

Standard Manufacturing Procedure of Hingu Shodhana and Its Preliminary Analytical Profile

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Date of Submission: 20-01-2025

Date of Acceptance: 30-01-2025

ABSTRACT

Introduction: Shodhana, a critical Ayurvedic pharmaceutical process, is utilized to purify substances of plant, animal, metal, and mineral origins by eliminating toxic properties and modifying physical, chemical, and biological characteristics. This study focuses on the Shodhana of Hingu (Resin of *Ferula foetida* Regel.). It possesses Tikshna (Sharpness) and Ushna (Hotness) properties which causes Utkleda (Nausea). To eliminate these, ancient seers advised to do Shodhana of Hingu before using in any formulation. Till date no work was found on standard procedure of Hingu Shodhana. So, attempt has been made to develop a Standard Manufacturing Procedure (S.M.P.) for Hingu Shodhana and to establish a preliminary analytical profile of Shuddha Hingu. **Materials and methods:** Sample of Hingu was collected from local market of Vadodara and Shodhana was carried out as per the reference of Rasatarangini. Organoleptic characters and preliminary physico-chemical parameters were done before and after Shodhana of Hingu. **Observations and results:** After Hingu Shodhana, 0.89% average gain was observed. Alterations in organoleptic characters like color, odor, taste texture and appearance; physicochemical parameters like pH, loss on drying (w/w%), total ash (w/w%), acid insoluble ash (w/w%), water soluble extractive (w/w%), and alcohol soluble extractive (w/w%) from Ashuddha to Shuddha Hingu are seen. **Conclusion:** The study concludes that the developed SMP is easy, reproducible and can be taken as standard for future reference.

KEYWORDS: SMP, Shuddha Hingu, Shodhana, preliminary physico-chemical analysis

I. INTRODUCTION

Shodhana is an important intermediary pharmaceutical process used for the purification of

plant, animal, metal, and mineral origins. It is a process in which the toxic or unwanted properties of a drug are removed and additional properties or alteration in the properties are seen along with changes in physical, chemical, or biological properties.

Hinguis an oleo-resin gum of the plant *ferula foetida* Regel. of umbelliferae family. It is collected after making incisions at the upper part of the tap of more than five-year-old plants by scraping in March and April just before flowering. It is an extensively used herbal drug in different formulations like Hingawashtaka Churna, Shivaksharapachana Churna, Shoolaharana Yoga, Amapachaka Vati etc. It is used to treat a wide range of diseases, including Udararoga (abdominal disease), Gulma (abdominal lump), Shoola (colicky discomfort), Agnimandhya (digestive impairment), Krimiroga (helminthiasis), and Hridaroga (heart disease).

Hinguhastikshna (sharpness) and Ushna (hotness) Guna which may cause Utkleda (Nausea). Acharya Sharadhar has mentioned to use Bharjita Hingu to avoid Utkleda. Classics also advised to use Bharjita Hingu for the preparation of Rasayoga. Thus, it is advised by seers that Hingu should be used in formulations only after the Shodhana process like Bharjana (Frying).

Till date no work was found on standard procedure for Hingu Shodhana. So, attempt has been made to develop a Standard Manufacturing Procedure (S.M.P.) for Hingu Shodhana by Bharjana principle and to establish a preliminary analytical profile of Shuddha Hingu.

II. MATERIALS AND METHODS

Procurement of Hingu

Both Hingu and Goghrita were procured from the local market of Vadodara as per FSSAI standards in August, 2023.

Preparation of HinguShodhana

HinguShodhana was carried out by reference of Rasatarangini. Three batches of HinguShodhana were prepared in the Pharmaceutical Laboratory of Upgraded

Department of Rasashastra and Bhaishajya Kalpana, Vadodara, Gujarat. Before dealing with main pharmaceutical process, pilot batches were carried out. Equipment used for HinguShodhana are mentioned in Table no.1.

Table no. 1: Equipment with specification of HinguShodhana

Sr. no.	Equipment	Specifications
1.	Electric weighing balance	Swisser (An ISO 9001:2008) Cls-3 Maximum capacity: 100 kg, Minimum capacity: 10 g
2.	Gas stove	Prestige Gas cook tops, Model no.: Gas Top GTM-01 Ignition mode- Electro Burner size supply by Gas
3.	Infrared thermometer	Fluke 64 max Maximum: 600° C, Minimum: -30° C
4.	Kitchen pincer	Length-32 cm, width-7 cm
5.	S.S. vessel	Diameter -30 cm, Depth - 7 cm
6.	S.S. spoon	Length-17 cm, width-4 cm
7.	S.S. plate	Diameter -28 cm, Depth-2 cm
8.	S.S. mortar and pestle	Mortar: depth-7.5 cm, diameter-16 cm, height-9 cm Pestle: length-18 cm, width-4 cm

Procedure

A shuddhaHingu was taken in above mentioned quantity and small pieces were made by pounding in stainless steel mortar and pestle. Goghritawas taken in s. s. vessel and heated. Pieces of Hingu were added in s. s. vessel and Bharjana

was done. When Hingu became crispy and dark brown color it was removed carefully. Put and spread it on butter paper. After drying, ShuddhaHingu was collected and stored in air tight container. [Figure no.1]

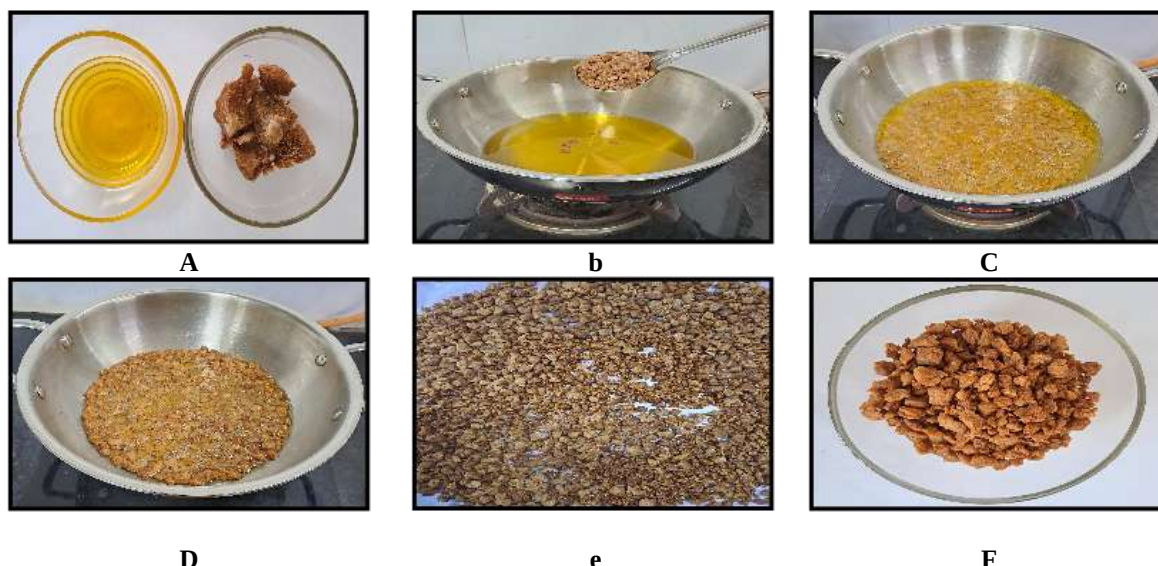


Figure 1: HinguShodhana: (a)Ingredients for HinguShodhana (b)Adding pieces of Hingu in melted Goghrita (c)Bharjana process (d)Brown coloured Hingu floated over Goghrita (e)Drying of Hingu (f)Shuddha Hingu

Preparation of sample for analysis:

Ashuddha Hingu and Shuddha Hingu were powdered with the mechanical grinder and passed

through sieve #60. Collected powder was stored in air tight plastic bag.

Analytical parameters:

AshuddhaHingu and ShuddhaHingu were analysed by using different organoleptic parameters i.e., colour, odour, taste, texture and appearance; physico-chemical parameters i.e., pH, loss on drying, total ash, acid insoluble ash, water soluble extractive, and alcohol soluble extractive. Organoleptic and preliminary physico-chemical analysis were conducted at Quality Testing Laboratory, Upgraded Department of Rasasashtra and Bhaishya Kalpana, Government Ayurved College, Vadodara, Gujarat.

III. OBSERVATION AND RESULTS

The characteristic smell of Goghrita and Hingu were perceived throughout the Shodhana. After heating it for 7 min. bubbles started to appear with the characteristic smell of Goghrita and Hingu. Further after heating for 21 min., Hingu turned crispy (140.9 °C) and dark brown in color. After removing, Hingu from vessel it was placed on butter paper till extra Goghrita got absorbed. After complete drying, collected Hingu was dark brown in color and easily breakable while pressing. The results of Hingu Shodhana are given in Table no.2.

Table no.2: Results of Hingu Shodhana

Batch no.	Weight of AshuddhaHingu (g)	Goghrita (g)	Total duration (days)	Weight of Shuddha Hingu (g)	Weight gain (g)	Weight gain (%)	Average gain
1	300 g	300 g	8	304	4	1.33	302.87 g0.89%
2	300 g	300 g	8	301	1	0.33	
3	300 g	300 g	8	303	3	1	

AshuddhaHingu and all three samples of ShuddhaHingu were subjected to assessment of

organoleptic characters and the observations were tabulated in Table no.3.

Table no.3: Observations of organoleptic parameter of Ashuddha and Shuddha Hingu

Sample		Color	Odor	Taste	Texture	Appearance
AshuddhaHingu		Brown	Strong, characteristic	Astringent	Hard	Lump
Shuddha Hingu	B1	Dark brown	Characteristic smell of Goghrita & Hingu	Astringent	Brittle	Small pieces
	B2	Dark brown	Characteristic smell of Goghrita & Hingu	Astringent	Brittle	Small pieces
	B3	Dark brown	Characteristic smell of Goghrita & Hingu	Astringent	Brittle	Small pieces

AshuddhaHingu and all three samples of ShuddhaHingu were subjected to assessment of

preliminary physico chemical parameters and the results were tabulated in Table no.4.

Table no.4: Results of preliminary physico-chemical parameters

Sample	Ashuddha Hingu	Shuddha Hingu			
		B-1	B-2	B-3	Average
pH	7.88	5.34	5.38	5.39	5.37
Loss on drying (w/w%)	6.27	3.19	3.17	3.16	3.17
Total ash (w/w%)	1.33	1.09	1.19	1.14	1.14
Acid insoluble ash (w/w%)	0.34	0.29	0.24	0.24	0.26
Water soluble extractive (w/w%)	52.65	31.39	30.54	31.74	31.22
Alcohol soluble extractive (w/w%)	56.24	8.61	8.68	7.87	8.38

IV. DISCUSSION

Shodhanais an important intermediary pharmaceutical process used for the purification of metals, minerals, plants, and animal origin. For HinguShodhana, different principles and media are advocated in Ayurvedic texts. Bharjana, Bhavana, and Agnisanyoga principles are mentioned by using media like Ghrita and PadmapatraRasa. HinguShodhan by Bharjan in Ghrita is a mostly advised method by seers. In the current attempt, HinguShodhana is done by the Bharjana method in three batches to develop the Standard Manufacturing Procedure (S.M.P.) with its analytical profile.

AshuddhaHingu possesses Tikshna and UshnaGuna which causes Utkleda. During Bharjana in Ghrita, these Tikshna and Ushna Guna may be reduced by Sheeta Guna of Ghrita and eradicate the Utklesha. In the modern perspective, it contains 10% to 17% volatile oils i.e., ferulic acid, polysulphides, and disulphide which cause bloating abdomen. These volatile oilsevaporate after Shodhana which leads to decrease the Utklesha. Thus, it is advised by seers that Hingu should be used in formulations only after the Shodhana process.

In the present study, Shodhana of Hingu has been carried out as per the reference of Rasatarangini. Before starting the main batch, two pilot batches were carried out to determine the size of Hingupieces should take for Shodhana and to decide the duration required for the whole procedure. In both pilot batches, 20 g of AshuddhaHinguand 20 g Goghrita were taken. In the first pilot batch, powdered Hingu was taken and Bharjana was done till it turned crispy. It was taken out and put on butter paper and spread to absorb the extra Goghrita in Hingu. Itwas observed that Goghrita absorbed by powdered Hingu and it didn't get dry even after 23 days. So, the second pilot batch was carried out by taking small pieces of Hingu instead of powder, and Shodhan procedure was done in Goghrita. It got dry after 3 days. Thus, it was decided to adopt 2nd pilot batch for the main batch.

Total 3 main batches were carried out to develop SMP. In that, 300 g AshuddhaHingu and 300 g Goghrita were taken for Shodhana in each batch. Hingu contains sulphur and during heating, it may release various sulphur-containing compounds. During Bharjana in Goghrita, the triglycerides in the fat break down into free fatty acids and other compounds. This breakdown may produce a characteristic smell of Goghrita. After

Shodhana, Hinguturns into dark brown color which was due to Bharjana process. All the observations were found same in all three batches. The average yield of HinguShodhana is 302.87 gm (0.89% gain). This gain may be due to the absorption of Goghrita by Hingu.

Organoleptic and physicochemical parameters of AshuddhaHingu were done and they found compliance with the API standards. pH of Hingu was slightly decreased after Shodhana which may be due to the heating provided in Shodhana procedure vaporizing it's volatile contains like ferulic acid and umbelliferone. Also, Goghrita used here as a Shodhana media has5.9pH. This may also play a role in the decrease of pH.Due to evaporation of moisture content and volatile oil during Shodhana decreases the loss on drying value of ShuddhaHingu. Ash value was found more in AshuddhaHingu sample than in the ShudhdhaHingu samples. It may be due to some inorganic substances were removed during Shodhana procedure. The value of acid insoluble ash indicates the purity of the sample. Acid insoluble ash was found less in ShudhdhaHingu samples than in AshuddhaHingu sample. Hingucontain ferulic acid and umbelliferone, which are partially water and alcohol soluble. During Shodhana with Goghrita, these alkaloids are decreases., this may lead to a decrease in the value of water-soluble and alcohol soluble extractive after Shodhana.

V. CONCLUSION

In this study, HinguShodhana was conducted by the reference of Rasatarangini where Bharjan in Goghrita was done. The adopted method for HinguShodhana can be considered as easy and convenient. It is observed that Shodhana alters the organoleptic and physicochemical parameters of Hingu. Further advanced analysis like phytochemical, HPTLC, FTIRetc. might shed more light on this.

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