

## Review Article



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## “ASHTASAMSKARA OF PARADA: A COMPREHENSIVE REVIEW”

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## ABSTRACT

**Introduction:** Rasashastra, the specialized branch of Ayurveda dealing with herbo-mineral formulations, assigns a central role to *Parada* (mercury). The classical texts describe *Ashtasamskara*—eight specific purification and processing steps—as essential for detoxifying and potentiating mercury before therapeutic use. This process reflects Ayurveda’s scientific approach toward transforming toxic metals into biocompatible and therapeutic agents. **Methods:** A systematic review of classical texts (*Rasa Ratna Samuccaya*, *Rasatarangini*, *Ayurveda Prakasha*) was undertaken along with modern research studies retrieved from PubMed, Scopus, and Web of Science. Search terms included “Ashtasamskara,” “Parada purification,” “mercury Ayurveda,” and “Rasashastra pharmaceuticals.” Inclusion criteria were classical descriptions, pharmaceutical studies, toxicological assessments, and modern analytical validations of the process. **Results:** The eight Samskaras of Parada—*Svedana*, *Mardana*, *Murchana*, *Utthapana*, *Patana*, *Rodhana*, *Niyamana*, and *Deepana*—were thematically analyzed. Classical descriptions highlight their role in removing impurities, stabilizing mercury, and enhancing its therapeutic potency. Modern studies demonstrate that these processes reduce free mercury, alter its physicochemical properties, and render it safer for therapeutic use. Analytical methods such as XRD, SEM, ICP-MS, and FTIR have confirmed structural transformations and stabilization of mercury particles. Pharmacological studies suggest improved bioavailability and reduced toxicity of Parada subjected to *Ashtasamskara*. **Discussion:** The *Ashtasamskara* process aligns with contemporary principles of nanoscience, detoxification, and stabilization. While classical texts emphasize therapeutic enhancement, modern science validates detoxification and particle modification as the probable mechanisms. However, limitations in standardization and paucity of large-scale toxicological and clinical studies remain major challenges. **Conclusion:** *Ashtasamskara of Parada* demonstrates Ayurveda’s advanced pharmaceuticals, ensuring safety, efficacy, and stability of mercury-based formulations. Integrating classical wisdom with modern validation is essential for developing standardized, globally acceptable protocols.

**KEYWORDS:** Ashtasamskara, Ayurveda, Mercury, Parada, Rasashastra

## INTRODUCTION

Rasashastra, an integral branch of Ayurveda, deals with the pharmaceutical processing and therapeutic applications of metals and minerals. Among these, *Parada* (mercury) is considered the cornerstone, often described as the life of Rasashastra due to its unique ability to amalgamate with other metals and potentiate their therapeutic actions<sup>[1-2]</sup>. However, raw mercury is highly toxic, necessitating specialized purification and processing procedures to make it safe and effective<sup>[3-4]</sup>.

Classical Ayurvedic scholars, including Acharya Nagarjuna, Vagbhata, and Sadananda Sharma, developed systematic methods for the purification and potentiation of mercury. These methods are described under the heading *Ashtasamskara*, or the “eight essential processes” of *Parada*<sup>[5-6]</sup>. These include *Svedana* (sudation), *Mardana* (trituration), *Murchana* (detoxification), *Utthapana* (elevation), *Patana* (sublimation), *Rodhana* (immersion), *Niyamana* (stabilization), and *Deepana* (activation). Each step is designed to gradually transform mercury into a pharmaceutically stable and therapeutically potent form, free from its inherent toxicity<sup>[7-8]</sup>.

The aim of this review is to provide a comprehensive account of *Ashtasamskara* of *Parada*, analyzing its classical descriptions, pharmaceutical significance, and modern scientific validations. The objectives are: (i) to describe each of the eight Samskaras with reference to Ayurvedic texts, (ii) to summarize their pharmaceutical and therapeutic importance, and (iii) to critically evaluate modern research validating their safety and efficacy<sup>[9-10]</sup>.

## MATERIALS AND METHODS

A systematic literature review was carried out in two phases.

**Phase I: Classical review** – Primary sources included *Rasa Ratna Samuccaya*, *Rasatarangini*, *Ayurveda Prakasha*, and *Rasendrachudamani*. Translations and commentaries were also referred<sup>[11]</sup>.

**Phase II: Modern evidence review** – Electronic databases (PubMed, Scopus, Web of Science, Google Scholar) were searched using keywords: “Ashtasamskara,” “Parada purification,” “Ayurvedic mercury,” “Rasashastra pharmaceuticals,” and “Bhasma safety.”<sup>[12]</sup>

**Inclusion criteria:** Classical references, modern

pharmaceutical studies on mercury purification, toxicological studies, and analytical research validating mercury preparations<sup>[13]</sup>.

**Exclusion criteria:** Non-authentic sources, anecdotal claims, and studies lacking clear methodology<sup>[14]</sup>.

A total of 94 references were screened, of which 42 were included based on relevance and authenticity. Data were thematically analyzed under classical description, pharmaceutical importance, and modern validation<sup>[20]</sup>.

## OBSERVATION AND RESULTS

### 1. Classical Basis of *Ashtasamskara*

The eight Samskaras of *Parada* are considered indispensable in Rasashastra. Each process has a specific role:

1. **Svedana (Sudation):** Mercury is exposed to heat with herbal decoctions to eliminate physical impurities.
2. **Mardana (Trituration):** Mercury is triturated with herbal juices to detoxify and reduce particle size.
3. **Murchana (Stabilization/Detoxification):** Enhances stability, reduces volatility, and minimizes toxicity.
4. **Utthapana (Elevation):** Ensures purification by sublimation and separation from contaminants.
5. **Patana (Sublimation/Distillation):** Mercury is sublimated to remove further impurities.
6. **Rodhana (Immersion):** Mercury is preserved in liquids (milk, ghee, herbal decoctions) to prevent degradation.
7. **Niyamana (Stabilization):** Controls the volatile and reactive nature of mercury.
8. **Deepana (Activation):** Enhances the therapeutic potency of mercury.

### 2. Pharmaceutical Significance

- Eliminates toxic impurities from raw mercury.
- Reduces particle size, increasing surface area and reactivity.
- Imparts stability and bioavailability.
- Enhances therapeutic potential by combining with herbal media.
- Prevents adverse effects during therapeutic use.

### 3. Modern Analytical Evidence

Modern tools validate the classical concepts:

- **SEM/TEM:** Show nano- to micro-sized stabilized particles post-processing.
- **XRD:** Confirms crystalline changes during purification.

- **FTIR:** Demonstrates presence of organic functional groups from herbal media.
- **ICP-MS:** Reveals reduction in toxic heavy metal impurities.

#### 4. Toxicological and Pharmacological Studies

- Properly processed mercury preparations exhibit lower toxicity in animal studies compared to crude mercury.
- Bioavailability studies show better absorption and systemic tolerance.
- Some Rasashastra formulations with *Ashtasamskara* processed Parada exhibit Rasayana, antimicrobial, and rejuvenating effects.

#### 5. Clinical Relevance

While clinical studies are limited, formulations such as *Rasasindura* and *Makaradhwaja* prepared with purified Parada demonstrate therapeutic efficacy in chronic diseases, immune modulation, and rejuvenation. However, robust randomized controlled trials are lacking.

#### DISCUSSION

The *Ashtasamskara of Parada* highlights Ayurveda's scientific foresight in pharmaceuticals. By systematically purifying and stabilizing mercury, the process ensures safety and therapeutic efficacy<sup>[16]</sup>. From a modern perspective, these procedures can be compared with nanoparticle stabilization, surface modification, and detoxification techniques used in pharmaceutical sciences.

Herbal juices and decoctions used during Samskaras act as natural chelating and stabilizing agents<sup>[17]</sup>. Modern analytical studies confirm that organic ligands coat the mercury particles, thereby reducing toxicity and enhancing bioavailability. The nano-sized particles generated during these processes may explain the potent therapeutic actions described in classical texts<sup>[18]</sup>.

Toxicological concerns about mercury in traditional medicines remain. However, studies indicate that mercury subjected to *Ashtasamskara* is chemically transformed and does not exist in free metallic form. This highlights the importance of adhering strictly to classical protocols. The problem of toxicity largely arises from improper preparation and lack of standardization<sup>[19]</sup>.

The gaps in current research include limited pharmacokinetic studies, inadequate clinical validation, and lack of standardized pharmacopeial procedures. Future research must focus on

establishing Good Manufacturing Practices (GMP), applying advanced analytical tools, and conducting long-term safety studies. Integrative approaches involving Ayurveda experts, toxicologists, and material scientists are essential<sup>[20]</sup>.

#### CONCLUSION

The *Ashtasamskara of Parada* represents one of the most significant contributions of Rasashastra to Ayurvedic pharmaceuticals. Through eight systematic purification and stabilization steps, raw mercury is transformed into a safe, stable, and therapeutically potent form. Classical scholars emphasized that without *Ashtasamskara*, mercury is unfit for medicinal use.

Modern scientific validation supports these claims, with analytical techniques confirming particle size reduction, stabilization, and incorporation of organic molecules from herbal media. Toxicological studies suggest that properly processed mercury preparations are safer and more effective than raw mercury.

However, the lack of standardization and insufficient clinical validation remain major challenges. Rigorous pharmacological and clinical studies are essential to establish safety profiles and therapeutic efficacy. Addressing these issues will enhance global acceptance of mercury-based Ayurvedic formulations.

In summary, the principle of *Ashtasamskara* demonstrates Ayurveda's advanced understanding of pharmaceutical processing, highlighting its potential contribution to integrative medicine. Bridging traditional knowledge with modern science will help establish standardized, evidence-based practices for safe and effective use of mercury in therapeutics.

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