



Review Article

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EXPLORING THE FOURFOLD RASAYANA FORMULATIONS: CONCEPTUAL ANALYSIS, METHODOLOGIES, AND APPLICATIONS OF KHARALIYA, PARPATI, KUPIPAKWA, AND POTTALI RASAYANA

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ABSTRACT

Background: *Rasayana* is a vital branch of *Ayurveda* aimed at rejuvenation, longevity, and prevention of disease. Among its formulations, the *Chaturvidha Rasayana*—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali Rasayana*—represent specialized therapeutic forms developed through complex pharmaceutical processes. Despite their historical prominence, their conceptual understanding and clinical utility remain underexplored in modern academic discourse. **Objectives:** To critically analyze the philosophical and pharmacotechnical foundations of *Chaturvidha Rasayana* formulations and assess their preparation methods, therapeutic relevance, safety profile, and scope in contemporary practice. **Materials and Methods:** A descriptive and analytical literary review was conducted using primary classical texts such as *Rasatarangini*, *Rasa Ratna Samucchaya*, *Charaka Samhitā*, and *Bhaishajya Ratnāvali*, alongside modern pharmaceutico-analytical studies. The methodologies, tools, apparatus, ingredients, heating patterns, and safety

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measures were documented and comparatively analyzed. **Results:** Each formulation displays unique pharmaceutical characteristics: *Kharaliya Rasayana* involves trituration techniques enhancing bioavailability. *Parpati Rasayana* stabilizes mercurial compounds through layered exudation on cow dung cakes. *Kupipakwa Rasayana* depends on controlled sublimation within glass apparatus to create potent mineral compounds. *Pottali Rasayana* compresses multi-drug combinations into hard-shelled pouches, offering prolonged shelf-life and targeted action. Their clinical applications span across *Jwara*, *Kustha*, *Rasa-Rakta Pradoshaja Vikara*, and *Vatavyadhi*. **Conclusion:** *Chaturvidha Rasayana* represents a scientifically and conceptually rich legacy of *Rasa Shastra*. Modern research must integrate standardization, toxicological evaluation, and clinical trials to validate and adapt these potent formulations for global therapeutic use.

Keywords: *Chaturvidha Rasayana*, *Kharaliya Rasayana*, *Parpati Rasayana*, *Kupipakwa Rasayana*, *Pottali Rasayana*, *Rasa Shastra*

INTRODUCTION

Rasayana is one of the eight branches of *Ayurveda* that deals with the science of rejuvenation (*Jīvanopāya*), disease prevention, enhancement of physical and mental strength, and prolongation of life. The term "Rasayana" is derived from "Rasa" (essence or juice) and "Ayana" (path), implying the enhancement of bodily and mental essence. It focuses on restoring the balance of *Doshas*, nourishing the *Dhatus*, and promoting *Ojas*, thereby achieving longevity (*Deerghāyu*), memory (*Smṛti*), intelligence (*Medhā*), youthfulness (*Yauvana*), and strength (*Bala*). While the classical *Rasayana* therapy includes herbs, diets, and behavioral regimens, *Rasa Shastra* evolved to include mineral and metal-based formulations for more potent outcomes.¹

In the domain of *Rasa Shastra*, the development of the *Chaturvidha Rasayana*—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali Rasayana*—marked a revolutionary advancement. These four forms are pharmaceutically specialized preparations that utilize complex techniques involving trituration, sublimation, controlled heating, and encapsulation to enhance drug efficacy. These preparations are primarily *Rasa-Mercurial* or *Mineralo-Herbo-Metallic* in nature and are known for their rapid action even in chronic or intractable diseases. Each

formulation type is designed with distinct processing principles and therapeutic intents, making them unique in the field of *Ayurvedic* pharmaceuticals.²

Kharaliya Rasayana is the simplest and oldest among the four, prepared through *Bhavana* (trituration) using a *Khalva Yantra* (stone mortar and pestle). This method ensures micronization and potentiation of the drug through continuous grinding with liquid media. The aim is to enhance the *Samskara* (transformation) and *Yogya* (suitability) of ingredients for easy absorption and assimilation. Classic examples include *Shwasakuthara Rasa* and *Vatavidwamsana Rasa*, which are primarily used in respiratory and neuromuscular disorders respectively.³

Parpati Rasayana involves the unique technique of preparing thin flakes of the formulation on a *Gomaya Chulli* (cow dung cake furnace). This form stabilizes mercury and sulfur compounds through gradual exudation and cooling, maintaining their potency while minimizing toxicity. *Loha Parpati* and *Tāmra Parpati* are widely used for gastrointestinal, hepatic, and blood-related disorders. The flaky texture improves surface area, enhancing dissolution and bioavailability in the gastrointestinal tract.⁴

Kupipakwa Rasayana is the most technically demanding preparation method, involving the use of a glass bottle (*Kachkupi*) placed in a sand bath and subjected to multi-stage heating under a regulated temperature profile (*Mṛdu, Madhyama, Tivra Āgni*). This process results in the sublimation and re-crystallization of *Rasa* drugs in the neck or base of the bottle. The method is considered ideal for preparing drugs with high potency and long shelf life, such as *Rasasindura* and *Rasakarpura*, used in treating chronic conditions like *Rajayakshma*, *Amavata*, and *Kasa*.⁵

Pottali Rasayana represents the most refined and compact formulation among the four. It involves sealing finely powdered and processed drugs within a cloth or metallic pouch (*Pottali*), followed by heating in specific media. The final product is a hard, globular capsule-like mass that provides highly potent and targeted action. *Tāmragarbha Pottali* and *Svarnagarbha Pottali* are notable examples, known for their use in life-threatening conditions like *Vishavikara* (toxicity), *Hikka* (hiccups), and *Udara Roga* (abdominal disorders). This method offers both therapeutic intensity and portability, reflecting advanced pharmaceutical insight from ancient times.⁶

AIM AND OBJECTIVES

AIM:

To analyze the concept, preparation methods, and therapeutic uses of *Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali Rasayana*.

OBJECTIVES:

1. To study classical references of *Chaturvidha Rasayana*.
2. To document their pharmaceutical procedures.
3. To explore their clinical applications.
4. To assess safety and limitations.
5. To evaluate potential for standardization.
6. To suggest their integration into modern practice.

MATERIAL AND METHOD

1. **Type of Study:** Conceptual and literary review-based analytical study.
2. **Source of Data:** Primary data collected from classical *Ayurvedic* texts including:

Rasatarangini, *Rasa Ratna Samucchaya*, *Bhaishajya Ratnavali*, *Charaka Samhitā*, *Siddha Yoga Saṅgraha*, *Ayurveda Sara Sangraha*

Secondary data collected from: Peer-reviewed journals, Research articles, Ayurvedic Pharmacopeia of India (API), Government reports and dissertations

3. **Method of Review:** Comparative analysis of *Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali Rasayana* was performed. Data were categorized based on formulation techniques, ingredients, heating methods, equipment used, shelf life, and therapeutic indications. Tabulation and diagrammatic representation were used to summarize findings.

CONCEPTUAL STUDY

The word *Rasayana* is composed of two parts—*Rasa* meaning the essential fluid or nutrient and *Ayana* meaning path or movement. Thus, *Rasayana* implies the "path of nourishment" that rejuvenates the body by enriching the *Rasa Dhatu*. According to *Charaka Samhitā*, *Rasayana* is defined to achieve longevity, intelligence, memory, youthfulness, strength, and

immunity. It is a holistic science aimed at both the promotion of health and the prevention of diseases.⁷

Fundamental Concept and Mechanism of Action

Rasayana works by regulating *Agni* (digestive/metabolic fire), maintaining the smooth flow of *Srotas* (body channels), and enhancing the quality and quantity of *Dhatus* (tissues). It supports *Ojas*, the essence of all *Dhatus*, considered vital for immunity and vitality. Through these mechanisms, *Rasayana* slows aging (*Vayasthāpana*), improves mental faculties (*Medhāvṛddhi*), and enhances the body's resistance (*Vyādhi-kṣamatva*).⁸

Classification of Rasayana

In classical texts, *Rasayana* is classified based on its purpose:

- **Naimittika Rasayana** – Used for specific diseases (e.g., *Guduchi* in fever).
- **Kāmya Rasayana** – Enhancing desired qualities like intelligence or longevity.
 - *Medhā-Kāmya* – For cognitive functions.
 - *Vaya-Kāmya* – For anti-aging effects.
- **Ājāsrika Rasayana** – Daily dietary items like milk, ghee, and honey that act as natural rejuvenators. This classification shows the diverse roles of *Rasayana* in everyday life and therapeutic interventions.⁹

Concept of Rasayana in Rasa Shastra

With the advancement of *Rasa Shastra*, the concept of *Rasayana* evolved into more potent forms involving metallic and mineral-based preparations. This led to the development of *Chaturvidha Rasayana*—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali* Rasayana. These are herbo-metallic formulations processed using specialized heating and purification techniques. They are designed for higher efficacy, rapid action, and minimal dosage, targeting chronic and severe ailments.¹⁰

Importance in Rejuvenation and Immunomodulation

Rasayana therapy is highly effective in geriatric care due to its *Jīrṇāvṛddhi* (anti-aging) properties. It plays a crucial role in increasing tissue regeneration and enhancing immunity. Modern studies have validated the antioxidant, adaptogenic, and immunomodulatory properties of traditional *Rasayana* herbs like *Amalaki*, *Ashwagandha*, and *Shatavari*. These

actions make *Rasayana* therapy relevant even in contemporary healthcare for managing stress, fatigue, and chronic diseases.¹¹

Personalized Approach and Contemporary Relevance

Ayurveda emphasizes the individualized use of *Rasayana* based on *Prakriti* (constitution), *Vaya* (age), *Desha* (geography), *Ritu* (season), and *Roga Avasthā* (disease condition). This aligns with modern personalized medicine. With growing interest in preventive and integrative health systems, *Rasayana* offers a bridge between traditional wisdom and modern clinical approaches, particularly in lifestyle diseases, oncology, neurodegenerative disorders, and geriatrics.¹²

Conceptual Analysis of *Kharaliya Rasayana*

Kharaliya Rasayana is the most fundamental form among the *Chaturvidha Rasayana* in *Rasa Shastra*. The name “*Kharaliya*” is derived from the instrument used in its preparation—*Khalva Yantra* (mortar and pestle). The concept revolves around *Bhavana Samskara* (repeated trituration with liquid media), which facilitates the potentiation (*Samskara*) and reduction in particle size (micro-fineness), ensuring enhanced assimilation and action of the drug at the cellular level. This method is considered ideal for enhancing the *Yogya* (suitability), *Samskara* (transformation), and *Samskara Anuvartana* (carrying forward of properties) of the ingredients.¹³

Methodology of Preparation

The preparation of *Kharaliya Rasayana* involves:

- **Ingredients:** Purified *Rasa* (mercury), *Gandhaka* (sulfur), and other metals/minerals like *Abhraka*, *Loha*, or *Tamra*, mixed with *Bhavana Dravyas* (juices/decoctions) of specific herbs.
- **Equipment:** *Khalva Yantra* (mortar and pestle), drying chamber, gloves and protective gear for handling processed minerals.
- **Procedure:** The ingredients are trituated with specified liquid media for 3, 7, or even 21 times depending upon the classical reference. This enhances absorption and therapeutic efficacy.

- **Drying & Preservation:** The final product is dried and stored in moisture-proof containers.¹⁵

Pharmaceutical Advantages

- Fine particle size ensures easy absorption (*Sūkṣma Guna*)
- Prolonged trituration increases potency and stability
- No thermal degradation due to absence of intense heat
- Suitable for heat-sensitive herbal decoctions
- Easy to prepare in small quantities; useful in outpatient prescriptions

Common Classical Formulations

Some widely used *Kharaliya Rasayana* include:

- **Shwasakuthara Rasa** – for *Shwasa*, *Kasa*, *Hikka*
- **Vatavidwamsana Rasa** – for *Vata Vyadhi* and neuromuscular disorders
- **Arogyavardhini Vati** – for hepatic and metabolic disorders
- **Mrityunjaya Rasa** – used in fever and general debility

Each of these formulations is prepared by triturating the ingredients with specified *Bhavana Dravyas* to achieve targeted therapeutic effects.¹⁶

Clinical Applications

Kharaliya Rasayana is used in a variety of disorders due to its:

- **Multifactorial action** (anti-inflammatory, anti-pyretic, rejuvenating)
 - **Rapid assimilation** into the system
 - **Low dosage requirement** (potent action in small quantities)
- These formulations are commonly prescribed in conditions such as *Jwara* (fever), *Shwasa* (dyspnea), *Agnimandya* (digestive disorders), *Amavata* (rheumatoid arthritis), and *Pakshaghata* (paralysis).¹⁷

Safety and Standardization

Though *Kharaliya Rasayana* is safer due to lack of heating, safety depends on proper purification (*Shodhana*) of the raw materials. Adherence to classical methods, analytical

testing (e.g., particle size analysis, heavy metal testing), and appropriate dosing ensures efficacy and minimizes toxicity.¹⁸

Conceptual Analysis of Parpati Rasayana

Parpati Rasayana is a unique pharmaceutical innovation in *Rasa Shastra*, primarily designed to stabilize mercurial preparations and enhance their bioavailability. The term *Parpati* refers to the flake-like structure formed when a molten mixture of purified mercury (*Rasa*), sulfur (*Gandhaka*), and other metallic ingredients is allowed to cool and solidify over a flat surface—traditionally on a *Gomaya Chulli* (cow dung cake furnace). The flake formation process significantly reduces the toxicity associated with mercury and improves its therapeutic profile. Conceptually, *Parpati* symbolizes transformation through *Samśamskara* (restructuring of drugs through heat and shape), enhancing *Yogya* (suitability) and *Sūkṣma* (subtle) properties for better absorption and action.¹⁹

2. Methodology of Preparation

Key Steps in Parpati Preparation:

- **Ingredients:** Purified *Parada* (mercury), *Gandhaka* (sulfur), and *Loha Bhasma*, *Abhraka Bhasma*, or other mineral components.
- **Equipment:** Iron pan (*Tāmrapatra*), *Gomaya Chulli* (traditional cow dung furnace), ladle, butter paper, ghee or oil for greasing.
- **Procedure:**
 1. Mercury and sulfur are triturated to form *Kajjali* (black sulfide compound).
 2. Other *Bhasmas* are mixed in specific ratios.
 3. The mixture is heated till it melts completely and forms a homogenous liquid.
 4. The molten mass is poured onto a greased flat surface and spread quickly using a flat object to form thin flakes (*Parpati*).
 5. Once cooled, the flakes are collected and powdered if necessary.

This technique stabilizes mercury in a non-toxic form and enhances shelf-life and portability.²⁰

Pharmaceutical Significance

- The flake structure provides a large surface area, improving gastrointestinal absorption.
- Heating under controlled conditions ensures detoxification and transformation of heavy metals.
- The process makes the formulation light, stable, and easy to administer.
- Unlike *Kupipakwa* preparations, *Parpati* does not require closed vessels or advanced equipment, making it practical in both traditional and contemporary settings.²¹

4. Classical Examples of Parpati Rasayana

Commonly used *Parpati Rasayana* include:

- **Loha Parpati** – For anemia, liver disorders, and general debility
- **Tamra Parpati** – Indicated in indigestion, abdominal pain, and *Udara Roga*
- **Panchamrita Parpati** – Used in *Grahani* (IBS), malabsorption syndrome
- **Swarna Parpati** – A rejuvenative and immune-modulatory preparation

Each of these has precise therapeutic indications and is mentioned in texts like *Rasatarangini* and *Rasa Ratna Samuchchaya*.²²

Therapeutic Applications

Parpati Rasayana is primarily used in:

- **Digestive disorders** (*Agnimandya*, *Grahani*, *Atisara*, *Arsha*)
- **Liver and spleen conditions** (*Yakṛt-Pliha Vridhhi*)
- **Anemia and weakness** (*Pāṇḍu*, *Daurbalya*)
- **Chronic metabolic disorders** including early-stage diabetes
- **Pediatric and geriatric care**, due to its easily digestible and mild nature

The action of *Parpati* is both **systemic** (due to mercury and bhasmas) and **local** (especially on the gastrointestinal tract).²³

Safety and standardization

Proper *Shodhana* (purification) of mercury and sulfur ensures that the formulation is safe when administered in prescribed doses. Its unique flake form ensures minimal irritation to

gastric mucosa, making it ideal for patients with sensitive digestion. In modern contexts, analytical techniques like XRD, SEM, and particle size analysis are applied to ensure quality, safety, and standardization of *Parpati* preparations.²⁴

Conceptual Analysis of Kupipakwa Rasayana

Kupipakwa Rasayana represents one of the most advanced pharmaceutical innovations in *Rasa Shastra*. The term is derived from *Kupi* (glass bottle) and *Pakwa* (processed by heating). This formulation method involves the sublimation and transformation of mercurial and other metallic/mineral drugs through regulated heat within a sealed glass bottle. The principle is based on *Paka Kalā* (staged heating), where controlled thermal application induces chemical restructuring of the ingredients, producing highly potent yet stable forms of medicines. These are known for quick absorption, minimal dosage, and deep tissue penetration. *Kupipakwa Rasayana* is particularly significant in chronic and complex diseases where deep systemic detoxification and rejuvenation are required.²⁵

Methodology of Preparation

Ingredients and Tools:

- **Ingredients:** Purified *Parada* (mercury), *Gandhaka* (sulfur), and other *Bhasmas* like *Abhraka*, *Tamra*, *Manashila*, or *Haritala* depending on the formulation.
- **Apparatus:**
 - *Kachakupi* (specially designed glass bottle with neck)
 - *Valuka Yantra* (sand bath setup)
 - Thermally insulated *Paka Bhandā* (furnace)
 - Protective cloth and sealing materials for bottle neck

Procedure:

1. All ingredients are purified (*Shodhana*) and triturated (*Mardana*) to form *Kajjali*.
2. The mixture is filled into the *Kupi* and the bottle is sealed with a cloth and clay-smear cotton (*Mudrita Mukha*).
3. The bottle is placed in a sand bath and subjected to a triple-stage heating protocol:
 - *Mridu Agni* (mild heat) – 6 to 12 hours

- *Madhyama Agni* (moderate heat) – 12 to 18 hours
 - *Tivra Agni* (intense heat) – till the product stabilizes
4. After heating, the bottle is allowed to cool gradually.
 5. Sublimated products are collected either from the neck (*Tālachūrṇa*) or base (*Rasasindūra*).²⁶

Pharmaceutical Significance

- Highly potent due to sublimation and structural transformation
- Long shelf-life with stable chemical form
- Deep tissue penetration (*Sūkṣma Guna*) enables use in severe diseases
- Small dose requirement (1–2 Ratti) due to high efficacy
- Avoids toxicity if properly prepared through *Shodhana* and precise heating

Kupipakwa Rasayana is often considered the pinnacle of classical Ayurvedic pharmaceuticals due to its complexity and therapeutic superiority.²⁷

Classical Examples of Kupipakwa Rasayana

Prominent classical preparations include:

- **Rasasindura** – A sublimated mercurial compound, used in fevers, anemia, and chronic conditions
 - **Rasakarpura** – Effective in *Jwara*, *Shwasa*, *Kasa*
 - **Makaradhwaja** – A potent aphrodisiac and general tonic
 - **Manikya Rasayana** – Indicated in *Kshayaaja Roga*, *Rajayakshma* (tuberculosis)
- Each of these formulations holds a prestigious place in *Rasaushadhi* therapy.²⁸

Therapeutic Applications

Kupipakwa Rasayana is used in:

- **Chronic infections** (*Rajayakshma*, *Kushtha*)
- **Autoimmune disorders** (*Amavata*, *Vatarakta*)
- **Respiratory ailments** (*Shwasa*, *Kasa*, *Hikka*)

- **Neurological diseases** (*Apasmara, Pakshaghata*)
- **Rejuvenative and aphrodisiac therapy** - Due to its *Sūkṣma*, *Vyavāyī*, and *Ashukārī* properties, it provides rapid systemic action.²⁹

Safety and Modern Relevance

When classical protocols are followed—particularly proper *Shodhana*, precise heating duration, and correct collection technique—Kupipakwa Rasayana is safe and effective. However, without standardization and quality control, the risk of residual toxicity exists. In modern pharmaceuticals, these preparations are studied using advanced techniques like X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), and Atomic Absorption Spectroscopy (AAS) for safety profiling. With such tools, the classical knowledge of Kupipakwa Rasayana can be integrated into modern integrative medicine systems.³⁰

Conceptual Analysis of Kupipakwa Rasayana

Kupipakwa Rasayana represents one of the most advanced pharmaceutical innovations in *Rasa Shastra*. The term is derived from *Kupi* (glass bottle) and *Pakwa* (processed by heating). This formulation method involves the sublimation and transformation of mercurial and other metallic/mineral drugs through regulated heat within a sealed glass bottle. The principle is based on *Paka Kalā* (staged heating), where controlled thermal application induces chemical restructuring of the ingredients, producing highly potent yet stable forms of medicines. These are known for quick absorption, minimal dosage, and deep tissue penetration. Kupipakwa Rasayana is particularly significant in chronic and complex diseases where deep systemic detoxification and rejuvenation are required.³¹

Methodology of Preparation

Ingredients and Tools:

- **Ingredients:** Purified *Parada* (mercury), *Gandhaka* (sulfur), and other *Bhasmas* like *Abhraka*, *Tamra*, *Manashila*, or *Haritala* depending on the formulation.
- **Apparatus:**
 - *Kachakupi* (specially designed glass bottle with neck)
 - *Valuka Yantra* (sand bath setup)
 - Thermally insulated *Paka Bhanda* (furnace)

- Protective cloth and sealing materials for bottle neck³²

Procedure:

1. All ingredients are purified (*Shodhana*) and triturated (*Mardana*) to form *Kajjali*.
2. The mixture is filled into the *Kupi* and the bottle is sealed with a cloth and clay-smear cotton (*Mudrita Mukha*).
3. The bottle is placed in a sand bath and subjected to a triple-stage heating protocol:
 - *Mridu Agni* (mild heat) – 6 to 12 hours
 - *Madhyama Agni* (moderate heat) – 12 to 18 hours
 - *Tivra Agni* (intense heat) – till the product stabilizes
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5. Sublimated products are collected either from the neck (*Tālachūrṇa*) or base (*Rasasindūra*).³³

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- **Makaradhwaja** – A potent aphrodisiac and general tonic

- **Manikya Rasayana** – Indicated in *Kshayaaja Roga*, *Rajayakshma* (tuberculosis) Each of these formulations holds a prestigious place in *Rasaushadhi* therapy.³⁵

Therapeutic Applications

Kupipakwa Rasayana is used in:

- **Chronic infections** (*Rajayakshma*, *Kushtha*)
- **Autoimmune disorders** (*Amavata*, *Vatarakta*)
- **Respiratory ailments** (*Shwasa*, *Kasa*, *Hikka*)
- **Neurological diseases** (*Apasmara*, *Pakshaghata*)
- **Rejuvenative and aphrodisiac therapy** - Due to its *Sūkṣma*, *Vyavāyī*, and *Ashukārī* properties, it provides rapid systemic action.³⁶

Safety and Standardization

When classical protocols are followed—particularly proper *Shodhana*, precise heating duration, and correct collection technique—Kupipakwa Rasayana is safe and effective. However, without standardization and quality control, the risk of residual toxicity exists. In modern pharmaceuticals, these preparations are studied using advanced techniques like X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), and Atomic Absorption Spectroscopy (AAS) for safety profiling. With such tools, the classical knowledge of Kupipakwa Rasayana can be integrated into modern integrative medicine systems.³⁷

Conceptual Analysis of Pottali Rasayana

Pottali Rasayana is considered the most compact, potent, and sophisticated formulation in *Rasa Shastra*. The term “Pottali” refers to a “sealed bolus or pouch,” wherein a combination of finely processed *Rasa*, *Uparasa*, *Bhasma*, and *Herbo-mineral* drugs is enclosed and subjected to specialized heating. This formulation is unique due to its targeted action, high therapeutic potency, long shelf-life, and portability. Conceptually, it represents the epitome of Ayurvedic nanopharmaceutical thinking—condensing multiple powerful drugs into a small, easily administered form while enhancing efficacy through heat-induced transformation.³⁸

Methodology of Preparation

Key Ingredients:

- *Shuddha Parada* (mercury), *Gandhaka* (sulfur), *Loha Bhasma*, *Tamra Bhasma*, *Svarna Bhasma*, and various plant extracts depending on the indication.

Essential Equipment:

- Cloth or metallic foil (for binding the bolus), string, heating chamber (*Paka Bhanda*), *Musha* (crucible), and sometimes a *Valuka Yantra*.

Procedure:

1. Ingredients are finely powdered and mixed in specified ratios.
2. This mixture is enclosed tightly in a cloth or metallic wrapper to form a spherical bolus (*Pottali*).
3. The *Pottali* is tied and suspended or placed in a medium such as molten ghee, oil, or specific decoctions and subjected to *Paka* (regulated heat).
4. The heating causes chemical transformation, consolidation, and fusion of ingredients within the *Pottali*.
5. After cooling, the *Pottali* is preserved in an airtight container and administered in microdoses by scraping off the required quantity.³⁹

Pharmaceutical Importance

- Highly concentrated and potent form of medicine.
- Small dosage (typically 1–2 Ratti) is sufficient for therapeutic effect.
- Enclosure and controlled heating prevent oxidation or contamination.
- Excellent shelf-life and ease of transport make it ideal for emergency or long-term storage.
- Suitable for emergency use, life-threatening conditions, or rapid response therapies.

Classical Examples of *Pottali Rasayana*

- **Tamragarbha Pottali** – Used in gastrointestinal disorders, *Udara Roga*, and *Grahani*.
- **Svarnagarbha Pottali** – Effective in *Vishavikara* (toxic conditions), *Rajayakshma*, and *Jwara*.
- **Rasa Pottali** – Used in *Kasa*, *Shwasa*, and general debility.

- **Mr̥tyuñjaya Pottali** – A classical lifesaving formulation used in *Sannipata Jwara*, poisoning, and coma-like conditions.

These formulations are documented in texts such as *Rasa Tarangini*, *Rasa Ratna Samuccaya*, and *Ayurveda Sara Sangraha*.⁴⁰

Therapeutic Applications

Pottali Rasayana is employed in:

- **Acute and emergency conditions:** poisoning, snake bites, coma (*Mūrcchā*), or *Sannipāta Jwara*.
- **Chronic conditions:** tuberculosis (*Rajyakshma*), liver disorders, abdominal distension, and *Grahani*.
- **Neurological disorders:** convulsions, *Apasmara*, and paralysis.
- **Immunomodulatory and rejuvenative therapy**, especially *Svarna* and *Loha* based Pottalis. Its fast-acting, deep-penetrating, and disease-specific action makes it ideal in critical care within the Ayurvedic system.⁴¹

Safety and Standardization,

Despite their efficacy, *Pottali Rasayana* formulations must be used only under expert supervision due to their high potency and the inclusion of heavy metals. Proper *Shodhana*, *Bhavana*, and *Paka* ensure safety. In modern terms, *Pottali Rasayana* aligns with the concept of controlled-release nanomedicine. Analytical tools such as SEM, FTIR, AAS, and XRD are increasingly used to validate their safety, particle uniformity, and pharmacological properties. Their compact design and rapid effect make them highly relevant for standardized, evidence-based integrative medicine.⁴²

RESULT AND FINDINGS

1. The study successfully differentiated the four major types of *Rasayana* formulations—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali*—based on classical references, preparation techniques, pharmaceutical sophistication, and therapeutic intent.
2. *Kharaliya* formulations were found to be the most accessible and simplest in terms of preparation. They rely heavily on *Bhavana Samskara* and are suitable for outpatient use with broad applications in respiratory and neurological disorders. Examples like

Shwasakuthara Rasa and *Vatavidwamsana Rasa* are widely used due to their rapid absorption and ease of administration.

3. *Parpati* preparations offer unique benefits for gastrointestinal diseases due to their flake-like structure, which improves mucosal compatibility and absorption. *Loha Parpati*, *Panchamrita Parpati*, and *Tamra Parpati* were consistently documented for conditions like *Grahani*, *Atisara*, and liver disorders.
4. *Kupipakwa Rasayana*, such as *Rasasindura* and *Makaradhwaja*, emerged as highly potent formulations processed through complex sublimation and thermal transformation. They are indicated in deep-seated systemic diseases like *Rajayakshma*, *Amavata*, and *Kasa*. The study confirmed their superior bioavailability and long shelf life.
5. *Pottali Rasayana* demonstrated the highest potency in microdoses and are best suited for acute, life-threatening conditions like *Vishavikara*, *Jwara*, and *Mūrcchā*. Their preparation technique—encapsulation and heat transformation—enables long-term preservation and targeted therapeutic effect.
6. While *Kupipakwa* and *Pottali* offer maximum potency, they also require precise processing and expert handling due to their mineral and metallic content. Standardization, *Shodhana*, and toxicological testing are essential for their modern applicability.
7. All four types of *Rasayana* were found to hold potential for integration into modern evidence-based and integrative medical systems. Their pharmacological actions correlate with immunomodulatory, adaptogenic, and rejuvenative effects recognized by contemporary science.

DISCUSSION

The concept of *Chaturvidha Rasayana* demonstrates the depth of pharmaceutico-therapeutic innovation within *Rasa Shastra*. Each type—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali*—has a distinct method of preparation, reflecting the classical understanding of drug transformation and *Samskara*. These formulations represent an advanced form of *Rasayana Chikitsa*, wherein metals, minerals, and herbs are processed through sophisticated techniques to enhance potency, bioavailability, and specificity of action. Their individualized

preparation methods underline the adaptability and dynamism of *Ayurvedic* pharmaceuticals.⁴³

Kharaliya Rasayana, with its ease of preparation and safety due to absence of intense heat, is ideal for general clinical use. It is particularly effective in *Vata-Kapha* disorders such as respiratory illnesses and musculoskeletal conditions. *Parpati Rasayana*, on the other hand, is designed to act gently on the gastrointestinal tract. The flake-like texture ensures better assimilation in conditions like *Agnimandya*, *Atisara*, and *Grahani*. These two forms thus provide practical options in outpatient departments and for diseases requiring long-term but safe drug administration.⁴⁴

Kupipakwa and *Pottali Rasayana* are significantly more complex and demand precision in terms of thermal control and *Shodhana* (purification). Their high therapeutic potency makes them suitable for chronic, systemic, or life-threatening conditions such as *Rajayakshma*, *Vishavikara*, or *Apasmara*. Their small dose requirement and rapid systemic action demonstrate the *Sūkṣma*, *Vyavāyī*, and *Ashukārī* qualities, which are central to the effectiveness of *Rasaushadhis*. However, the need for expert handling and rigorous safety protocols must be emphasized in current practice.⁴⁵

From a modern medical viewpoint, these *Rasayana* types show promising parallels with concepts such as nanoformulations, controlled-release medications, and targeted therapy. Their documented actions—adaptogenic, antioxidant, immunomodulatory, and rejuvenative—are increasingly supported by preclinical and clinical studies. The increasing global interest in traditional medicine systems presents a strong case for integrating *Chaturvidha Rasayana* into complementary and integrative health care models, provided safety, standardization, and ethical prescribing guidelines are ensured.⁴⁶

Despite their therapeutic value, widespread clinical adoption of *Rasaushadhis* like *Chaturvidha Rasayana* is limited due to concerns regarding toxicity, standardization, and lack of regulatory clarity. Future research should focus on developing pharmacopeial standards, validating safety through modern analytical tools, and conducting randomized controlled trials. Incorporating Good Manufacturing Practices (GMP), toxicological profiling, and digital documentation of classical methods will help revive and legitimize these powerful formulations in mainstream Ayurvedic and integrative medicine.⁴⁷

COMPARATIVE TABLE: CHATURVIDHA RASAYANA

Aspect	Kharaliya Rasayana	Parpati Rasayana	Kupipakwa Rasayana	Pottali Rasayana
Meaning	Trituration-based Rasayana prepared in <i>Khalva Yantra</i>	Flake-like preparation poured on flat surface after heating	Sublimated preparation inside sealed glass bottle (<i>Kupi</i>)	Compact bolus/pouch of drugs sealed and heated in specific media
Main Instrument	<i>Khalva Yantra</i> (stone mortar & pestle)	<i>Gomaya Chulli</i> (cow dung furnace), iron plate	<i>Kachakupi</i> , <i>Valuka Yantra</i> , <i>Paka Bhanda</i>	Cloth or metallic wrapper, suspension string, <i>Paka Bhanda</i>
Key Process	Repeated <i>Bhavana</i> and <i>Mardana</i> (triturations)	Heating <i>Kajjali</i> and pouring on greased surface to form flakes	Multi-stage heating inside sealed glass bottle (Mridu-Tivra Agni)	Powdered drugs sealed, heated in liquid medium to consolidate
Heat Involvement	No high heat; only mechanical trituration	Mild to moderate open heating	Controlled intense heating in closed vessel	Medium to high heat, sometimes indirect (e.g., via oil/ghee decoctions)
Dosage Form	Fine powder	Thin flakes (crisp form)	Sublimated fine powder or crystal at neck/base of bottle	Solid spherical bolus; scraped off as needed
Potency Level	Mild to moderate	Moderate	High	Very high (microdose effective)
Therapeutic Use	Respiratory, neurological, digestive disorders	Gastrointestinal, liver, and spleen disorders	Chronic diseases, respiratory, TB, autoimmune conditions	Emergency care, poisoning, fever, unconsciousness

Examples	<i>Shwasakuthara Rasa, Vatavidwamsana Rasa</i>	<i>Loha Parpati, Tamra Parpati, Panchamrita Parpati</i>	<i>Rasasindura, Makaradhwaja, Rasakarpura</i>	<i>Tamragarbha Pottali, Svarnagarbha Pottali, Mrityunjaya Pottali</i>
Shelf Life	Moderate	Long	Very long	Very long
Ease of Preparation	Easiest among all; OPD-suitable	Requires skilled spreading and temperature control	Technically difficult; requires expertise and equipment	Complex but compact; suitable for high-value preparations
Safety Considerations	Safest if proper <i>Shodhana</i> done	Safer on gastric mucosa due to form	Needs expert handling; risk if poorly prepared	High potency—must be used under expert guidance
Modern Correlation	Herbal nanoformulations, triturated drug delivery	Sustained-release flakes, enhanced GI absorption	Closed-vessel sublimation, nano-metals, long-acting agents	Targeted drug delivery systems, emergency response capsules

CONCLUSION

The exploration of *Chaturvidha Rasayana*—*Kharaliya*, *Parpati*, *Kupipakwa*, and *Pottali*—reveals the profound scientific and therapeutic wisdom embedded in *Rasa Shastra*. Each formulation type showcases a unique blend of conceptual clarity, pharmaceutical innovation, and clinical applicability, tailored to meet specific disease profiles and patient needs. While *Kharaliya* and *Parpati* offer safer, easily administrable options for routine and gastrointestinal disorders, *Kupipakwa* and *Pottali* Rasayana demonstrate unparalleled potency for chronic, systemic, and acute conditions. The potential of these formulations in modern healthcare lies in their standardization, safety validation, and evidence-based clinical integration, paving the way for their revival as powerful tools in global integrative medicine.

CONFLICT OF INTEREST -NIL

SOURCE OF SUPPORT -NONE

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