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PHARMACEUTICO-ANALYTICAL STUDY OF KODASHARI GUTIKA

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ABSTRACT

Kodashari Gutika, a classical Ayurvedic Herbo-mineral formulation mentioned in *Sahasrayogam* containing ingredients such as *Shuddha Hingula*, *Shuddha Vatsanabha*, and *Pippali*, has been indicated in various types of *Jwara* namely *Taruna Jwara*, *Taapa Jwara*, and *Sannipataja Jwara*. Most of the signs and symptoms of *Sannipataja Jwara* closely resemble those of Typhoid Fever. The research aims to evaluate the pharmaceutical and analytical aspects of this formulation, considering its potential application in Typhoid fever. **Aims and Objectives:** this study aims to evaluate the pharmaceutical, analytical properties of *Kodashari Gutika*. **Methodology:** The present study has been carried out in two stages namely, pharmaceutical, analytical. In the pharmaceutical study, *Shodhana* of ingredients of *Kodashari Gutika* was carried out as per the classical textbooks. The preparation of *Kodashari Gutika* was carried out according to the reference of *Sahasrayogam*. In the analytical study, the sample of *Kodashari Gutika* was subjected to a series of analytical tests to establish quality parameters. **Results:** The pharmaceutical study at various steps of *Shodhana* and *Vati Nirmana* complied with the standard operating procedures mentioned in the classics and provided descriptive data for the methods adopted. The analytical study provided standardization data for the formulation, including its physicochemical properties. **Discussion:** *Kodashari Gutika* a herbo mineral Formulation, tracing its reference from *Sahasrayogam* is indicated in various types of fever. Different stages of typhoid fever are

corelated to *Taruna Jwara*, *Tapa Jwara* and the complicated stage to *Sannipataja Jwara*. It is studied for its antibacterial effect against *Salmonella typhi*. However, this study only highlights on the pharmaceutical and analytical aspects of the formulation.

KEYWORDS: *Kodashari Gutika,* pharmaceutical study, analytical parameters, standardisation.

INTRODUCTION

Ayurveda, the ancient system of medicine, offers a holistic framework for health management and disease treatment based on the balance of *Dosha*, *Dhatu*, *Mala,* and *Agni*. Among its various specialised branches, *Rasashastra* emphasises the preparation and therapeutic application of *Rasaushadhis*-herbo-mineral formulations renowned for their potency, minimal dosage requirements, and rapid action. These formulations are prepared using meticulous pharmaceutical processes, including *Shodhana* and *Bhavana*, ensuring safety, efficacy and enhanced therapeutic value.

Kodashari Gutika, a classical formulation described in *Sahasrayogam*, is a herbo-mineral preparation indicated for the conditions such as *Tapa Jwara, Taruna Jwara*, and *Sannipataja Jwara*.[1] The key ingredients of this formulation are: *Shuddha Hingula, Shuddha Vatsanabha*, and *Pippali.* These ingredients undergo rigorous pharmaceutical processing to enhance their bioavailability and therapeutic efficacy. The pharmaceutical preparation of *Kodashari Gutika,* including the sequential steps of *Shodhana, Bhavana* and *Guti Nirmana* plays a pivotal role in its standardisation and clinical applicability.

Furthermore, the analytical evaluation of this formulation, encompassing both classical and modern techniques, is essential for establishing its physicochemical properties. This step ensures quality control, and helps in validating its therapeutic potential.

The present research study aims to explore the pharmaceutical processes involved in the preparation of *Kodashari Gutika* and its analytical evaluation through advanced techniques. By bridging traditional Ayurvedic knowledge with contemporary analytical methodologies, the research seeks to contribute to the standardisation and scientific validation of this formulation.

AIMS AND OBJECTIVES

To evaluate the pharmaceutical process including *Shodhana, Bhavana,* and *Guti Nirmana,* and conduct a detailed analytical study of *Kodashari Gutika.*

MATERIALS AND METHODS

PHARMACEUTICAL STUDY

The evolution of pharmaceutical practices from traditional to modern times has brought both improvements and challenges in drug formulation. In *Rasashastra* procedures like *Shodhana, Marana* and *Bhavana,* etc were carefully followed to ensure the effectiveness and safety of medicines.

The present study aimed to develop a standard operative procedure for the preparation of *Kodashari Gutika* and to validate the *Shodhana* process of *Hingula* and *Vatsanabha.*

MATERIALS

- Pharmaceutical source: The raw drugs which were required for the preparation were collected from SDM Ayurveda Pharmacy, Udupi.
- *Kodashari Gutika* was prepared in the practical hall of the department of *Rasashastra* & *Bhaishajya Kalpana*, SDM college of Ayurveda, Hospital and Research centre, Udupi.

Table 1: Ingredients of *Kodashari Gutika.*

Drug name	Botanical/Chemical Name	Family	Part used	Ratio
Shuddha Hingula	Cinnabar			2 parts
Shuddha Vatsanabha	*Aconitum ferox*	Ranunculaceae	Root	1 part
Pippali	*Piper longum*	Piperaceae	Fruit	1 part
Jambira	*Citrus medica*	Rutaceae	Fruit juice	Q. S

The entire process of the preparation includes the following.

1. *Shodhana* of *Hingula*
2. *Shodhana* of *Vatsanabha*
3. Preparation of *Pippali Churna*
4. Extraction of *Jambira Swarasa*
5. Preparation of *Kodashari Gutika*

Practical No: 01: *Hingula Shodhana*[2]

Materials: Raw *Hingula* – 250 grams, Ardraka *Swarasa* – 190 ml

Procedure: The Raw drugs were assessed for *Grahya Lakshana* as per classical texts. 250g of *Ashuddha Hingula* was finely powdered using a *Khalva Yantra*. Fresh *Ardraka Swarasa* was prepared by crushing and squeezing cleaned *Ardraka*. The powdered *Hingula* underwent seven rounds of *Bhavana* with freshly extracted *Ardraka Swarasa* each time. After achieving *Subhavita Lakshana*, the mixture was sun-dried and triturated to obtain *Shuddha Hingula* in fine powder form, which was stored in an airtight container for further use.

Practical No: 02: *Vatsanabha Shodhana*[3]

Materials: *Ashuddha Vatsanabha*: 500 g, *Gomutra*: 4.5 L, Warm water: 1L

Procedure: *Ashuddha Vatsanabha* was cut into *Chanaka*-size pieces and soaked in freshly collected *Gomutra* in a stainless-steel vessel, kept under sunlight. The *Gomutra* was replaced daily for three days. On the fourth day, the external skin was removed, and the pieces were washed with hot water and sun-dried. The dried *Vatsanabha* was powdered into *Sukshma Churna* and stored in an airtight container.

Practical No: 03: Preparation of *Pippali Churna*

Materials: *Pippali*: 150 grams

Procedure: Well-dried 150 grams of *Pippali Phala* was pounded in a *Khalva Yantra* and further ground using a mixer grinder. The powder was sifted through the *Vastra Galana* method to obtain fine powder, which was then stored for future use.

Practical No: 04: Extraction of *Jambira Swarasa*

Materials: *Jambira*, Measuring flask, kora cloth

Procedure: Well-grown *Jambira Phala* was taken from the local market in Udupi. The fruits were cut into half and squeezed manually to obtain the *Swarasa*. The *Swarasa* was filtered once using cloth and kept in a measuring flask.

Practical No: 05: *Kodashari Gutika Nirmana*

Procedure: 100g of *Shuddha Hingula* was triturated in *Khalva Yantra* to a fine powder, then mixed with 50g of *Shuddha Vatsanabha churna* and 50g of *Pippali Churna* until a homogenous mixture was obtained. *Jambira Swarasa* was added, and the mixture underwent seven rounds of *Bhavana*, assessed for *Subhavitha Lakshana*. The prepared mass was rolled into pills, sun dried and stored in an airtight container.

Observation: the bright orange colour of *Hingula* faded with the addition of *Vatsanabha Churna* and *Pippali Churna*. The initial *Bhavana* required more *Swarasa*, with reduced quantities needed for subsequent rounds. The drug mass took longer to dry, and the aroma of *Ardraka* and *Gomutra* was prominently noted. Each *Bhavana* took approximately three hours.

ANALYTICAL STUDY

Standardisation of Ayurvedic formulations is essential for ensuring quality and purity of prepared medicines, manufacturing processes as well as raw ingredients. Analytical study involves the systemic examination of a process to identify or quantify a substance, determine the components of a solution or mixture or establish the chemical structures of compounds.

The basic analytical study of *Kodashari Gutika* and the instrumental test HPTLC was carried out at S.D.M Centre for Research in Ayurveda & Allied sciences, Udupi.

The sample of *Kodashari Gutika* was subjected to various analytical tests.

- **Organoleptic characters:** the analysis included parameters such as Colour, Taste, Smell, and consistency.
- **Physicochemical analysis**: include pH Analysis, Loss on drying, Ash values (Total Ash, Acid insoluble ash, Water soluble ash), and Soluble Extractive Values (Water soluble extractive, Alcohol soluble extractive).
- **Chromatography**: HPTLC

RESULTS

Table no. 2: Observations of *Hingula Shodhana.*

Parameters	**Before *Shodhana***	**After *Shodhana***
Colour	Bright red	Bright orange
Touch	Hard	Soft
Smell	Not specific	*Ardraka* smell
Weight variations	250 grams	240 grams

Results of Pharmaceutical study of *Hingula Shodhana*

- Time taken: 8 days
- *Ashuddha Hingula* taken: 250 grams
- *Shuddha Hingula* obtainded: 240 grams
- Weight loss: 10 grams

- Weight loss in percentage: 4%

Table no. 3: Observation of *Vatsanabha Shodhana.*

Parameters	**Before *Shodhana***	**After *Shodhana***
Colour	Light brown colour	Blackish brown
Touch	Hard	Rough
Smell	Specific	Smell of *Gomutra*
Weight variation	250 grams	200 grams

Result of Pharmaceutical study of *Vatsanabha Shodhana*

- Time taken: 5 days
- *Ashuddha Vatsanabha* taken: 250 grams
- *Shuddha Vatsanabha* obtainded: 200 grams
- Weight loss: 50 grams
- Weight loss in percentage: 20%

Table no. 4: Observations of preparation of *Pippali Churna.*

Parameters	**Before powdering**	**After powdering**
Colour	Black	Greyish
Touch	Hard	Soft
Smell	Smell of *Pippali*	Smell of *Pippali*
Weight variation	150 grams	100 grams

RESULT

- *Pippali* taken – 150 grams
- *Pippali Churna* obtained- 100 grams
- Weight loss- 50 grams
- Weight loss percentage – 33.33%

Table No. 5: Observations of preparation of *Kodashari Gutika.*

Parameters	**Before *Bhavana***	**After *Bhavana***
Colour	Orange	Brick red
Touch	Smooth	Hard
Smell	*Gomutra* and *Ardraka* smell	Mild *Nimbu* smell along with strong *Ardraka* and *Gomutra* odour
Weight variation	200 grams	220 grams

RESULTS

- Quantity of ingredients taken: 200 grams
- Quantity of the ingredients obtained: 220 grams

- Weight gain: 20
- Weight gain in percentage: 10%
- **Results of organoleptic evaluation**

Table No. 6: Organoleptic characteristics of *Kodashari Gutika.*

Organoleptic characteristics	***Kodashari Gutika***
Colour	Brick red
Taste	*Amla Kashaya*
Smell	Strong *Ardraka* and *Gomutra* odour
Consistency	Hard

- **Results of Physico-chemical analysis**

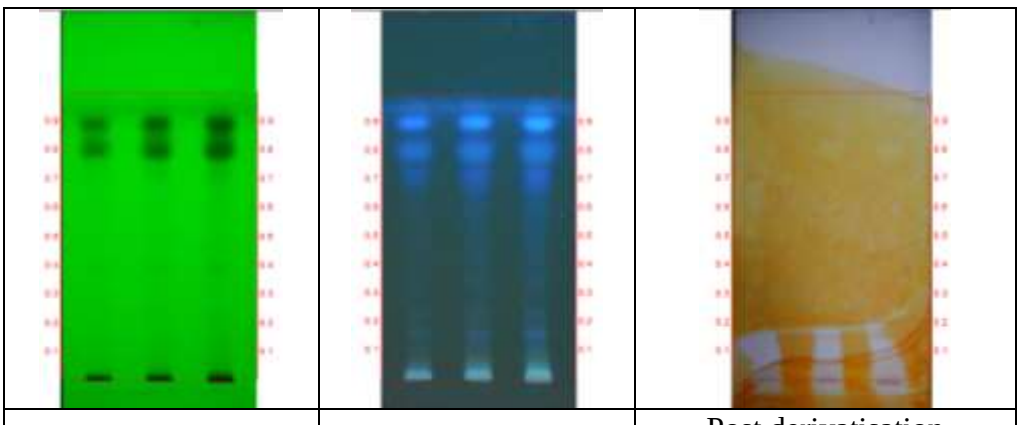
Table No. 7: Results of standardization parameters of *Kodashari Gutika.*

Parameter	**Results n=3%w/w (Avg ± SD)**
	Kodashari gutika
Loss on Drying At 105^0C	7.75±1.27
Total Ash	4.91±1.45
Acid Insoluble Ash	0.00±0.00
Water soluble Ash	2.96±0.01
Alcohol soluble extractive value	7.77±0.02
Water soluble extractive value	26.79±0.00
pH	3.15

- **Results of HPTLC**

Table No. 8: R_f values of sample of *Kodashari Gutika.*

Short UV	**Long UV**	**Post derivatization**
-	0.16 (F. blue)	-
0.39 (Green)	0.35 (F. blue)	-
-	0.68 (F. blue)	-
0.72 (D. green)	-	-
0.80 (D. green)	0.80 (F. blue)	-
0.90 (D. green)	0.90 (F. blue)	-



Short UV	Long UV	Post derivatisation (Dragendroff's reagent)

HPTLC photo documentation of ethanolic extract of *Kodashari gutika*

Track 1- Kodashari gutika– 5µl

Track 2- Kodashari gutika– 5µl

Track 3- Kodashari gutika– 5µl

Solvent system – Toluene: Ethyl acetate: Diethyl amine (7:2:1)

Aconitine Rf 0.62, At 288nm

Pictures of ingredients of *Kodashari Gutika*	
	
Fig: 1 Hingula	**Fig: 2 Vatsanabha**
	
Fig: 3 Pippali	**Fig: 4 Jambira**

***Hingula* shodhana**	
	

Vatsanabha shodhana	
	
	

Preparation of *Kodashari Gutika*

Shuddha Hingula

Shuddha Vatsanabha

Pippali Churna

DISCUSSION

Discussion on pharmaceutical study

Hingula* Shodhana:** *Ashuddha Hingula* can cause conditions such as *Andhyatwa Chittavibhrama, Klama, Moha, and Prameha.** Thus, purifying *Hingula* is crucial before its use in any formulation. Although various purification methods are outlined by different Acharyas, in this study bhavana with *Ardraka Swarasa* was adopted as described in the *Rasa Tarangini*. The *Bhāvana* process using *Ardraka Swarasa* reveals notable differences in the

physical properties between the raw and purified samples. During the process of *Shodhana* by *Bhāvana* method, several changes were observed in *Hingula* such as, the lustre of *Hingula* was diminished, there was a reduction in the hardness, a noticeable color change occurred and the brightness of the *Hingula* decreased. These changes may be attributed to the acidic content in *Ardraka Swarasa*, which contains acids such as tartaric acid, oxalic acid, and citric acid. these acids might have reacted with *Hingula*, leading to a loss of luster and shine.

Vatsanabha Shodhana*: Gomutra* was used for detoxifying *Vatsanabha* by *Nimajjana* method. The colour change in *Gomutra* indicated removal of toxins by diffusion method. The process converts toxic alkaloids into safer compound. *Gomutra's* properties like *Katu, Ushna, Tikshna,* and bio-enhancing effects further enhance the safety and therapeutic efficacy of *Vatsanabha*.

Preparation of *Kodashari Gutika*: The preparation of *Kodashari Gutika* involved combining *Shuddha Hingula, Shuddha Vatsanabha, and Pippali Churna*. These ingredients were then processed through *Bhavana* with *Jambira* Swarasa. The choice of *Jambira* Swarasa as the medium for *Bhavana* not only helps in particle size reduction but also enhances the bioavailability of the active compounds and also adds its own therapeutic properties.

After *Bhavana* considerable weight gain was seen in the final product indicating the addition of liquid medium enhanced the bulk of the formulation.

Discussion on analytical study: In the current study, the *Kodashari Gutika* sample underwent comprehensive analytical testing to evaluate its quality. Since the analytical standards for *Kodashari Gutika* are not detailed in standard reference texts such as the API or AFI, the results obtained from this study can be considered standard for its analytical parameters. The organoleptic analysis revealed that the formulation, in pill form, has a firm texture, brick-red color, and distinct ginger and *Gomutra* odour, with a salty and astringent aftertaste. In powdered form, it exhibited a softer consistency. These characteristics highlight the influence of ingredients and the Bhavana process, where mediums like *Ardraka Swarasa* and *Gomutra* impart distinct sensory attributes, ensuring the uniqueness of the formulation.

The physico-chemical parameters provide insights into the stability and composition of Kodashari Gutika. The loss on drying at 105°C was 7.75%, indicating a moderate moisture content essential for maintaining stability while preventing microbial growth. The total ash

value of 4.91% reflects the high mineral content typical of herbo-mineral formulations, while the absence of acid-insoluble ash (0.00%) confirms the lack of siliceous impurities, indicating a pure and high-quality product. The water-soluble ash value of 2.96% suggests the presence of soluble inorganic components, while the alcohol-soluble extractive value of 7.77% and water-soluble extractive value of 26.79% highlight the solubility of key bioactive compounds, ensuring their bioavailability and therapeutic efficacy. The acidic pH of 3.15 suggests potential antimicrobial properties and stability in an acidic environment. High-performance thin-layer Chromatography (HPTLC) analysis further confirmed the chemical complexity and diversity of the formulation. bioactive compound. These findings suggest that *Kodashari Gutika* contains diverse phytoconstituents, some of which may contribute significantly to its therapeutic effects.

CONCLUSION

The pharmaceutical and analytical study of *Kodashari Gutika* highlights its Safety, efficacy, and quality. The pharmaceutical study demonstrated the effectiveness of traditional purification and preparation techniques which include *Shodhana,* and *Bhavana* by successful reduction in toxicity and imparting therapeutic properties. The analytical study highlights the stability, purity and bioavailability of the formulation and helps in standardisation of *Kodashari Gutika.*

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