



# wA Comprehensive Pharmaceutico-Analytical and Antimicrobial Study of Kaskandana Avaleha

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## Introduction

The *Trisutra (hetu, linga and ausadha)* from the foundation of ayurvedic medicine.<sup>1</sup> *Ausadha* is the most significant of all. it is accountable for both the prevention and advancement of health as well as the reduction of illness.<sup>2</sup> *Rasashastra* is a branch of Ayurveda that concentrates on a number of pharmaceutical procedures, such as *Shodhana*, *Marana*, *Satvapatan*, *Amratikaran*, etc., as well as a thorough description of metals, minerals, herbo-minerals, and medicinal items derived from animals. *Rasa-Aushadhies* is superior to *Kashth Aushadhies* due to its quicker relief and effect.<sup>3</sup>

*अल्पमात्रोपयोगित्वादरूचेरप्रसङ्गतः*

*क्षिप्रमारोग्यदायित्वात् औषधेभ्योऽधिकोरसः॥*

(र.र. समु. 28/1)

## NEED OF STUDY

*Kasa* has been characterized as both a standalone disorder and a sign of numerous diseases, and if left untreated, it may lead to a condition with a dismal prognosis. According to *Ayurveda*, *kasa* is a condition that has most of the symptoms of a respiratory illness. Vitiating *Kapha* prevents *Prana Vata* from flowing freely in *Kantha* and *Uras* during the pathophysiology of illness *Kasa*.<sup>4</sup> Since *Kapha* is the primary cause of *Kasa*, early intervention is required since *Kasa* is a potential *Nidanarthakara Vyadhi*<sup>5</sup> that could Outcome in *Kshaya*. Treatment for the aforementioned recurrent *Kasa* illness should have two goals: one that reduces the disease and the other that encourages the. Thus, it is necessary to assess *Kaskandana Avaleha*'s antibacterial activity against the different microorganisms in this investigation. Although *Kaskandnaavaleha* has been referenced in a number of *Ras Shashtra* literature, to the best of my knowledge, no pharmacy currently produces it. In such a scenario, it becomes a necessity to conduct this study, so that *Kaskandnaavaleha* 'can be manufactured and its antimicrobial effect be studied for the greater good of humanity.

In modern medicine, *Kasa* is correlated with cough, one of the most common symptoms affecting the respiratory system. Various microorganisms, along with inflammatory conditions of the respiratory tract, contribute significantly to the onset and persistence of cough. *Lauha Bhasma*, described in Ayurveda for

its therapeutic efficacy as *Rasayan* effect in *Kasa* and other respiratory disorders, possesses properties that may help improve respiratory health and support the body's defense against microbial infections. Therefore, to evaluate the antimicrobial potential of *Lauha Bhasma* against microorganisms associated with *Kasa*, the present study entitled “A Pharmaceutico-Analytical and Antimicrobial Study of *Kaskandna avaleha* with Special Reference to *Yogratnakar*” is proposed

## **DRUG REVIEW**

### ***Lauha* (Iron)**

#### **Etimology & Defination**

The word *Lauha* is derived from root ‘**लुह गार्ध्ये**’ (*Luha Gardhye*) with suffix ‘**घङ्**’ (*Ghan*), which means to grow relish.

“**धातुलोहे लुह इति मतः सोऽपिकषार्थवाची**”

The Sanskrit word “*lauha*” is derived from a root “*loha*” meaning to pull.

(**लुह कर्षणे**) thus, the metals extracted out from their respective ores are known as ‘*lauha*’.

***Lauha* has been classified into three varieties i.e. 7 ( R.R.S. 5/69-71)**

#### **1. Mundalauha**

#### **2. Tikshnalauha**

#### **3. Kanthalauha**

#### **Processing of *Lauha*:**

Amount of *Lauha* for the preparation of *Lauha Bhasma* should be 5-13 *pala* or 1to 3 *sera* or 40 to 60 *tola*, as per various references text book.

#### **Iron Snapshot**

- Chemical name: ferrum derived from latin )
- Chemical formula: Fe
- Atomic Number: 26
- Atomic Weight: 55.845
- Protons: 26
- Electrons: 26
- Neutrons: 30
- Density: @ 293 K: 7.86g/ cm<sup>3</sup> at 1 tam
- Melting Point: 2795 °F, 1535 °C, 1808 °K
- Boiling Point: 4982 °F, 2750 °C, 3023 K
- Element Catogory : Transition Metal
- Group: 8
- Period: 4
- Block: D

**Appearance:**

Colour: Sivery Grey

Luster: Metallic, Tarnishes in moist air due to oxidation ie Rust

Phase: Solid State

Hardness 4 (on Moh's scale), 490 MPa (Brinell Hardness)

**Varieties of iron: 8**

There are three varieties of commercial iron on the basis of carbon content present in it are:

- Cast Iron
- Wrought Iron
- Steel

| S.No | Drug and Media                                                                                   | Type     | Procedure                   | Repetition            | Reference                                                                                                      |
|------|--------------------------------------------------------------------------------------------------|----------|-----------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------|
| 1.   | Swarasa of Guduchi<br>Hamsapadi,<br>Naktamala, Triphala,<br>Gopalaka, GoRasana,<br>Tumburu Phala | Vishesha | Dhalana                     | -                     | Rasarnavam                                                                                                     |
| 2.   | Triphala Jala                                                                                    | Vishesha | Dhalana                     | -                     | Chakraduttah                                                                                                   |
| 3.   | Shasha Rakta                                                                                     | Vishesha | Lepana<br>and<br>Paritapana | 3<br>3<br>7           | Rasendra Chudamani<br>Rasa Prakasha<br>Sudhakara<br>Rasa Ratna Samucchaya                                      |
| 4.   | Saindhava lavana and<br>Triphala Kwatha                                                          | Vishesha | Lepana<br>and<br>Paritapana | -                     | Rasendra Chudamani<br>Rasa Prakasha<br>Sudhakara Rasa Ratna<br>Samucchaya                                      |
| 5.   | Chincha Phaladala<br>Kwatha                                                                      | Vishesha | Nirvapa                     | -                     | Rasendra Chudamani<br>Rasa Ratna Samucchaya                                                                    |
| 6.   | Triphala Kwatha                                                                                  | Vishesha | Nirvapa                     | -<br>7<br>7<br>7<br>7 | Rasendra Chudamani<br>Rasa<br>Ratna Samucchaya<br>Rasendra Sara Samgraha<br>Ayurveda Prakasha<br>Rasatarangini |
| 7.   | Gomutra                                                                                          | Vishesha | Nirvapa                     | -                     | Rasa Ratna Samucchaya<br>Ayurveda Prakasha<br>Rasendra Chudamani                                               |

**Shodhana of Lauha:**

Samanya and Vishesha Shodhana methods must be followed to make Lauha free from all the Doshas.

Mainly Nirvapa (heating upto red hot and quenching in liquid media) process is followed for Lauha Shodhana .

Commonly *Triphala Kwatha* is used as liquid media for Lauha Shodhana . And the Triphala Kwatha for Lauha Shodhana should be prepared specifically. 16 Pala of Triphala is mixed with 8 times water and boiled, upto it remains one fourth. This much decoction is taken for Shodhana of 5 Pala of Lauha.

**Samanya Shodhana of Lauha :** The procedure is general for *Shodhana* of all the metals. Here metals are heated upto redhot state and quenched 7 times in each *Tila Taila* , *Takra* , *Gomutra* , *Arnal* , and *Kulottha Kwatha*.

**Vishesha Shodana of Lauha :** The *Vishesha Shodhana* method must be followed after *Samanya Shodhana* to make *Lauha* free from all the *Doshas* .

**Marana of Lauha :** *Hingula* is the mostly used material for *Lauha Marana* *Triphala Kwatha* is the most commonly used liquid media for *Bhavana* . Mainly *Gajapata* is used as heating grade to prepare *Lauha Bhasma* It is very interesting to note that many a times *Lauha Bhasma* is prepared without heating.

## ADJUVANT DRUGS

### (1.) *TILA TAILA* 9

**Placement of utility:** *Samanya Shodhana of Lauha*

**English name:** Sesame oil

**Latin name (Tila):** *Sesamum indicum*

**Family:** Pedaliaceae

### (2.) *TAKRA* 10

**Placement of utility:** *Samanya Shodhana of Lauha*.

**English name:** Butter milk

### (3.) *GOMUTRA* 11

**Place of utility:** *Samanya Shodhana* and *Maran of Lauha*

**English name:** Cow's urine

### 4 *KANJI/ARNAL*

**Phase of utility:** *Samanya Shodhana of Lauha*

Many times, both are mentioned as synonymous (*Kanji* and *Arnal*) Different preparatory procedure of both preparations are also available. *Tandula*, *Rajika* and *Saindhava Lavana* are used for preparation of *Kanji*. In present study kanji was taken as prepared by college pharmacy.

### 5 *KULOTTHA KWATHA* 12

Place of use: *Samanya Shodhana of Lauha*

#### *KULOTTHA*

**Latin name:** *Dolichos biflorus*

**Family:** Leguminosae

**English name:** Horse gram

**6 TRIPHALA KWATHA 13**

Place of use: *Vishesha Shodhana* of *Lauha*

Properties:

- *Rasa: Kashaya, Amla*
- *Vipaka: Madhura*
- *Virya: Anushna*
- *Guna: Laghu*

**(7 )HARITAKI 14**

**Latin name:** *Terminalia chebula*

**Family:** Combretaceae

**English name:** Chebulic myrobalans

**8 .VIBHITAKI 15**

**Latin name:** *Terminalia belerica*

**Family:** Combretaceae

**Englishname-:** Belericmyrobalans

**Useful part** – *phala*(fruit)

**(9) AMLAKI 16**

**Latin name:** *Embllica officinalis*

**Family:** Euphorbiaceae

**English name:** Indian gooseberry

**10) KUMARI 17**

**Place of use:** *Bhavana Dravya* of *Lauha Bhashma* during *Marana*

**Latin name:** *Aloe barbadensis*

**Family:** Liliaceae

**English name:** Common Indian aloe

**11 ARKA 18**

**Placement of utility :** *Arka ksheer* use in *Maran* of *Lauha*

*Arka (Calotropis procera, Fam. - Asclepidaceae)* is a shrub 6-8 ft. high bearing purple spotted pink scented flowers.

**Latex of Calotropis procera-** The latex of *Calotropis procera* is *tikta -lavana, Snigdha - Laghu and Ushna*. It is effective in *Kustha, Gulma, Udararoga* and best for *virechana*.

The latex of *C.procera* contains water and water solubles, 88.4 - 93.0 and caoutchouc 0.8 - 2.5%. The coagulum contains; resins 52.8 - 85.0 and Caoutchouc, 11.4 - 22.9%. The latex contains trypsin, an active labenzyme and a heart poison

**(12.) HINGULA 19**

**Place of use:** *Marana of Lauha*

**SYNONYMS**

- English name: Cinnabar
- Sanskrit: *Hingula*
- Hindi: *Hingul*

**Shodhana:** *Hingula Shodhana* is done by 7 times levigation with liquid media like *Nimbu Rasa* etc.

**(13) KANTAKARI 20**

**Useful parts** - *Mula*(root) and *panchanga*(whole plant)

**Rasadi Panchaka-**

- **Rasa** - *Tikta , Katu*
- **Guna** - *Laghu, ruksha*
- **Vipaka** - *Katu*
- **Virya** - *Ushna*

**14 PIPPALI & PIPPALI MULA 21**

**Useful part** - *Phala*(Fruit) & *Mula*(Root)

**Rasadi panchaka**

- Rasa - *Katu*
- Guna - *Tikshna Laghu Snigdha*
- Vipaka - *Madhura*
- Virya - *Anushna*

**15 Aja Mutra (Goat's Urine) 22**

Charaka and sushruta Samhita describes Mutra varga(Urine Group)

*Mutrashtaka* comprises the urine of eight animals—cow, buffalo, goat, sheep, elephant, horse, donkey, and camel. When human urine is included, the group is termed *Mutranavaka*, as described in *Kaiyadeva Nighantu*. The use of one's own urine, known as *Shivambu Prayoga*, is traditionally practiced for *Rasayana* purposes following specific guidelines. Among all varieties, *Gomutra* is regarded as the most important and is preferred when other types are unavailable.

**सामान्य गुणकर्म-**

**'उष्णं तीक्ष्णमधोऽरूक्षं कटुकं लवणान्वितम् । मूत्रमुत्सादने युक्तं युक्तमालेपनेषु च ॥**

**युक्तमास्थापने मूत्रं युक्तं चापि विरेचने । स्वेदेष्वपि च तदयुक्तमानाहेष्वगदेषु च ॥**

उदरेष्वथ चार्शःसु गुल्मकुष्ठकिलासिषु । तदयुक्तमुपनाहेषु परिषेके तथैव च ॥

दीपनीयं विषघ्नं च क्रिमिघ्नं चोपदिश्यते । पाण्डुरोगोपसृष्टानामुत्तमं शर्म चोच्यते ॥ श्लेष्माणं शमयेत्पीतं मारुतं चानुलोमयेत् । कर्षोत्पित्तमधोभागमित्यस्मिन् गुणसंग्रहः ॥

(च. सू. 1/96 -100)

#### 16 Aja Mutra(Goat's Urine) :

**अजामूत्र (बकरी) - रस में कषाय, मधुर, पथ्य और दोषनाशक है। यह विशेषतः क्षयरोग में उपयोगी है ।**

According to classical guidelines, urine from the female goat, sheep, cow, and buffalo is recommended, whereas urine from the male elephant, camel, horse, and donkey is prescribed. However, the urine of female animals is generally regarded as lighter (*laghu*), while that of male animals is considered heavier (*guru*). Therefore, urine from female animals is preferred. In its absence, urine from male animals may also be used.

### MICROBES REVIEW

Microbiology is the branch of science that deals with the study of microorganisms, also called microbes. The term *microbiology* is derived from Greek words: *micro* meaning "small," *bio* meaning "life," and *logy* meaning "study." Microorganisms are tiny living organisms that are too small to be seen without a microscope. They may consist of a single cell or multiple cells. Common examples of microorganisms include bacteria, viruses, fungi, protozoa, and algae. Microorganisms are found almost everywhere on Earth where liquid water is present. They can live in extreme environments, such as hot springs at the bottom of oceans and deep underground within the Earth's crust. Depending on their need for oxygen, these microorganisms are grouped into two types: aerobic microorganisms, which require oxygen to live, and anaerobic microorganisms, which can survive without oxygen. Some microorganisms are able to make the substances they need for growth and survival by using carbon dioxide and nitrogen from their surroundings. In contrast, anaerobic microorganisms can carry out their life processes without the presence of free oxygen. Bacteria can also be grouped according to their reaction to the Gram staining

## Differences between Gram-positive and Gram-negative Bacteria

| Characteristic        | Gram-positive bacteria | Gram-negative bacteria |
|-----------------------|------------------------|------------------------|
| Thickness             | 15–25 nm               | 10–15 nm               |
| Variety of Amino acid | Few                    | Several                |
| Aromatic and Sulfur   | Absent                 | Present                |
| Lipids                | Low (2–4 percent)      | High (15–20 percent)   |
| Teichoic acid         | Present                | Absent                 |
| Periplasmic space     | Absent                 | Present                |
| Enzyme digestion      | Protoplast             | Spheroplast            |

method. Bacteria that retain the stain and appear purple are known as Gram-positive bacteria, whereas those that do not retain the stain and appear pink or red are called Gram-negative bacteria.

The present study is “A PHARMACEUTICO ANALYTICAL AND ANTIMICROBIAL STUDY OF “*Kaskandna Avaleha*” and the Following microbes will be included to assess the antimicrobial efficacy *kas kandna Avaleha*

### MICROBES SELECTED FOR THE PRESENT STUDY

#### Gram -positive bacteria

1. *Staphylococcus aureus*
2. *Streptococcus pyogenes*
3. *Streptococcus pneumoniae*

#### Gram-negative bacteria

1. *Pseudomonas aeruginosa*
2. *E-coli*
3. *Klebsiella pneumoniae*

### AYURVEDIC REVIEW OF KRIMI (MICROBES)

The association between humans and microorganisms has been recognized since ancient times and is reflected in early Ayurvedic and Vedic literature. The concept of *Krimi* is described in the Vedas, indicating that microorganisms and the diseases they cause were known to the ancient sages. References to *Krimi* and *Krimiroga* are found in Vedic texts, where they denote microbes and infectious disorders. In later post-Vedic writings, including the *Aranyakas*, *Brahmanas*, and epics, the study and description of *Krimi* continued to hold significant importance, demonstrating an early understanding of microscopic life and its role in human health and disease.

Ayurveda is a comprehensive system of medicine that describes numerous diseases and their management. Infectious diseases are referred to by terms such as *Sankramaka Roga*, *Upsargaja Roga*, and *Bhutabhishangaja Roga*. In Ayurvedic literature, the term *Bhuta* is used for disease-causing agents that produce harmful effects in the body. The collective term *Krimi* includes a wide range of organisms such as worms, insects, bacteria, viruses, and parasites, whether harmful or harmless. Ancient Ayurvedic

scholars thoroughly studied these organisms and provided detailed descriptions of their classification, symptoms, and methods of treatment.

## ORIGIN OF KRIMI:

**ये क्रिमयः पर्वतेषु वनेषु औषधिषु पशु अपसृपन्तः ।**<sup>23</sup>

*Krimi* are present everywhere (omnipresent). Their *Utpatti Sthana* (origin place) is described as mountains, forests, plants, animals, water, etc.

## Conceptual study

Definition:

The term “Concept” denotes a structured and clearly defined explanation of an idea or subject. It encompasses comprehensive knowledge ranging from its historical background to contemporary progress. A thorough understanding of a concept involves exploring its origin, developmental stages, established principles and applications, traditional importance, as well as recent innovations and advancements.

**सर्वरोगविशेषज्ञः सर्वकार्यविशेषवित् ।**

**सर्वभेषजतत्त्वज्ञो राज्ञः प्राणपतिर्भवेदिति ॥१९॥ (च. वि.6/19)**<sup>24</sup>

Even a simple medicinal substance can be transformed into a highly potent formulation through various pharmaceutical processes such as adding or removing specific ingredients, administering bhavana with suitable media for a prescribed duration, collecting the drugs at the proper time, applying different processing techniques, and utilizing rational scientific methods. These procedures enhance the efficacy and therapeutic value of the drug, making it more suitable for clinical use.<sup>1</sup>

A conceptual evaluation of *Kasa Kandana Avaleha* involves understanding the scientific principles associated in *Rasa Shastra*. It includes important pharmaceutical procedures such as *Shodhana*, *Bhavana*, and *Marana*, which induce significant physical as well as chemical transformations in metallic and mineral substances. These processes are carried out to enhance safety, improve therapeutic effectiveness, and ensure proper suitability of the formulation, thereby establishing the scientific basis of preparations like *Kasa Kandana Avaleha*.

## THE BENEFITS OF CONCEPTUAL RESEARCH:

- Conceptual research is primarily concerned with the formulation of theories and frameworks that help explain a particular subject. It emphasizes understanding the fundamental nature, underlying causes, and essential elements of a topic through theoretical interpretation instead of experimental or practical investigation.
- This form of research primarily relies on available literature, classical references, and scholarly explanations. As it is based on theoretical study rather than laboratory experimentation, it requires comparatively less time while still providing valuable and systematic insights.
- Conceptual research is both feasible and easy to conduct. Once a well-defined framework is established, the research mainly focuses on gathering, arranging, and critically evaluating relevant literary sources. This systematic method supports the development of precise theoretical understanding and enhances knowledge about formulations such as *Kasa Kandana Avaleha* in *Rasa Shastra*.

## AVALEHA KALPANA (MEDICATED SEMISOLID PREPARATION)

*Avaleha* or *Leha* is a semisolid Ayurvedic dosage form meant for internal use. It is prepared by processing herbal decoctions, fresh juices, or other liquid preparations with sweetening agents such as jaggery, sugar,

or sugar candy until a thick consistency is achieved. These formulations are generally administered with suitable adjuvants to enhance their therapeutic action.

### IMPORTANCE OF AVALEHA KALPANA:

- 1) Avaleha Kalpana possesses a longer shelf life and greater stability compared to Panchavidha Kashaya Kalpana.
- 2) It has got more palatability, because it contains sweetening agents and therefore can be easily taken by child as well as adult.
- 3) Some Ayurvedic medicines such as Asava and Arishta, because of their Tikshna and Laghu properties, are not suitable for long-term use. However, Avaleha can be used for a longer duration without causing harmful effects.
- 4) Avaleha Kalpana contains Madhura Dravya and Sneha Dravya, which help in preservation and increase its shelf life.
- 5) Avaleha Kalpana can be used both in diseased and healthy individuals as a Vajikarana and Rasayana. Many Acharyas have described formulations like Chyawanprash and Brahama Rasayana, which help improve strength and resistance in patients.

### Charaka Samhita-

Avaleha Kalpana is available in various sthana of charaka Samhita are:

- Sutra Sthana - Snehavicharana
- Sharira Sthana - Shishuprashan Vidhi
- Chikitsa Sthana - Rasayana & Vyadhi Pratighata Chikitsa
- Kalpa Sthana - 60 ygas are described
- Siddhi Sthana - Utility of Avaleha in Panchkarma

### Sushruta samhita

In Sushruta Samhita, Avaleha Kalpana is mentioned in various Sthanas such as Sutra Sthana, Sharira Sthana, Chikitsa Sthana, Kalpa Sthana and Uttar Sthana.

### Ashtanga Hridaya:

Avaleha Kalpana has been mentioned for diseases such as Kapharoga, Garbha Vyapat, Raktapitta, Tridoshaja Kasa, Swasa, Hikka, and Arsha. Its method of preparation along with Siddhi Lakshana has also been explained.

### Sharangadhara Samhita:

#### (1) MadhyamaKhanda:

A detailed explanation of Avaleha Kalpana is given in the 8th chapter. It includes its definition, preparation procedure, indications, dosage, preservation, and storage methods. According to Acharya Sharangadhara, Avaleha is useful in conditions like Swasa, Kasa, Hikka, Urograha, Jwara, and Raktapitta.

#### (2) UttaraKhanda:

Avaleha preparations are also recommended for various disorders such as Netravikara, Timira, Arsha, Akshidaha, and Raktabhishyanda.

**In these formulations, a drug is described mainly in five forms:**

1. Dry powdered formulations prepared without the addition of water, such as Churna.
2. Water-based preparations converted into solid dosage forms, including Vati (tablets) and Modaka (medicated boluses).
3. Liquid formulations prepared with water, such as Asava, Arishta, and Kwatha.
4. Semi-solid preparations made using water, including Avaleha and similar formulations.
5. Oil-based or fatty preparations prepared with water and medicinal substances, such as Ghrita (medicated ghee) and Taila (medicated oil).

Among the various Ayurvedic formulations, Avaleha Kalpana is unique because it combines different types of ingredients in a single preparation. It includes Prakshepa Dravyas in the form of fine powders, Kalka or Pishti (herbal paste), Sneha (ghee or oil) for preparing the paste, and honey and sugar to improve the taste, preserve the formulation, and enhance its therapeutic effectiveness.

Avaleha formulations are easy for patients to consume and can be taken along with milk, honey, or Bhasma when required. Since Avaleha is usually administered by licking, it stimulates the secretion of saliva, which helps improve the digestive process naturally.

The therapeutic effect of a medicine depends not only on its ingredients but also on its dosage form, the method of administration, and the Anupana (vehicle or adjuvant) used along with it. These factors play an important role in enhancing the efficacy of the drug.

Because Avaleha is a semi-solid preparation, it is administered by licking. This mode of administration stimulates the taste receptors in the mouth and promotes the secretion of saliva, which supports the digestive process. As the medicine is consumed gradually, it reaches the stomach slowly and is believed to penetrate the sukshma srotas (minute channels), helping to remove srotorodha (obstruction of channels). Due to these properties, Avaleha formulations are considered particularly beneficial in the management of upper respiratory disorders, Unmada (mental disorders), and Apasmara (epilepsy).

Avaleha Kalpana contains a combination of different pharmaceutical components such as Kalka (herbal paste), Pishti, Sneha (ghee or oil), and other supportive ingredients. The presence of these multiple formulations in a single preparation enhances its therapeutic value and makes Avaleha an effective dosage form.

Avaleha can also be administered along with other Ayurvedic medicines, such as Churna and Bhasma, to improve their overall effectiveness. For example, in respiratory conditions like Shwasa (dyspnea) and Kasa (cough), formulations such as Chyavanprasha Avaleha, Kantakari Avaleha, and Vasavaleha are commonly prescribed together with Sitopaladi Churna or Talisadi Churna to achieve better therapeutic results.

**GENERAL PROCEDURE FOR THE PREPARATION OF AVALEHA:**

**काथादीनां पुनः पाकात् घनत्वं सारसक्रियाः।**

**सोऽवलेहश्च लेहः स्यात् तन्मात्रा स्यात् पलोन्मिता ।**

**(शा. म. ख. 8/1) 25**

According to Acharya Sharangdhara. When decoctions and other liquid preparations are further cooked until they attain a thick semisolid consistency, the preparation obtained is known as *Rasakriya*. This is also called *Avaleha* or *Leha*. The prescribed dose of this preparation is approximately one *Pala*.

## लिहते अनेन् इति लेहः ( श. क. द्रु) 26

The term *Avaleha* is derived from the Sanskrit root “*lih*,” which means “to lick or taste.” In Ayurvedic pharmaceuticals, *Leha* is considered one among the four forms of food preparations namely *Peya* (drinkable), *Leha* (lickable), *Bhakshya* (chewable), and *Chavya* (masticatory). Among these, *Leha* preparations are consumed by licking because of their pleasant taste and smooth consistency. Due to the presence of sweet substances such as glucose and fructose, the process of digestion and absorption of *Avaleha* begins in the oral cavity itself. Acharya Sharangadhara described *Avaleha* as an *Upakalpana* (secondary preparation) of *Kwatha* and emphasized the significance of *Kwatha Kalpana* in his classical text. In contemporary practice, *Avaleha* formulations have become increasingly popular owing to their better patient acceptability, nutritional value, and therapeutic usefulness.

### GENERAL PROCEDURE FOR THE PREPARATION OF LEHA:

#### Essential Components -

1. Medicinal liquid base, such as *Kashaya* (decoction), *Swarasa* (fresh juice), *Hima* (cold infusion), or *Phanta* (hot infusion) prepared from the selected herbs.
2. Sweetening substances like jaggery, sugar, or sugar candy, which provide taste and help in preservation.
3. Fine powders or herbal pastes of specific medicinal drugs added to enhance the therapeutic effect.
4. Ghee, oil, and/or honey, which are incorporated to improve the consistency, palatability, and medicinal properties of the formulation.

According to the formulation, a fresh juice (*Swarasa*) or decoction (*Kashaya*) is prepared first. To this liquid, jaggery, sugar, or sugar candy is added and dissolved completely. The mixture is then filtered to remove any impurities. After filtration, it is heated over a moderate flame until the desired stage of *Paka* is achieved, which is identified by the formation of threads between the fingers (*Tantu Paka*) or when a small portion dropped into water settles without dissolving immediately. At this stage, the vessel is removed from the heat, and the finely powdered medicinal ingredients are added gradually with continuous stirring to ensure a uniform mixture. If the formulation contains ghee or oil, they are added while the preparation is still warm and mixed thoroughly. Honey, if prescribed, is added only after the preparation has cooled to preserve its properties.

Once the *Avaleha* has cooled completely, it should be stored in clean, dry, airtight, wide-mouthed containers of suitable quality to maintain its stability and shelf life.

According to Acharya Sarangadhara, the general method of *Avaleha* preparation is described in *Sarangadhara Samhita*. He has also provided standard proportions of ingredients to be used when their quantities are not specifically mentioned in a formulation.

#### The general guideline is:

- Sita (Sugar) – 4 parts
- Guda (Jaggery) – 2 parts
- Drava Dravya (Liquid ingredients) – 4 parts
- Churna (Powdered drugs) – 1 part

सिता चतुर्गुणा कार्या चूर्णाच्च द्विगुणो गुडाः ।

द्रवं चतुर्गुणं दद्यादिति इति, सर्वत्र निश्चयः ॥ (शा. म. ख. 8/2)

**AVALEHA SIDDHA LAKSANAS:**

*सुपक्वे तन्तुमत्वम् स्यादऽवलेहोऽप्सु मज्जति ।*

*स्थिरत्वं पीडिते मुद्रा गन्ध वर्ण रसोद्भवः ॥ (शा. म. ख. 8/3)*

**Characteristics of a Properly Prepared Avaleha****1. ThreadFormation (Tantu Matva):**

The Avaleha should exhibit a thread-like consistency when a small quantity is stretched between two fingers.

**2. Sinking in Water (Apsumajjati):**

When placed in water, the Avaleha should sink rather than dissolve immediately or float on the surface.

**3. Firm and Dense Texture (Kharatva):**

The preparation should possess a sufficiently thick, firm, and slightly coarse consistency on touch.

**4. Retention of Finger Impressions (Pidite Mudra):**

When pressed between the fingers, the Avaleha should retain the impression of the fingers, indicating proper consistency.

**5. Development of Characteristic Properties (Gandha-Varna-Rasodbhava):**

The final product should display the characteristic aroma, colour, and taste of the ingredients used in its preparation.

*दुग्धमिक्षुरसो यूषः पञ्चमूलकषायजम् । वासाकाथो यथा योग्यमनुपान प्रशस्यते ।*

Sharangadhara Samhita, Madhyama Khanda 8/4

*(शा. म. ख. 8/4)*

**Dosage:**

The effectiveness of a medicine depends on its proper dosage. An insufficient dose may not produce the desired effect, while an excessive dose can be harmful. Therefore, administering the correct dose is essential. Acharya Sharangadhara has prescribed the recommended dosage of Avaleha Kalpana as follows.

*तन मात्रा पलोन्मितम् । (शा. म. ख. 8/1)*

Dose 1 Pala = 40 gm

**Expiry Period or Shelf Life:** Expiry period for Avaleha Kalpana is one year.

*हीनत्वं गुटिका लेहो लभेते वत्सरात् परम् । (शा. प्र. ख. 1/52)*

**Preservation and Storage:**

Lehyas should be preserved in non-reactive containers such as glass, porcelain, or food-grade plastic to maintain their quality, stability, and therapeutic efficacy.

**HISTORY OF KASKANDNA AVALEHA:**

Classification of Avaleha: depending on consistency divided in 4 groups <sup>11</sup>

- 1) Phanita
- 2) Raskriya
- 3) Avaleha
- 4) Ghana

| Type      | Liquidity | Solidity |
|-----------|-----------|----------|
| Phanita   | ++++      | +        |
| Rasakriya | +++       | ++       |
| Avaleha   | ++        | +++      |
| Ghana     | +         | ++++     |

**TYPES OF IMPURITIES REMOVED BY SHODHANA:****1. Physical Impurities:**

Minerals are primarily obtained from the earth and may be contaminated with foreign materials such as soil, sand, stones, clay, leaves, and other extraneous matter. Shodhana helps in removing these physical contaminants.

**2. Chemical Impurities:**

Metals such as iron, copper, and mercury remain underground for prolonged periods and may undergo chemical interactions with surrounding substances. As a result, they can contain undesirable chemical impurities that need to be eliminated through Shodhana.

**3. Natural Impurities:**

Certain substances, particularly those belonging to the Visha and Upavisha groups, possess inherent toxic properties. Shodhana is performed to reduce or neutralize their toxicity, making them suitable for therapeutic use.

**MAIN OBJECTIVES:** - The purposes of Shodhana are –

- The removal of undesirable chemical and physical contaminants.
- Reducing or eliminating the material's toxicity.
- Conversion of the hard, non-homogeneous material into a homogenous, soft, brittle, and ductile state.
- To break down materials into fine particles so that in Shodhana process they can be exposed to the Shodhana media as much as possible for the intended chemical reaction.
- Potentiation of the medicinal material's therapeutic efficacy.
- Transforming the substance into a format that may be processed further.
- Causes distinct and appropriate physio-chemical alterations.

**TYPES:** The process of Shodhana is broadly classified into the following two types:

## 1. Samanya Shodhana (General Purification):

This is a common purification procedure applied to all substances belonging to a particular group, such as Maharasa, Uparasa, and Dhatu Varga. Since these substances often possess similar types of impurities, the same purification method is used for each member of the group. For example, the general purification process carried out for metals is known as Samanya Shodhana of Dhatu.

## 2. Vishesha Shodhana (Specific Purification):

This is a special purification procedure designed for an individual substance. Different drugs may contain unique impurities that cannot be removed by general purification alone. Therefore, Vishesha Shodhana is performed to eliminate these specific impurities and is usually carried out after Samanya Shodhana. For example, Lauha (iron) is specifically purified using Triphala Kwatha in its Vishesha Shodhana process

**सक्लेदात् क्रिमयष्वास्य भवन्त्युपहतात्मनः।**

**मर्मकदेषे संजाताः सर्पन्तो भक्षयन्ति च॥**

According to Acharya Charaka, *Kleda* (excess moisture or dampness) is considered an important factor in the formation and proliferation of *Krimi* within the body. Once developed, these organisms can migrate from one site to another, spreading throughout the entire body or affecting specific organs and tissues

## CONCEPT OF BHAVANA:

According to Acharya Charaka, Bhavana is an important pharmaceutical Samskara that enhances the therapeutic efficacy and medicinal qualities of a drug. In this process, various liquid media such as Swarasa (fresh juice), Kwatha (decoction), and water are employed. These liquids facilitate subtle physicochemical transformations within the drug, thereby improving its potency, bioavailability, and overall therapeutic effectiveness. Through Bhavana, the inherent properties of the substance are refined and optimized for medicinal use.

## DEFINITION:

- Bhavana can be defined as a pharmaceutical process in which a powdered drug is thoroughly mixed with a suitable liquid medium and kept soaked for a specific period, often overnight. The material is then dried, traditionally under sunlight, and the procedure may be repeated as required to enhance the properties of the drug.
- In another context, Bhavana refers to the process of **Mardana (trituration)**, where finely powdered metals, minerals, or herbal substances are continuously ground with a prescribed liquid medium until the liquid is completely absorbed or the mixture attains a dry state.
- This process facilitates the intimate mixing of the drug with the liquid medium, resulting in improved potency, uniformity, and therapeutic effectiveness of the final product.

## CONCEPT OF MARANA

Marana is an important pharmaceutical process in Rasa Shastra in which purified metals and minerals are converted into Bhasma. Although the term *Marana* literally means destruction of the original form, it actually transforms substances into a fine, non-toxic, therapeutically active, and easily absorbable form. This process enhances the medicinal value and bioavailability of the material and is performed only after proper Shodhana (purification).

शोधितान् लोहधात्वादि विमर्दय स्वरसादिभिः ।

अग्निसंयोगतो भस्मीकरणं मारणं स्मृतम् ।। (द्र.गु.वि.)

#### DEFINITION OF MARAN:

"Marana or Bhasmikanana" refers to the procedure wherein pure metals or minerals are triturated with the Swarasa or Kwatha of the appropriate plant and are then subjected to Puta according to the nature of the drug until it is transformed into Bhasma. While "Putapaka" is a term frequently associated with the "Marana" procedure.

According to Abhinava Rasa Shastra, Marana is the process of converting purified and detoxified metals and minerals into a bioassimilable form that can be readily absorbed and utilized by the body. This transformation is achieved through various pharmaceutical procedures such as Bhavana, Mardana, and Puta, which enhance the therapeutic suitability of the substance.

#### Mardana (Trituration)

Mardana is a pharmaceutical process in which continuous grinding and pressure are applied to reduce the particle size of a substance. The friction generated during grinding produces heat, which facilitates chemical interactions and promotes the formation of new compounds. Continuous trituration ensures uniform chemical reactions throughout the material while preventing its deterioration. This process enhances the potency and therapeutic efficacy of the drug. Prolonged Mardana gradually converts the material into fine, superfine, and ultimately microfine particles, thereby improving its suitability for medicinal use.

In *Mardana* process steps are:

- 1) Force with pressure
- 2) Speed of friction
- 3) Heat
- 4) Duration

#### CHAKRIKAKARANA:

Chakrikakarana is the pharmaceutical process of shaping a levigated, dough-like mass into small, uniform, flat pellets or discs. This step ensures even and consistent distribution of heat during subsequent incineration, thereby promoting uniform processing and proper formation of Bhasma.

#### MAIN OBJECTIVES:

- Enhancement of Heat Transfer: To increase the surface area of the material, thereby facilitating efficient and maximum heat exposure during the Puta process.
- Optimal Utilization of Space: To accommodate a greater quantity of material within the limited capacity of the Sharava (earthen saucer).
- Uniform Heating: To ensure even and consistent distribution of heat throughout the material during incineration.
- Ease of Handling and Collection: To facilitate convenient retrieval, handling, and processing of the material after completion of the heating process.

## **PUTAPAKA**

Putra is a process in which a material is heated to a specific temperature level under controlled conditions for a fixed period of time to achieve proper incineration and transformation into the desired form.

### **OBJECTIVES:**

- To provide the required amount of heat, avoiding both underheating and overheating.
- To ensure proper and complete incineration of the material.
- To reduce the particle size of the substance for better processing.
- To create suitable conditions for the desired chemical transformations to occur.
- To obtain a product with uniform texture, smoothness, and proper consistency.
- To enhance the therapeutic efficacy of the medicine.
- To convert the material into a form that is easily assimilated, bioavailable, and absorbable by the body.

### **PROCEDURE:**

The type of Putra selected depends on the nature of the material being processed. For instance, Varaha Putra is commonly employed for the Marana of Swarnamakshika. In this method, approximately two-thirds of the pit is first filled with cow dung cakes. The sealed Sharava Samputa containing the material is then placed in the pit, and the remaining one-third is filled with additional cow dung cakes. These cakes are ignited to provide the required heat. After the heating process is complete, the Samputa is allowed to cool naturally. Once self-cooling is finished, it is removed and opened, and the processed pellets are collected and finely powdered.

#### **Showing type of Putas, dimensions of Putas & maximum Temperature reached**

| Name of <i>Putra</i>  | Dimensions         |            | Source of Fuel      | Max. Temp.          |
|-----------------------|--------------------|------------|---------------------|---------------------|
|                       | Classical          | Metric(cm) |                     |                     |
| <i>Maha Putra</i>     | <i>2 Hasta</i>     | 91x91x91   | 1500 <i>Upala</i>   | 1000°C for 1hr      |
| <i>Gaja Putra</i>     | <i>1Rajahasta</i>  | 57x57x57   | 1000 <i>Upala</i>   | 1000°C for 1 hrs.   |
| <i>Kukkuta Putra</i>  | <i>2 Vitasti</i>   | 46x46x46   | 100 <i>Upala</i>    | 1000°C for 1/2 hrs. |
| <i>Varaha Putra</i>   | <i>1 Aratni</i>    | 42x42x42   | 500 <i>Upala</i>    | 1000°C for 1/2 hrs. |
| <i>Kapota Putra</i>   | -                  | 23x23x23   | 8 <i>Upala</i>      | 800°C for 1/2 hrs.  |
| <i>Bhudhara Putra</i> | <i>2 Angula</i>    | 20x20x20   | -                   | 140°C for 1/2 hrs.  |
| <i>Gorbara Putra</i>  | <i>1 Vitasti</i>   | 23x23x23   | <i>Upala Churna</i> | 400°C for 4 hrs.    |
| <i>Bhanda Putra</i>   | <i>Brihatbanda</i> | -          | <i>Tusha</i>        | 400°C for 8 hrs.    |
| <i>Valuka Putra</i>   | <i>Brihatbanda</i> | -          | <i>Valuka</i>       | 400°C for 6 hrs.    |
| <i>Lavaka Putra</i>   | <i>Lavaka</i>      | -          | <i>4 Tola Tusha</i> | -                   |

**CLASSICAL ANALYTICAL PARAMETERS OF BHASMA:**

- Ancient scholars of Rasashastra developed specific quality assessment standards to ensure the preparation of high-quality Bhasma.
- They also described various methods for evaluating these quality parameters.
- Different tests are employed to determine the degree of perfection and proper processing of Bhasma.
- While most of these assessments are based on organoleptic observations such as appearance, texture, and behavior, some tests also provide indications of the chemical nature and quality of the final product.

**These parameters can be divided into two groups:**

**(1) Physical parameters**

- Varitara
- Susukshma
- Slakshnatvam
- Unnama
- Rekhapurnata
- Anjana Sannibha

**(2) Chemical parameters**

- Varna
- Gata Rasatvam
- Apunarbhavata
- Nishchandravam
- Niruttha

**PHYSICAL PARAMETERS OF BHASMA:**

The following classical tests are used to evaluate the physical properties of *Bhasma*, such as fineness, smoothness, and lightness.

**VARITARA**

- This test assesses the fineness and lightness of *Bhasma*.
- A properly prepared *Bhasma* should float on the surface of still water.
- The test is based on the principle of surface tension, where extremely fine and light particles are unable to break the water's surface tension.

**UNNAMA**

- This test serves as a confirmation of the *Varitara* test.
- It evaluates the lightness and quality of the floating *Bhasma*.

### REKHAPURNATVAM

- This test determines the micro-fineness of *Bhasma*.
- Finely prepared *Bhasma* is easily absorbed and assimilated by the body.
- The particles should be small enough to enter the fine lines of the fingertips.

### SLAKSHNUTVAM

- This test evaluates the smoothness of *Bhasma*.
- Properly prepared *Bhasma* should feel smooth and soft when touched.
- Such smooth particles do not irritate the gastrointestinal mucosa and are easily.

### SUSUKSHMA

- *Susukshma* indicates the extremely fine particle size of a properly prepared *Bhasma*.
- This characteristic is evaluated through classical tests such as *Varitara* and *Rekhapurnatva Pariksha*.
- A well-prepared *Bhasma* should possess very fine and minute particles.
- Such fineness enhances its absorption, assimilation, and therapeutic effectiveness within the body.
- The *Susukshma* property is considered an important indicator of the quality and proper preparation of *Bhasma*.

### ANJANA SANNIBHAM

- *Anjana Sannibham* refers to the smooth and non-irritating nature of properly prepared *Bhasma*.
- Just as *Anjana* (collyrium) is soft and gentle, a well-incinerated *Bhasma* should also possess similar characteristics.
- The *Bhasma* should be smooth in texture and should not cause irritation to the lining of the gastrointestinal tract.
- This property indicates proper processing and enhances the suitability of *Bhasma* for internal use.

### CHEMICAL PARAMETERS OF BHASMA:

The following classical tests are used to evaluate the chemical transformation and quality of *Bhasma* after the *Marana* process.

### VARNA

- *Varna* refers to the characteristic colour of a particular *Bhasma*.
- Each *Bhasma* possesses a specific colour, which reflects the formation of the desired chemical compound.
- Any deviation from the expected colour may indicate improper preparation or incomplete incineration.

### GATARASATVAM

- Metals naturally possess a characteristic metallic taste.
- After proper incineration, the *Bhasma* should become tasteless.
- The absence of metallic taste indicates that the metal has been transformed into a suitable and stable form.

## NISHCHANDRATVAM

- Metallic lustre is a natural property of metals.
- Properly prepared *Bhasma* should be completely free from shine or metallic appearance.
- Loss of lustre indicates successful conversion of the metal into a non-metallic and therapeutically useful form.
- This test is commonly applied to *Dhatu Bhasma* and *Abhraka Bhasma*.
- 

## APUNARBHAVA

- *Apunarbhava* signifies that the *Bhasma* cannot be converted back into its original metallic form.
- This test confirms complete and proper incineration.
- A correctly prepared *Bhasma* should permanently remain in its transformed state.

## NIRUTTHA

- *Niruttha* refers to the inability of *Bhasma* to regain its metallic form even after reheating.
- During proper incineration, the metal is transformed into stable compounds that cannot be reduced back to metal.

## PHARMACEUTICAL STUDY

The process of preparing medicines from raw materials is referred to as pharmaceutical study. *Acharya Charaka* emphasized that practical experience is essential for a *Vaidya*, and considered *Karmabhyasa* (hands-on practice) to be one of the fundamental qualities of a competent physician.

## OBJECTIVES OF THE STUDY

The present pharmaceutical study is planned with the following aims & objectives-

- To preparation of *Lauha Bhasma*
- To ensure the preparation of safe and efficacious “*Kaskandna Avaleha*”
- To standardization of “*Kaskandna Avaleha*”

## MATERIALS AND METHODS

The materials and methods used for this preparation were selected based on the availability of raw materials, the procedures described in classical *Rasashastra* texts, their traditional importance, and expert guidance. All the raw materials required for the study were obtained from the pharmacy of M.M.M. Government Ayurved College.

### Pharmaceutical process carried out during the study are as follows:

1. Preparation of *Lauha bhasma*
2. Preparation of powders of raw drugs
3. Mixing of Herbal Powder Ingredients with *Lauha Bhasma* for the Preparation of *Kaskandana Avaleha*

**Flow chart of the pharmaceutical process-**

Vishesh Shodhit Lauha

↓

Trituration with following as respectively

*Gomutra* (1-3 puta), *Triphala Kwath* (4-6 puta), *Ghrita kumari swarasa* (7-9 puta), *Punarnava swaras*(10-12 puta), *Ark ksheer+ Hingula* 1/12 part (13-15 puta),( 16<sup>th</sup> puta)

↓

Pelletization

↓

*Sharava Samput*

↓

*Gajaputa heat* (1-12 puta)

*Ardhagajaputa*(13-15 puta)

↓

Processed was done for 16times

**Materials used-**

- Vishesh shodhit *Lauha*- 492gm
- *Gomutra* - (350ml x 3) =1050 ml for 3 *bhavana* (1-3 puta)
- *Triphala Kwath* - (350ml x 3) =1050 ml for 3 *bhavana* (4-6 puta)
- *Ghrita kumari swarasa* - (180 ml x 3) =540 ml for 3 *bhavana* (7-9 puta),
- *Punarnava swaras* - (200ml x 3) =600 ml for 3 *bhavana* (10-12 puta),
- *Ark ksheer* - (180x 3) =540ml for 3 *bhavana* (13-15 puta)
- *Hingula*1- (42gm x 3) =126 gm for 3 *bhavana* (13-15 puta)
- *Triphala Kwath* - (350ml x 3) =1050 ml for 3 *bhavana* (16<sup>th</sup> puta)

**Showing the details of Gajputa Observations of 1<sup>st</sup> to 16<sup>th</sup> puta of Lauha Bhasma**

| No. of puta | <i>Bhawana Darva</i> | Date of Puta | Type of puta   | Weight of material (gm) |            | Consistency of pellets after puta | Colour After Puta | Specific observation |
|-------------|----------------------|--------------|----------------|-------------------------|------------|-----------------------------------|-------------------|----------------------|
|             |                      |              |                | Before puta             | After puta |                                   |                   |                      |
| 1.          | <i>Gomutra</i>       | 21.9.25      | <i>Gajputa</i> | 512                     | 468        | Hard                              | Black             |                      |
| 2.          | <i>Gomutra</i>       | 10.12.25     | <i>Gajputa</i> | 485                     | 462        | Hard                              | Black             |                      |
| 3.          | <i>Gomutra</i>       | 16.12.25     | <i>Gajputa</i> | 489                     | 467        | Hard                              | Black             |                      |

| No. of puta | Bhawana Darvya                                            | Date of Puta | Type of puta        | Weight of material (gm) |            | Consistency of pellets after puta | Colour After Puta | Specific observation                                                     |
|-------------|-----------------------------------------------------------|--------------|---------------------|-------------------------|------------|-----------------------------------|-------------------|--------------------------------------------------------------------------|
|             |                                                           |              |                     | Before puta             | After puta |                                   |                   |                                                                          |
| 4.          | <i>Triphala decoction</i>                                 | 23.12.25     | <i>Gajputa</i>      | 556                     | 480        | Hard                              | Black             |                                                                          |
| 5.          | <i>Triphala decoction</i>                                 | 31.12.25     | <i>Gajputa</i>      | 592                     | 489        | Very soft                         | Light black       | After 5 <sup>th</sup> puta pellets were soft enough to make powder of it |
| 6.          | <i>Triphala decoction</i>                                 | 6.01.26      | <i>Gajputa</i>      | 598                     | 485        | Hard                              | Light black       |                                                                          |
| 7.          | <i>Ghrita kumari swarasa</i>                              | 09.01.26     | <i>Gajputa</i>      | 502                     | 491        | Soft                              | Light black       | Weight increase after put                                                |
| 8.          | <i>Ghrita kumari swarasa</i>                              | 23.01.26     | <i>Gajputa</i>      | 506                     | 463        | Very soft                         | Light brown       |                                                                          |
| 9.          | <i>Ghrita kumari swarasa</i>                              | 28.01.26     | <i>Gajputa</i>      | 475                     | 457        | Very soft                         | Light brown       |                                                                          |
| 10.         | <i>Punarnava swarasa</i>                                  | 16.02.26     | <i>Gajputa</i>      | 479                     | 451        | Very soft                         | Brown & violate   |                                                                          |
| 11.         | <i>Punarnava swarasa</i>                                  | 12.02.26     | <i>Gajputa</i>      | 503                     | 443        | Soft                              | Brown & violate   |                                                                          |
| 12.         | <i>Punarnava swarasa</i>                                  | 17.03.26     | <i>Gajputa</i>      | 471                     | 437        | Soft                              | Brown & violate   |                                                                          |
| 13.         | <i>Arka patra swaras + Higula</i><br>(1/12 part of Lauha) | 25.03.26     | <i>Ardhagajputa</i> | 540                     | 434        | Hard                              | Brown & violate   |                                                                          |
| 14.         | <i>Arka patra swaras + Higula</i>                         | 05.05.26     | <i>Ardhagajputa</i> | 570                     | 424        | Hard                              | Brown & violate   |                                                                          |

| No. of puta | Bhawana Darvya                                     | Date of Puta | Type of puta | Weight of material (gm) |            | Consistency of pellets after puta | Colour After Puta | Specific observation                                       |
|-------------|----------------------------------------------------|--------------|--------------|-------------------------|------------|-----------------------------------|-------------------|------------------------------------------------------------|
|             |                                                    |              |              | Before puta             | After puta |                                   |                   |                                                            |
|             | (1/12 part of Lauha)                               |              |              |                         |            |                                   |                   |                                                            |
| 15.         | Arka patra swaras + Higula<br>(1/12 part of Lauha) | 13.05.26     | Ardhagajputa | 513                     | 420        | Very soft                         | Reddish Brown     | Bhasma was very fine in nature after 15 <sup>th</sup> puta |
| 16.         | Triphala decoction                                 | 01.06.26     | Gajputa      | 472                     | 415        | Very soft                         | Redish Blackish   | Bhasm was very fine                                        |

### Materials of Kaskandna Avaleha

| Drug         | Quantity |
|--------------|----------|
| Aja mutra    | 4 Lit    |
| Vibhitaki    | 80 gm    |
| Pippli       | 40 gm    |
| Pippli-ool   | 40 gm    |
| Kantkari     | 80 gm    |
| Louha Bhasma | 40 gm    |

### कासकण्डना अवलेहः

अजामूत्रं शतपलं मन्दाग्नौ गुडपाकवत्। पक्त्वा वैभीतकं चूर्णपलद्वयमितं क्षिपेत् ॥ १

पिप्पलीपिप्पलीमूलपलमात्रं मृतायसम्। कण्टकारीफलरजोनिक्षिपेत्पलद्वयं ॥ २

ततो माषद्वयं खादेदृकं कर्षमथापिवा। क्षौद्रेणोष्णाम्बुना वाऽपि सर्वकासात् प्रमुच्यते ॥ ३ ॥

असाध्याभिषजात्यक्तश्चिरजाः पथ्यवर्जिताः। येकासास्तेऽप्यनेनाऽऽशु प्रणश्यन्ति न संशयः। कासकण्डननामाऽयं योगआत्रेयभाषितः ॥

(योगरत्नाकर, कास चिकित्सा)

**Equipments:** Steel vessel, Plastic gloves, etc.

Foreign materials such as dust, stones, seeds, and other unwanted impurities were removed from the raw materials.

All the ingredients were then spread out and dried under sunlight.

After complete drying, each ingredient was weighed separately to determine the weight loss that occurred during the drying process.

**Table No: Dried and cleaning of raw materials of Kaskandna Avaleha**

| S.No. | Ingredients         | Quantity taken(G) | Weight of ingredient after drying and cleaning (G) | Loss (G) | % Loss |
|-------|---------------------|-------------------|----------------------------------------------------|----------|--------|
| 1.    | <i>Aja mutra</i>    | 4 lit             | 3.8 lit                                            | 200 ml   | 5 %    |
| 2.    | <i>Vibhitaki</i>    | 80 gm             | 75 gm                                              | 5 gm     | 6.25 % |
| 3.    | <i>Pippli</i>       | 40 gm             | 37 gm                                              | 3 gm     | 7.5 %  |
| 4.    | <i>Pippli-mool</i>  | 40 gm             | 38 gm                                              | 2 gm     | 5 %    |
| 5.    | <i>kantkari</i>     | 80 gm             | 72 gm                                              | 8 gm     | 10 %   |
| 6.    | <i>Lauha Bhasma</i> | 40 gm             | 40 gm                                              | -        | 0 %    |

**Preparation of powder of raw drugs**

**Materials:** Ajamutra, Vibhitaki, Pippli, Pippli-mool, kantkari, Lauha Bhasma

**Equipments:** *Udukhala Yantra*, Grinder, Mixer machine, spatula, plastic container, cotton cloth, steel vessel, mask, plastic gloves, etc.

- The cleaned and dried raw materials were taken in the required proportions as mentioned above.
- Each ingredient was first broken into small pieces using a *Lauha Udukhala Yantra*.
- The broken materials were then ground separately in a grinder-mixer to obtain fine powders.
- Each powder was passed through a 120-mesh sieve to ensure uniform particle size. Thus, all 5 ingredients were processed and stored separately in powdered form.

**Precautions:**

All equipment should be thoroughly washed, cleaned, and dried before use.

Whenever the grinder lid is opened, allow a few moments for the fine powder particles to settle before handling the material to minimize loss and ensure safety.

**Preparation of Kaskandana Avaleha**

Kaskandana Avaleha was prepared according to the classical Ayurvedic method. Initially, 3.5 litres of goat's urine (*Aja Mutra*) was taken in an iron vessel and heated over a mild flame. The liquid was boiled continuously until its volume gradually decreased and became concentrated.

When the liquid started becoming thick, the previously prepared *Lauha Bhasma* was added slowly. The mixture was stirred continuously with an iron ladle to ensure proper mixing and to prevent it from sticking to the vessel.

Heating was continued until most of the liquid had evaporated and about 300 mL of the concentrated mass remained. The flame was then turned off. The previously prepared fine powders (*Churna*) of *Kantakari* (*Solanum xanthocarpum*), *Vibhitaki* (*Terminalia bellirica*), *Pippali* (*Piper longum*), and *Pippalimoola* (*Piper longum* root), ingredients mentioned in the formulation were mixed with all above herbal power in ratio mentioned in *Yogratnakara* to the warm concentrated mass.

The ingredients were mixed thoroughly by hand until a uniform mixture was obtained. The prepared medicine was in the form of a coarse powder. It was spread evenly on stainless-steel trays and allowed

to dry completely. After drying, the material was powdered finely and stored in clean, dry, airtight containers for further study and use.

**Table No. Final Observations & Results of Preparing of Kaskandna Avaleha**

| S.No. | Ingredients         | Latin name                   | Parts used    | Weight of powder ingredient gm. | Ratio of Kaskandna Avaleha in |
|-------|---------------------|------------------------------|---------------|---------------------------------|-------------------------------|
| 1.    | <i>Aja mutra</i>    | Goat urine                   | Mutra         | 3.5 lit                         | 100 part                      |
| 2.    | <i>Vibhitaki</i>    | Terminalia BellericaRoxb.    | Phala (Fruit) | 69 gm                           | 2 part                        |
| 3.    | <i>Pippli</i>       | Pipper Longum Linn.          | Phala (Fruit) | 34 gm                           | 1 part                        |
| 4.    | <i>Pippli-mool</i>  | Pipper Longum Linn.          | Mool (Root)   | 35 gm                           | 1 part                        |
| 5.    | <i>kantkari</i>     | Solanum Xanthocarpum Sachard | Phala (Fruit) | 67 gm                           | 2 part                        |
| 6.    | <i>Lauha Bhasma</i> | Iron Rust                    | Bhasma powder | 38 gm                           | 1 part                        |

*Aja-mutra*, *Vibhitaki*, *pippli*, *pippli-mool*, *kantkari*, all ingredients collected, powdered and passing through 120 no sieve by sieve shaker. Prepared Lauha bhasma were mixed with all above herbal power in ratio mentioned in Yogratanakara.

**Final Yield of Kaskandna Avaleha - 380 gm**

#### **Packing:**

total 380 gm of *Kaskandna Avaleha* were packed in 2 plastic container, one of them 120 gm quantity was sent for Analytical and Anti-microbial study to S.R. Labs & Research Centre, Jaipur (Rajasthan)

#### **Labelling:**

A printed coloured label was attached to each plastic container. The label included the name of the formulation, reference, dose, ingredients, manufacturing date, expiry date, helpline number, name of the pharmacy, department, and college.

The formulation was prepared in the Pharmacy of M.M.M. Government Ayurved College, Udaipur, Rajasthan.





## INGREDIENTS OF KASKANDNA AVALEHA



□□□□

## BHAWNA DAVY A OF LAUHA MARAN PROCESS



## ANALYTICAL STUDY 27

Analytical study involves a detailed examination of a drug to obtain important information about its composition, quality, and characteristics. In recent years, scientific research has advanced rapidly, with many developments in biology being supported by chemical and physical techniques. Modern analytical instruments help researchers understand the structure and function of biological systems at different levels. Physicochemical analysis plays an important role in setting quality standards for both raw materials and finished formulations by providing reliable and measurable data. It also helps in understanding the pharmacokinetic and pharmacodynamic properties of a drug, which are essential for evaluating its safety, quality, and therapeutic effectiveness.

**Table : Showing the Modern Analytical Parameters**

| Organoleptic parameter | Physio-chemical Analysis      | Heavy Metal Analysis | Microbiological Analysis |
|------------------------|-------------------------------|----------------------|--------------------------|
| 1. Appearance          | 1.pH value                    | 1. Lead (pb)         | 1.Total bacteria count   |
| 2. Colour              | 2.Loss on drying              | 2. Cadmium (Cd)      | 2.Total fungal count     |
| 3. Odour               | 3.total Ash value             | 3. Mercury (Hg)      |                          |
| 4. Taste               | 4.Acid Insoluble Ash          | 4. Arsenic (As)      |                          |
|                        | 5.Water Soluble Extractive    |                      |                          |
|                        | 6. Alcohol Soluble Extractive |                      |                          |

## ANTIMICROBIAL STUDY

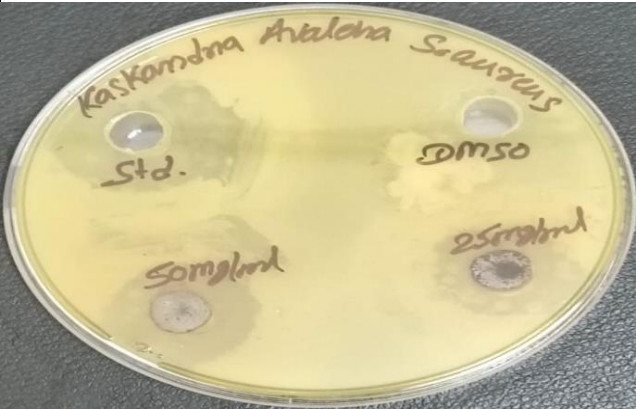
### Test organisms used

Use cultures of the following microorganisms

- *E. coli* MTCC 1687,
- *Pseudomonas aeruginosa* MTCC 1688,
- *Staphylococcus Aureus* MTCC 737,
- *Streptococcus pyogens* MTCC 1926,
- *Klebsella pneumonia* MTCC 39,
- *Streptococcus pneumoniae* MTCC 1935.

### Showing Results of Kaskandna Avaleha Antimicrobial Activity

| A. | Anti-Microbial activity         |                                                                     |                         |                       |         |                       |
|----|---------------------------------|---------------------------------------------------------------------|-------------------------|-----------------------|---------|-----------------------|
|    | Antimicrobial Activity          | As per standard antimicrobial sensitivity protocol of pharmacopoeia | Zone of Inhibition (mm) |                       |         |                       |
|    |                                 |                                                                     | Standard                | Test Sample (in DMSO) |         |                       |
|    |                                 |                                                                     | Positive control        | 25mg/ml               | 50mg/ml | DMSO Negative control |
| 1. | <i>E.coli</i>                   |                                                                     | 26                      | 18                    | 24      | 8                     |
| 2. | <i>Pseudomonas aeruginosa</i>   |                                                                     | 26                      | 16                    | 20      | 8                     |
| 3. | <i>Staphylococcus Aureus</i>    |                                                                     | 26                      | 14                    | 20      | 8                     |
| 4. | <i>Streptococcus pyogens</i>    |                                                                     | 26                      | 16                    | 22      | 8                     |
| 5. | <i>Klebsella pneumonia</i>      |                                                                     | 26                      | 22                    | 24      | 8                     |
| 6. | <i>Streptococcus pneumoniae</i> |                                                                     | 26                      | 18                    | 22      | 8                     |

| S.N. | Name Microbe                 | Image                                                                                |
|------|------------------------------|--------------------------------------------------------------------------------------|
| 1.   | <i>Staphylococcus aureus</i> |  |

|    |                                 |                                                                                     |
|----|---------------------------------|-------------------------------------------------------------------------------------|
| 2. | <b>Streptococcus pyogens</b>    |   |
| 3. | <b>Streptococcus pneumoniae</b> |  |

## CONCLUSION

The conclusion is the most significant part of any research study, as it is derived from a critical interpretation of the observations, analytical findings, and experimental results. It summarizes the overall outcome of the investigation and reflects the achievement of the research objectives.

The present thesis entitled “**A Pharmaceutico-Analytical and Antimicrobial Study of *Kaskandana Avaleha***” was undertaken to evaluate the pharmaceutical preparation, analytical quality parameters, and antimicrobial potential of the formulation. Based on the pharmaceutical observations, analytical evaluation, and antimicrobial findings obtained during the study, the following conclusions were drawn:

- The present study successfully standardized the pharmaceutical preparation of *Kaskandana Avaleha* in accordance with the classical references. The preparation process was documented systematically to establish a reproducible Standard Operating Procedure (SOP) and Standard Manufacturing Procedure (SMP).
- The pharmaceutical preparation of *Kaskandana Avaleha* was carried out following classical *Ayurvedic* principles. Careful control of processing conditions, including preparation of the decoction, addition of sweetening agents, and incorporation of *Prakshepa Dravyas*, was essential to obtain a uniform, stable, and acceptable final product.

- Analytical evaluation established the quality parameters of *Kaskandana Avaleha* through organoleptic examination and physicochemical analysis, including pH, loss on drying, ash values, extractive values, total sugar, reducing sugar, non-reducing sugar, and heavy metal analysis. The results indicated that the prepared formulation complied with acceptable quality standards.
- Heavy metal analysis confirmed that the concentrations of toxic elements, including lead, cadmium, arsenic, and mercury, were within the permissible limits, indicating the safety of the prepared formulation.
- The antimicrobial study demonstrated that *Kaskandana Avaleha* possesses antimicrobial activity against the selected test microorganisms. The formulation exhibited inhibitory effects against both Gram-positive and Gram-negative bacteria, suggesting its potential role as a natural antimicrobial formulation.
- The findings of the present study provide scientific support for the quality, safety, and antimicrobial potential of *Kaskandana Avaleha* and may serve as a reference for its future standardization and therapeutic application.

## References

1. Sengupta Shri Narendranath, Sengupta Shri Balaichandra; Jalpakalpataru commentary on Caraka Samhita by Gangadhara; published by Vidyavilas press; Sutrasthana; chapter 1st; commentary on verse 7; page 20.
2. Bhrmhanad Tripathi, charaksamhita ,vimansthan, ChoukhambhaSurbhartiPrkashan 1st Edition,2006,adhyay30 shlok 26, page no 565.
- 3.Kulkarni DA. Rasa RatnaSamuchchya. 14th edition. New Delhi. Meharchandlachhman das publication, 1998; 94-95
- 4.Vd. Ravidattatripathi,Charaksamhitachikitsasthan18/08 Chaukhamba Sanskrit Sansthana, Varanasi. Page no. 540.
- 5.Vaidya JadavajiTrikamjiCharak Samhita chikitsa 18/08,ChaoukhambasanskritSamsthan,varanasiPage no. 540.
- 6 R.R.S. 5/1 Upadhyay Madhav, *Ayurveda* Prakasha, Mishra G.S., Sanskrit-HindiCommentary, Chaukhamba Bharati Academy, Varanasi, 1999, 386 p 89
- 7 R.R.S. 5/69-71 P 106
8. History of Chemistry in Ancient and Medieval India by Acharya P.C.Ray, Edited by P.Ray, Published from chowkhamba krishnada academy, Varanasi, Reprint 2004.
9. Misra Sribhava, Bhavaprakasa, Misra B.S., Vaisya R., Hindi Commentary,Chaukhamba Sanskrit Samsthana, Varanasi, 2002,Vol. I : 779
- 10.P.V. Sharma , D.G.V. II- pg 121
11. Bhavaprakash, Purvakhand, MutraVarga, 1-6
- 12.Misra Sribhava, Bhavaprakasa, Misra B.S., Vaisya R., Hindi Commentary,Chaukhamba Sanskrit Samsthana, Varanasi, 2002,Vol. I :651
13. Misra Sribhava, Bhavaprakasa, Misra B.S., Vaisya R., Hindi Commentary,Chaukhamba Sanskrit Samsthana, Varanasi, 2002,Vol. I :4
14. Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 277-285

- 15-- Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 702-707
16. Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 33—38
- 17 Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 402--406
- 18 P.V. Dravyaguna Vijnana, Vol. II. Chaukhambha Bharati Academy, Varanasi.
- 19 Database on Medicinal Plants Used in Ayurveda, Vol. 7 (CCRAS). 37 Ibid, 2/39.
- 20 Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 362-367
- 21 Hegde P L. A text book of Dravyaguna Vijnana.(2). New Delhi: Chaukambha Publications, 2020; pg 538-544
- 22Deshpande, M. (2021). Dravyaguna Vijnana (Vol. 1). New Delhi: Chaukhamba Sanskrit Pratishthan. (Mutra Varga, pg 658-659)
- 23 Ashtang Hridya. 2/31/5
- 24 Shastri Pandit Kashinath "Charak Samhita" Viman sthan varanasi, Chaukhambha Sanskrit Sansthan, part 1, edition reprint 2016,
- 25Sharangadhara Samhita, Madhyama Khanda 8/1
- 26Sharangadhara Samhita, Madhyama Drvya Kalpna 8/4
- 27 Ayurvedic pharmacopoeia of India, part-1, volume-VI, appendix 2.4.1, pg no 275.Laboratory Guide for the Analysis of Ayurveda and Siddha Formulations, CCRAS, 2010.