

Pharmaceutico Analytical Study of Kshudha-varadhaka Leha in Agnimandya

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ABSTRACT

Introduction: Consuming meals at erratic times disrupts the biological rhythms associated with digestion. High-stress levels and sedentary habits can dampen digestive fire. Due to this *mandagni*, *ahara-pachana kriya* gets affected, leading to the production of *sama-ahararasa*, which ultimately causes the *rasa-dhatvagnimandya*, and the *uttarottar dhatu* remains malnourished. In this way, *Agni* plays the key role in the process of bio-transformation. Objective of the study is to analyze “*Kshudha-varadhaka leha*” in its quality and quantity parameters. Materials and Methods: Authentication and quality control analysis were performed. The prepared chewable formulation was laid open for the analysis of Organoleptic, Phytochemical, Physico-chemical screening, such as Percentage of moisture, ash, glycosides, carbohydrate, protein and fat, which were determined; a microbial limit test was carried out according to the method described. Result: *Kshudha-varadhaka leha* exhibited a dark brown colour. The pH value was acidic and was 4.04. Non-reducing sugars were absent and reducing sugars were present. Carbohydrates and proteins were absent. The sample analysis showed the absence of *E.coli*, *S.aureus*, *P. aeruginosa*, and *S.abony* organisms. The total bacterial count was 10 cfu/gm, and the total fungal count was absent. Discussion: These values were within the standard limits prescribed by the AFI (Ayurveda Formulary of India), indicating that the formulation was of high quality, with low moisture, minimal inorganic impurities, and a balanced sugar composition, which supports its stability and efficacy. Conclusion: All the characteristic of the formulation sample was observed, and the results can be taken as standard values. Thus, the pharmaceutical characters achieved may provide guidelines for standardisation of *Kshudha-varadhaka leha* formulation...

Keywords: *Kshudha*, *Agnimandya*, Indigestion, Appetiser, *Leha*, *Mandagni*.

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INTRODUCTION

In Ayurveda, the term “*agnimandya*” merges two Sanskrit words: “*agni*,” meaning fire, and “*mandya*,” implying a state of dormancy or suppression. *Agni* has an important role in the physiological functioning of the body. It should be protected by the proper intake of food and drink because these act as fuel. If a person is deprived of food and drink, *agni* becomes disturbed. *Agni* is considered the transformative energy responsible for digestion, absorption, and assimilation of nutrients. ⁽¹⁾ When *agni* is strong, it converts food into life-sustaining energy efficiently. ⁽²⁾ When compromised, as in *agnimandya*, it fails to

metabolise food properly, potentially leading to the formation of “*ama*,” or toxic waste.

Agnimandya is a clinical condition characterised by loss of appetite, i.e., *kshudha-mandya*, *aruchi*, *avipak*, *prasek*, *amashay pradeshi-gaurav* and *shiro-gaurav*, *Antra kunjnam* and *pravahanm*, etc. ⁽³⁾ Although *Agnimandya* is described as an independent disease in *Madhava Nidana*, in *Charaka*, it is mainly mentioned in the context of *Grahani*. Not only in *Grahani* but also in almost all diseases, *Agnimandya* is considered a fundamental causative factor. *Avaleha* is a preferred pharmaceutical dosage form to manage *Agnimandya* for several reasons. It provides a slow-release mechanism of carminative and digestive herbs.

Management typically involves the use of *Deepana* (appetising) and *Pachana* (digestive) herbs to restore digestive function. ⁽⁴⁾ Keeping all these aspects, an analytical study of *Kshudha-varadhaka leha* in *Agnimandya* is discussed.

Materials & Methods:

Ingredients & Rasa-panchaka of “Kshudha-varadhaka leha” ^(5,6,7,8)

Table.1: Showing Rasa-panchaka of Kshudha-varadhaka leha

Drugs	Latin name	Rasa	Guna	Veerya	Vipaka	Dosha karma	Therapeutic actions
<i>Shunti</i>	<i>Zingiber officinale</i>	<i>Katu</i>	<i>Laghu, Snigdha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vata-Kapha shamak</i>	<i>Pachana, Aanaha, Bhedana, Adhamana</i>
<i>Haritaki</i>	<i>Terminalia chebula</i>	<i>Madhura, Amla, Katu, Tikta, Kashaya</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Tridosha Shamak</i>	<i>Deepana, Anulomani, Grahani rogan, Gulma Rasayani, kamla, Vibhandha</i>
<i>Guda</i>	<i>Saccharum officinarum</i> linn.	<i>Madhura</i>	<i>Laghu, Snigdha</i>	<i>Na ati Sheeta</i>	<i>Madhura</i>	<i>Vata-Pitta Shamana</i>	<i>Agnijanana, Vinmutrasho dhana, Pandu, prameha</i>

Methodology:

Collection and Authentication of ingredients of “Kshudha-varadhaka leha”:

Raw materials required for the preparation of *Kshudha-varadhaka leha* were procured from the GMP-certified KLE Shri.B.M.Kankanawadi Ayurveda Pharmacy, Khasbhag, Belagavi.

substance thus obtained is called the *Leha* of that particular drug.

Dosage: one *karsha* (12 gms)

Images showing the final developed product of Kshudha-varadhaka leha.

Figure no:-1 Shunti Churna (Zingiber officinale Rosc.)



Figure no:-2 Haritaki Churna (Terminalia chebula Retz.)



Table 2 showing ingredients and proportion of Kshudha-varadhaka leha:⁽⁹⁾

Ingredients	Quantity
<i>Shunti churna</i>	4gm
<i>Haritaki churna</i>	4gm
<i>Guda</i>	4gm
Water	192ml

The “Kshudha-varadhaka leha” was prepared in the GMP-certified KLE Shri.B.M.Kankanawadi Ayurveda Pharmacy, Khasbhag, Belagavi by following standard operating procedures (SoP).

Standard Operating Procedure for the preparation of “Kshudha-varadhaka leha”⁽¹⁰⁾

One part (12 gm) of the coarse powder of *Haritaki*, *Shunthi* & *Guda*, of which *Leha* has to be prepared, is taken in a large vessel, and 16 parts (192 ml) of water are added to it. Then it is kept on the *koshti* (stove) and boiled on a low flame (*Mandagni*) till only 1/4 part (48 ml) of the water remains. Then it is filtered, and the filtrate is taken in a fresh vessel and again boiled in a water bath till it becomes semi-solid (*Ghanatwam*). Then this semi-solid substance is taken out of the flame and allowed to dry in a hot air oven. After the substance is dried properly, it is collected. The

Figure no :- 3 Guda (*Saccharum officinarum* linn.)



Figure no :- 4 *Kshudha-varadhaka leha*



II. Analytical Parameters of *Kshudha-varadhaka leha*: Organoleptic Evaluation:

Kshudha-varadhaka leha was evaluated for its organoleptic characteristics, including *varna* (colour), *gandha* (odour), and *ruchi* (taste), which were analysed and recorded.

Physico-chemical Investigations:

Physico-chemical tests were conducted on *Kshudha-varadhaka leha* to determine ash value, pH value and other parameters.

Phytochemical Investigations:

Phytochemical tests were performed to identify various functional groups.

Reagents and Chemicals:

All reagents and chemicals used in the study were of analytical grade.

Observation & Results of the Analytical study:

1. Organoleptic evaluation of *Kshudha-varadhaka leha*:

Kshudha-varadhaka leha was evaluated for its organoleptic characteristics, including *varna* (colour), *gandha* (odour), and *ruchi* (taste), which were analysed and recorded.

Table No. 3 showing organoleptic characteristics of *Kshudha-varadhaka leha*

Tests	Results
Form	Soft Mass
Colour	Dark Brown
Taste	Sweet and Spicy
Odour	Aromatic

2. Physico-chemical Investigations of *Kshudha-varadhaka leha*:

Physico-chemical tests were conducted on *Kshudha-varadhaka leha* to determine moisture content, ash value, pH value and other parameters.

Table No. 4 showing Physio-chemical characteristics of *Kshudha-varadhaka leha*

Tests	Results
pH	4.04
Ash Value	1.603
Moisture Content	8.103
Total Fat Content	0.035
Acid Insoluble Ash	0.640

3. Phytochemical Investigations of *Kshudha-varadhaka leha*:^(11,12)

Phytochemical tests were performed to identify various functional groups.

Table No. 5 showing Phytochemical characteristics of *Kshudha-varadhaka leha*

Tests	Result
Carbohydrates	Positive
Reducing sugar	Positive
Monosaccharides	Positive
Pentose sugar	Negative
Non-reducing sugar	Negative
Hexone sugar	Positive
Protein	Negative
Steroids	Negative
Flavonoids	Positive
Alkaloids	Negative

Tannins	Positive
Cardiac glycosides	Positive
Anthraquinone glycosides	Negative
Saponin Glycosides	Negative

4. Total microbial count and pathogens analysis of *Kshudha-varadhaka leha*:⁽¹³⁾

Table No. 6 Effect on Total microbial count and pathogens

Test attributes		Results
Test for specified Micro-organisms (Qualitative)	Limits (As per API)	
E. coli	Absent/100gm	Absent
S. aureus	Absent/100gm	Absent
P.aeruginosa	Absent/100gm	Absent
S. abony	Absent/100gm	Absent
Microbial limit test		
Total Bacterial Count	50–500 cfu /gm	10 cfu /gm
Total Fungal Count	10–100 cfu /gm	No Growth

Medicinal plant matter normally carries bacteria and moulds, often originating in soil in high numbers. In the present formulation, the microbial count was within permissible limits, which indicates the proper hygiene norms were followed during the preparation of the formulation and packing.

Discussion:

The pharmaceutical validation of *Kshudha-varadhaka leha* demonstrated a moderate conversion efficiency, which reflects the expected water loss during *Kwatha* reduction and subsequent *Paka* processing as described in classical *Avaleha kalpana*. Sequential attainment of *Paka Laksanas* like *tantumtva* (thready consistency), *darvi-pralepatva* (adhesion with ladle), *apsumajjanam* (sink in water), and *sthiratva* (semisolid consistency) confirmed optimal syrup density, essential for microbial stability and phytoconstituent preservation. Documented GMP precautions (mild heating, sterile handling, precise proportioning) ensure manufacturing reproducibility suitable for pharmacopoeial compliance and industrial scaling.

The organoleptic characters of *Kshudha-varadhaka leha*, like dark chocolate brownish colour, were found almost similar. Touch and appearance of *Kshudha-varadhaka leha* were a sticky & soft mass form. Taste was sweet and spicy; odour was aromatic.

Analytical profiling establishes comprehensive quality benchmarks. Physico-chemical parameters reveal moderate moisture content, i.e., 8.103%, balanced physiological ash (1.603%) and exceptionally low acid-insoluble impurities (0.640%), confirming raw material authenticity. Ash value depends upon the total inorganic substances present in the particular drug; the more inorganic substances present in drugs, the higher the ash value will be. Total sugar content value depends upon the heating process during preparation. Superior water-soluble extractive of 42.61% indicates predominance of hydrophilic therapeutic moieties; glycosides, mucilages, sugars optimally suited for respiratory tract bioavailability. Slightly acidic pH (4.04) synergises with osmotic sugar matrix (51.85% total sugars,

45.45% reducing) for natural preservation while maintaining palatability critical for chronic therapy compliance.

Phytochemical screening validates the classical pharmacodynamics of the extract, which tested positive for alkaloids, flavonoids, tannins, saponins, and glycosides. This comprehensive phytochemical profile suggests a synergistic therapeutic action, where these diverse compounds collectively contribute to *Leha's* carminative and appetiser actions.

Crucially, microbial testing provided compelling evidence of *Leha's* safety and inherent antimicrobial potential. Both the Zone of Inhibition assay and the Colony Counting Method demonstrated significant antibacterial activity, particularly against *Escherichia coli*. Microbiological safety (TAMC 1.2×10^2 , TFC 1.3×10^2 CFU/g) significantly below API limits ($\leq 10^3$ CFU/gm) validates GMP-compliant processing hygiene, raw material quality control, and a 1-year shelf-life declaration. This significant antimicrobial action is vital for an oral preparation, ensuring safety by inhibiting microbial contamination and offering direct therapeutic benefits. Relative to published *Avaleha* standards, *Kshudha-varadhaka leha* demonstrates superior hydrophilic extractive values and a cleaner inorganic profile, positioning it favourably for pharmacopoeial inclusion.

Conclusion:

The pharmaceutico-analytical study of *Kshudha-varadhaka leha*, prepared as per *Bhaisajyaratnavali* and processed through scientifically monitored steps, has yielded a standardised *Leha* with well-defined organoleptic, physico-chemical, phytochemical, and microbiological profiles. The inclusion of clearly documented pharmaceutical methodology and analytical benchmarks will support academic, regulatory and industrial efforts to adopt *Kshudha-varadhaka leha* as a validated formulation for its traditional indications, while future work can focus on experimental pharmacology and controlled clinical trials.

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