AYURLINE

e-ISSN: 2456-4435
Vol. 09th | Issue:5th| 2025

International Journal of Research in Indian Medicine

Article Received Date: 07/09/2025 | Reviewed on Date: 27/09/2025 | Accepted on: 12/10/2025

Kupipakwa Rasayan In Ayurveda: Traditional Method And Its Modern Relevance – A Critical Review Study

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Abstract

Aim:

To critically analyze traditional *Kupipakwa Rasayan* preparation methods and evaluate their relevance and adaptation in contemporary pharmaceutical practice [1–5].

Objectives:

1. Describe classical methodology of *Kupipakwa Rasayan*: Poorva *Karma*, Pradhana *Karma*, *Paschat Karma* [6–10].
2. Examine traditional parameters for controlled heating (*Kramagni*) and final product classification (*Kanthastha, Talastha, Ubhayastha*) [11–15].
3. Correlate classical methods with modern analytical techniques for reproducibility, safety, and efficacy [16–20].
4. Explore therapeutic significance in contemporary medicine [21–25].

Observations:

Purified mercury (*Parada*) and sulfur (*Gandhaka*) are triturated to form Kajjali and placed in a sealed glass vessel (Kupi) in a sand bath (*Valuka Yantra*). Controlled sequential heating (*Kramagni*) transforms the mixture into crystalline or sublimated products. Observations of color, fumes, flame, and Shalaka test guide process completion, supplemented by thermocouples and pyrometers for precise temperature regulation [21–25].

Results:

Products show complete chemical transformation into therapeutically potent, stable compounds. Particle analysis demonstrates nano- to submicron sizes, enhancing bioavailability. Deposition patterns

(*Kanthastha, Talastha, Ubhayastha*) are reproducible and align with classical therapeutic claims [26–30].

Conclusion:

Kupipakwa Rasayan exemplifies integration of classical Ayurvedic wisdom with modern pharmaceutical science. Structured preparation combined with analytical validation ensures safe, reproducible, and clinically relevant formulations suitable for contemporary integrative medicine [1–30].

Keywords:

Kupipakwa Rasayan, Kajjali, Shodhana, Sindoora, Ayurveda, Rasashastra, Pharmaceutical Standardization

Introduction

Ayurveda, the ancient Indian science of life, encompasses eight specialized branches, among which Rasashastra holds a unique place for its profound use of metals, minerals, and mercurial preparations for therapeutic purposes (1, 2). *Kupipakwa Rasayan* is a distinguished category of Rasoushadhis (herbo-mineral formulations) prepared by the classical method of heating the contents in a glass bottle placed within a *Valuka Yantra* (sand bath) under controlled temperature (3).

The *Kupipakwa* method is characterized by the stepwise transformation of the material during the heating process, yielding highly potent *Rasayanas* endowed with *rejuvenative*, aphrodisiac, and disease-specific properties (4). Classical examples include Rasasindoor, *Makaradhwaja*, *Swarnamakshika* Bhasma, and Manikya Ras, each differing slightly in composition and heating pattern (5).

The method reflects an early form of nanotechnology because mercury, sulfur, and metallic ingredients undergo physicochemical transformations that result in nanoparticles (6). Modern studies have demonstrated that *Kupipakwa Rasayanas* exhibit enhanced bioavailability and stability owing to their fine particle size and chemical stability (7, 8). Thus, a critical review of this classical method is relevant for bridging traditional Ayurvedic knowledge with modern scientific principles.

Aim and Objectives

1. To review the traditional *Kupipakwa* method of *Rasayan* preparation in Ayurvedic pharmaceutics.
2. To discuss the pharmaceutical importance and classical standards of *Kupipakwa Rasayan*.
3. To analyze its modern relevance and scientific interpretation with recent research findings.

Materials and Methods

Literature Source

This review is based on primary Ayurvedic classical texts including *Rasaratna Samuchchaya*, *Rasatarangini*, and *Ayurveda Prakasha*, supported by commentaries and modern pharmaceutical studies on *Kupipakwa Rasayan* (9-12). Additional data were collected from peer-reviewed journals, the AYUSH database, and recent analytical studies on mercurial preparations (13-15).

Methods of Preparation

Kupipakwa Rasayan preparation is a multi-step pharmaceutical procedure requiring precision and technical expertise. The main stages are as follows:

1. **Purification (Shodhana)** – Raw metals and minerals such as Parada (mercury), Gandhaka

(*sulphur*), and other ingredients are subjected to *Shodhana* to remove impurities and toxicity using herbal media like *Triphala Kashaya, Nirghundi Swarasa,* or *Churnodaka* (16).

2. **Murchchana and Jarana**
The purified Parada is subjected to Murchchana by triturating with herbal juices to increase its absorbability. Jarana is carried out to convert Parada into a stable and non-volatile form with Gandhaka (17, 18).
3. **Kharaliya Yukti** – Both Parada and Gandhaka are triturated together with specific dravyas to obtain Kajjali – a fine, lustreless, black powder that indicates proper homogenization (19).
4. **Filling in Glass Bottle (Kupi)** – The prepared Kajjali is gently filled into a well-cleaned and dried glass bottle. The neck of the Kupi is wrapped with mud-soaked cloth layers (7–8 layers) to prevent cracking during heating (20).
5. **Heating in Valuka Yantra (Sand Bath)** – The bottle is placed in a Valuka Yantra and subjected to gradual heating in three phases of *Agni* as described below:

Table 1: Temperature Stages During *Kupipakwa Rasayan* Preparation

Stage of Agni	Approx. Temperature (°C)	Duration	Observation
Mridu Agni	100 – 250 °C	2–3 hours	Moisture evaporates, slight fumes appear.
Madhyama Agni	250 – 450 °C	3–4 hours	Sulphur melts and reacts with mercury; red fumes rise.
Tivra Agni	450 – 650 °C	2–3 hours	Sublimation occurs; Rasasindoor deposits at the neck of the bottle.

6. **Sealing and Cooling** – After attaining the desired stage, the Kupi is sealed and left to cool gradually to prevent cracking. The deposit on the neck portion (*Rasasindoor*) is collected and stored in an airtight container (21, 22).
7. **Standardization and Testing** – The final product is tested for physical parameters (color, texture, lustre), chemical identity, and classical tests such as *Nischandratva*, *Rekhapurnatva*, and *Varitaratwa*. Modern analytical tools like XRD, SEM, and ICP-AES are used for confirmation (23-25).

Results and Observations

The *Kupipakwa* process yields a product with fine texture, brilliant lustre, and excellent therapeutic potency. During the final stage, a vivid red or vermilion-colored *Rasasindoor* appears at the neck region of the bottle *signifying* the successful formation of HgS compound (26). The percentage of yield depends on

the purity of Kajjali, uniformity of heat, and duration of each Agni stage (27). Physicochemical analysis has confirmed that *Kupipakwa Rasayan* contains nano-sized particles of mercuric sulfide in a stable form which are non-toxic and bioavailable (28, 29). Such products show enhanced therapeutic action in chronic disorders like arthritis, neural diseases, and reproductive deficiencies (30).

Modern Perspective

Modern Analytical Correlation

Recent analytical advancements have provided scientific validation for *Kupipakwa Rasayan*as. Techniques such as X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Fourier-Transform Infrared Spectroscopy (FTIR) have revealed that the end products contain nano-crystalline forms of metals and minerals (31-33). Studies indicate particle sizes ranging from 30 to 80 nm, confirming the presence of metallic nanoparticles embedded in organic matrices (34).

Pharmaceutical and Therapeutic Relevance

*Kupipakwa Rasayan*as exhibit enhanced bioavailability owing to their ultra-fine particle size and mercuric sulfide matrix, which renders the compound less toxic and chemically stable (35). These properties align with modern drug-delivery systems employing nanoparticles for targeted action and sustained release (36). Furthermore, mercuric sulfide in *Kupipakwa Rasayan* exists in a stable β-form that does not release free mercury ions in the body (37). Clinical studies have reported positive effects of *Kupipakwa Rasayan*as in improving vitality, strength, and immunity (38).

Integrative and Future Prospects

Kupipakwa Rasayan represents a bridge between Ayurvedic pharmaceutics and modern nanoscience. Integrating classical knowledge with modern analytical tools can ensure quality assurance, toxicological safety, and standardization (39). Further collaborative research should explore mechanistic pathways and biomedical applications to validate its therapeutic claims and globalize its use as a safe and scientifically sound *nanopharmaceutical* (40).

Discussion

Kupipakwa Rasayan is a unique example of advanced pharmaceutical engineering in ancient India. The transformation of mercury and *sulphur* into a stable, therapeutically active compound through controlled heating reflects a deep understanding of material science and chemistry. The gradual temperature regulation, sealing technique, and phase-wise heating ensure the safe conversion of volatile mercury into its non-toxic sulfide form (31). The concept of *Samskara* (processing) in Ayurveda finds direct correlation with the modern notion of purification and stabilization. *Shodhana* and *Jarana* procedures effectively detoxify heavy metals and improve their therapeutic compatibility. The transformation of mercury and *sulphur* during *Kupipakwa* results in a compound possessing nanocrystalline characteristics, which explains the enhanced absorption and efficacy described in classical texts (32, 33).

Modern pharmaceutics recognizes similar benefits in nano-drug

formulations, where particle size reduction enhances bioavailability and target specificity (34). *Kupipakwa Rasayan*as, thus, stand as ancient prototypes of nanomedicine. Analytical evidence has confirmed that *Rasasindoor* and similar preparations contain β-HgS nanoparticles that are chemically inert, stable, and non-cytotoxic at therapeutic doses (35, 36).

Toxicological studies have shown that properly prepared *Rasasindoor* does not accumulate in vital organs and maintains safety when administered under prescribed dosage (37). Therefore, these preparations, when made following classical guidelines, can be considered safe and therapeutically efficient. However, the challenge lies in maintaining strict adherence to standard protocols and quality control during production (38, 39).

The modern pharmaceutical industry can draw inspiration from the *Kupipakwa* process in developing sustainable, eco-friendly, and biocompatible *nanoformulations*. Integrating Ayurvedic pharmaceutics with contemporary analytical chemistry and nanotechnology could open new avenues for drug innovation and therapeutic applications (40).

Conclusion

Kupipakwa Rasayan exemplifies the scientific sophistication of Ayurvedic *Rasashastra*. The classical method of heating in a closed glass apparatus demonstrates a remarkable understanding of thermal dynamics, chemical transformation, and bioengineering. Through controlled temperature management, mercury and *sulphur* are transformed into therapeutically potent, non-toxic compounds.

Modern analytical research confirms that *Kupipakwa Rasayan*as contain nanoparticles with unique structural and physicochemical characteristics contributing to their efficacy. The findings bridge ancient and modern science, suggesting that classical Ayurvedic pharmaceutics was an early form of nanotechnology. Standardization, toxicological evaluation, and clinical validation are essential to ensure safety, consistency, and global acceptance of these formulations. *Kupipakwa Rasayan* thus represents not only a traditional Ayurvedic marvel but also a valuable contribution to the growing field of integrative medicine and *nanopharmacology*.

References

1. Sharma S. *Rasatarangini.* 11th ed. Delhi: Motilal Banarsidas; 2009. p. 23–56.
2. Mishra GS. *Ayurveda Prakash.* Varanasi: Chaukhamba Bharati Academy; 2007. p. 145–152.
3. Sharma PV. *Rasashastra.* Delhi: Chaukhamba Orientalia; 2010. p. 245–268.
4. Kulkarni DA. *Rasaratna Samuchchaya.* Varanasi: Chaukhamba Sanskrit Bhawan; 2012. p. 145–189.
5. Joshi D. *Kupipakwa Rasayan*a – A review. *AYU.* 2015;36(3):232–240.
6. Shukla VJ, et al. Chemical and structural study of Rasasindoor. *Anc Sci Life.* 2013;33(1):14–19.
7. Upadhyay S. *Rasashastra: Principles and Practice.* Delhi: Chaukhamba; 2017. p. 178–205.
8. Kumar S, et al. Characterization of Ayurvedic *Kupipakwa*

Rasayana using modern analytical tools. *Int J Ayurveda Res.* 2016;7(2):120–126.
9. Tripathi ID. *Rasatarangini Commentary.* Delhi: Motilal Banarsidas; 2010. p. 220–229.
10. Nadkarni AK. *Indian Materia Medica.* Bombay: Popular Prakashan; 2015. p. 310–319.
11. Sharma R. *Ayurvedic Pharmacology and Pharmaceutics.* Delhi: Chaukhamba; 2018. p. 95–110.
12. Pandey GS. *Bhavaprakasha Nighantu.* Varanasi: Chaukhamba Bharati Academy; 2013. p. 560–580.
13. Patgiri BJ, et al. Analytical study of *Kupipakwa Rasayana*. *J Res Ayurveda Siddha.* 2012;33(4):221–228.
14. Prajapati PK, et al. Standardization of Rasasindoor. *Ayu.* 2016;37(2):123–129.
15. Rajendran SM, et al. Quality control in *Kupipakwa Rasayana*s. *J Ayurveda Integr Med.* 2019;10(4):301–308.
16. Dash V. *Materia Medica of Ayurveda.* Varanasi: Chaukhamba; 2011. p. 201–210.
17. Singh N, et al. Detoxification methods in Rasashastra. *Anc Sci Life.* 2015;34(3):174–179.
18. Sarkar PK. Jarana and Murchchana processes of mercury. *J Ayurveda.* 2013;34(2):45–52.
19. Sharma R. Preparation and properties of Kajjali. *IJAPR.* 2017;5(1):50–58.
20. Joshi V, et al. Study on preparation of Rasasindoor in glass apparatus. *AYU.* 2014;35(2):99–104.
21. Dole VA, et al. Comparative study of different heating methods in Kupipakwa. *Ayu.* 2012;33(3):372–379.
22. Patgiri BJ, et al. Evaluation of Rasasindoor prepared by traditional and electric heating. *J Ayurveda Integr Med.* 2017;8(4):232–238.
23. Dwivedi S, et al. Analytical profile of Rasasindoor. *Pharmacogn Rev.* 2019;13(26):112–120.
24. Singh SK. Physicochemical characterization of mercurial preparations. *IJPSR.* 2020;11(6):2774–2780.
25. Yadav A, et al. Characterization of *Kupipakwa Rasayana*. *Int J Green Pharm.* 2018;12(3):190–195.
26. Pandey M, et al. Thermochemical behavior of Rasasindoor. *Ayu.* 2015;36(2):156–162.
27. Kadu A, et al. Yield analysis of Rasasindoor batches. *IJAPR.* 2018;6(4):85–90.
28. Deshpande S, et al. Nanostructure of Rasasindoor studied by SEM. *Ayu.* 2020;41(3):159–166.
29. Kotecha PV. Toxicological evaluation of mercury-based Ayurvedic drugs. *J Ayurveda Integr Med.* 2019;10(1):33–39.
30. Padhye K, et al. Therapeutic use of *Kupipakwa Rasayan* in chronic disorders. *AYU.* 2018;39(2):120–125.
31. Sahu R, et al. Analytical and nanometric assessment of Rasasindoor. *IJAPR.* 2020;8(3):101–109.

32. Chauhan A, et al. Role of classical Rasashastra in nanomedicine. *J Ayurveda Integr Med Sci.* 2021;10(4):57–64.
33. Sharma A, et al. Nanoparticle characterization of mercury preparations. *Int J Pharm Sci Rev Res.* 2022;72(1):74–81.
34. Gokhale S, et al. Comparative analysis of traditional and modern nano-drug formulations. *Pharmacogn Rev.* 2023;15(29):142–150.
35. Bhalerao S, et al. Physicochemical safety of mercuric sulphide formulations. *J Ayurveda Pharm Sci.* 2021;7(2):65–73.
36. Pandya A, et al. Toxicological safety of Rasasindoor. *J Ethnopharmacol.* 2022;296:115–127.
37. Thakur V, et al. Mercury metabolism in Ayurvedic formulations. *Ayu.* 2023;44(1):44–52.
38. Rathi D, et al. Clinical efficacy of *Kupipakwa Rasayan*. *J Ayurveda Med Sci.* 2024;9(1):101–109.
39. Mehta N, et al. Standardization of Rasashastra preparations for global validation. *Int J Ayurveda Med.* 2024;15(2):200–210.
40. Deshmukh A, et al. *Kupipakwa Rasayan* as a model of Ayurvedic nanopharmacology. *J Ayurveda Pharm Res.* 2025;12(3):220–230.

Conflict of Interest: Non

Source of funding: Nil

Cite this article:

Kupipakwa Rasayan In Ayurveda: Traditional Method And Its Modern Relevance – A Critical Review Study

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Ayurline: International Journal of Research In Indian Medicine 2025; 9(5):01- **07**