka but negative in shodhita Bhallataka.

Thin Layer Chromatography

Sample - Methanolic Extract of *Bhallataka*.

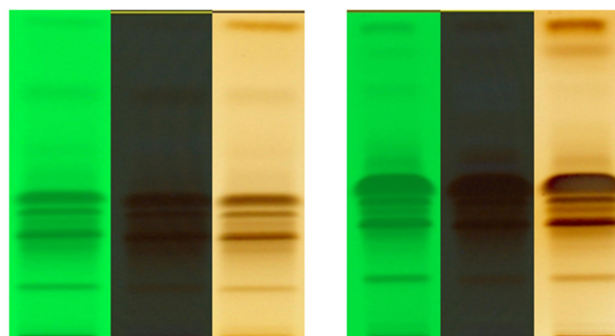
Mobile phase- Chloroform: Methanol (9.8:0.2) v/v

Stationary phase- Merck Pre Coated Silica Gel ₆₀F G₂₅₄

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Derivatizing Agent - 5% Methanol Sulphuric acid Solution.

Fig. 2. TLC photographs of Ashodhit and Shodhit Bhallataka



TLC Plate of Ashodhit Bhallataka **TLC Plate of Shodhit Bhallataka**

Observation of TLC

- I. Comparison between Ashodhita and Shodhita Bhallataka
Under the both sample gave different Rf values (Table 5)
- II. Ashodhita Bhallataka - Under the Ashodhita Bhallataka total 3 Rf values present are 0.32, 0.43, 0.46 and 0.96.
- III. Shodhita Bhallataka - Under the Shodhita Bhallataka total 5 Rf values present are 0.30 and 0.2, 0.36, 0.48, 0.87, 0.95.

Table 5: Showing Rf value of *Ashodhita Bhallataka* and *Shodhita Bhallataka*

	<i>Ashodhita</i>	<i>Shodhita</i>
	0.32	0.2
Rf value	0.43	0.36
	0.96	0.48
		0.87
		0.95

DISCUSSION

Bhallataka is recommended by Ayurveda following Shodhana. Even though Ayurveda mentions other Shodhana ways of Bhallataka, the method found in Rasamrita was chosen. Certain challenges arose during the Shodhana process, despite the extreme safeguards that were taken. On both arms of the person executing the Shodhana process, blisters began to emerge. The extraction of brick powder from

Bhallataka following the process of crushing it in a pottali presented another challenge. It therefore needed to be repeatedly cleaned in hot water and dried with delicate paper. Shodhana's effects were assessed using chromatographic, physico-chemical, and pharmaceutical metrics. When compared to raw Bhallataka fruits, the methanolic extract of processed Bhallataka fruits exhibits different Rf values, which amply demonstrates the chemical alterations that occur during Shodhana. Compared to raw fruits, shodhita (processed) fruits had a lower amount of fixed oil content. It is widely known that the primary chemical components in Bhallataka that cause blisters are bhilawanols and anacardic acids. Anacardic acids are closely connected to bhilawanol, also referred to as urushiol. Anacardic acid is changed into less harmful anacardol as a result of the oil's decarboxylation. The decarboxylation process can begin as soon as the fruit is cut, and it is accelerated by applying heat or fire. It's likely that soaking the fruits in cow's milk will eliminate an even higher proportion of oil. Ishtika churna absorbs irritating oil from fruit due to its adsorbent properties. Therefore, it's likely that certain chemical changes have occurred as a result of the purifying process using cow milk and brick powder.

CONCLUSION

It is clear that shodhana combined with ishtika churna and cow milk has decreased the amount of tarry oil in the Bhallataka fruit's pericarp, thereby lessening the fruit's toxicity. The Shodhana procedure involves chemical alterations, as indicated by differences in the values of organoleptic evaluation, phytochemical screening, TLC, and Rf values between the Ashodhita and Shodhita Bhallataka samples. The information showed that the Rasamrita-mentioned Bhallataka Shodhana technique does, in fact, lessen irritating oil.

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