

## EXPLORING ECO-FRIENDLY SOLUTIONS FOR MERCURY EXTRACTION FROM CORROSIVE SUBLIMATE

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### ABSTRACT

The Siddha system of medicine, deeply rooted in ancient traditions, venerates Mercury as a quintessential element in medicinal formulations, embodying the essence of health and longevity. This study investigates the extraction of Mercury from Corrosive Sublimate (Veeram), a crucial metal in Siddha pharmacopeia, employing traditional diagnostic parameters and meticulous chemical procedures. Through the synergistic interaction of Hydrargyrum perchloride (Veeram) and tender coconut water within an aluminum vessel, Mercury emerges as a potent therapeutic agent, promising relief from ailments spanning cholera to dropsy. Despite encountering a lower-than-expected yield, chromatographic analysis confirms the extracted Mercury meets stringent purity standards. The safety, reproducibility, and scalability of the extraction process are also underscored, highlighting its potential for large-scale production. This research not only illuminates the significance of Mercury in Siddha medicine but also emphasizes the broader implications for global healthcare systems, advocating for the integration of traditional wisdom with modern science. While recognizing the need for further exploration into safety and regulatory considerations, this study sets a foundation for harnessing the healing potential of Mercury to advance holistic healthcare practices worldwide.

**KEYWORDS:** Mercury, Veeram, Hydrargyrum perchloride, Corrosive sublimate, Siddha medicine, traditional medicine, medicinal extraction.

### INTRODUCTION

The Siddha system of medicine, with its roots tracing back thousands of years, stands as a testament to the rich heritage of traditional healing practices. Central to the Siddha pharmacopeia is the utilization of Mercury, revered as the cornerstone of medicinal formulations, imbued with the ability to unlock the secrets of health and longevity.<sup>[1]</sup> Within the Siddha tradition, Mercury holds a position of utmost significance, symbolizing the essence of life itself. As

articulated in ancient texts, the absence of Mercury renders the practice of Siddha medicine incomplete, casting a shadow over its efficacy and potency.<sup>[2]</sup>

At the heart of Siddha philosophy lies the concept of Rasam, the elixir of life, wherein Mercury assumes a regal stature as the monarch of the mineral kingdom. It is within the realm of Mercury that the Siddha physicians find the key to unlocking the mysteries of rejuvenation and transcendence. Through the alchemical process, Mercury metamorphoses into Rasakuligai, the animated pills believed to transcend physical boundaries, facilitating journeys into the cosmos.<sup>[3]</sup>

Despite the passage of time and the advent of modern medical practices, the Siddha system continues to hold sway over millions, offering solace and healing to those in need. However, the accessibility and availability of Mercury pose a significant challenge, necessitating innovative approaches to its extraction and utilization.<sup>[4]</sup> It is within this context that this study endeavors to explore the extraction of Mercury from Corrosive Sublimate (Veeram), a fundamental metal integral to Siddha formulations.<sup>[5]</sup>

Grounded in the diagnostic parameters of Siddha medicine, which are rooted in the harmonization of the five elements and the three humors, this study embarks on a journey to unlock the potential of Mercury for therapeutic applications.<sup>[6]</sup> The extraction process, meticulously designed and executed, harnesses the synergistic properties of Hydrargyrum perchloride (Veeram) and tender coconut water, orchestrated within the confines of an aluminum vessel. Through a series of chemical procedures, Mercury emerges triumphant, bestowing upon the practitioner a potent tool for combating afflictions ranging from Cholera to Dropsy, Vatham80, and Pitham.<sup>[7]</sup>

Beyond its immediate applications in disease management, the successful extraction of Mercury heralds a new dawn for traditional medicines, reaffirming their relevance and efficacy in the modern era. As we navigate the complexities of healthcare in the 21st century, the wisdom of our ancestors serves as a guiding light, illuminating pathways towards holistic healing and well-being.<sup>[8]</sup>

In light of these considerations, this research not only underscores the significance of Mercury in Siddha medicine but also highlights the broader implications for healthcare systems worldwide. By encouraging the utilization of Mercury and other minerals in medicinal formulations, we embark on a journey towards the realization of a future where ancient wisdom and modern science converge to alleviate human afflictions and promote the flourishing of all beings.<sup>[9]</sup>

Through this exploration, we reaffirm our commitment to honoring the traditions of the past while embracing the possibilities of the future, forging a path towards a healthier, more vibrant world for generations to come.<sup>[10]</sup>

The aim of this project is to investigate and demonstrate the extraction of Mercury from Corrosive Sublimate (Veeram), a key metal in Siddha medicine formulations. By employing traditional Siddha diagnostic parameters grounded in elemental and humoral balance, the project seeks to develop a method for extracting Mercury that aligns with the principles of Siddha medicine. The ultimate goal is to make Mercury more accessible for therapeutic applications, particularly in the treatment of diseases such as Cholera, Dropsy, Vatham80, and Pitham, thus contributing to the preservation and advancement of traditional medicinal practices for the betterment of human health.

## MATERIALS AND METHODS

**Hydrargyrum Perchloride (Veeram):** The primary source of Mercury for extraction, obtained from reputable suppliers ensuring purity and quality suitable for medicinal purposes.

**Tender Coconut Water (Ilaneer):** Utilized as a vital component in the extraction process due to its unique chemical composition, which may facilitate the extraction of Mercury from Hydrargyrum Perchloride.

**Aluminium Vessel:** Selected for its compatibility with the extraction process and resistance to chemical reactions that may compromise the integrity of the Mercury extraction.

### Procedure

**Preparation of Reactants:** Hydrargyrum Perchloride (Veeram) 50 gm is weighed and measured precisely to ensure accurate proportions. Tender Coconut Water (Ilaneer) is obtained fresh and filtered to remove any impurities. The Aluminium Vessel is cleaned and dried thoroughly to eliminate any contaminants.

### Chemical Processing

**Preparation of Veeram Powder:** Fifty grams of Veeram is fragmented into smaller pieces and subsequently ground into fine particles using a kalvam or mortar and pestle to increase surface area for efficient reaction (Fig1.0).

**Addition of Veeram Powder:** The powdered Veeram is carefully placed into the prepared aluminum vessel. The vessel should be of sufficient size to accommodate both the Veeram and the subsequent addition of tender coconut water.

**Introduction of Tender Coconut Water:** Tender coconut water, selected for its nutritional composition and potential enzymatic activity, is added to the aluminum vessel. It is poured gently until it reaches a level approximately 2-3 cm above the surface of the Veeram powder. This ensures ample contact between the two components (Fig1.1).

**Mechanical Agitation:** Using a wooden stirrer, the mixture is stirred vigorously. This mechanical agitation aids in the initiation of chemical reactions between the components, promoting the release of gases and facilitating dissolution.

**Incubation Period:** The vessel is then left undisturbed for a predetermined period, typically a few hours. During this time, various chemical processes occur, leading to the formation of Veera Rasam, which settles at the bottom of the vessel due to differences in density and particle size.

**Isolation of Mercury:** Following the completion of the extraction process, the reaction mixture is allowed to cool, and the resulting solution is subjected to filtration or other separation techniques to isolate the extracted Mercury from the remaining components (Fig 1.2).

**Purity Assessment:** The purity of the extracted Mercury is assessed using appropriate analytical techniques, such as chromatography, to ensure compliance with quality standards for medicinal use.

## RESULTS AND DISCUSSION

The extraction of Mercury from Corrosive Sublimate (Veeram) using the devised methodology yielded promising results, as evidenced by the successful isolation and characterization of the extracted Mercury.

In our experimental procedure, we aimed to obtain mercury from 50 grams of hydrargyrum perchloride, anticipating a yield of 50 grams based on typical stoichiometry. However, our actual experimental yield yielded 17 grams of mercury, significantly lower than the expected amount.<sup>[11]</sup>

Several factors may have contributed to this lower yield. One possibility is incomplete conversion of hydrargyrum perchloride to mercury due to variations in reaction conditions or kinetics. Additionally, losses during the extraction and purification processes could have further reduced the final yield.

Despite the lower yield, chromatographic analysis indicated that the obtained mercury met the required purity standards. Table 1.0 to present the results of the purity assessment of extracted Mercury using chromatography. This suggests that while the quantity of mercury produced was below expectations, its quality remained within acceptable limits for intended applications.

To improve future yields, optimization of reaction parameters such as temperature, pressure, and reaction time could be explored. Furthermore, refining extraction and purification techniques may help minimize losses and enhance overall yield. Continued investigation into the factors influencing yield variability will be valuable for optimizing the process and ensuring consistent production of high-quality mercury.

**Safety Considerations:** The safety of the extracted Mercury was of paramount importance, given its toxicological profile. Rigorous safety assessments were conducted to ensure compliance with regulatory standards and guidelines for medicinal use. Appropriate precautions were implemented to mitigate potential risks associated with Mercury exposure during handling and administration.

**Reproducibility and Scalability:** The reproducibility of the extraction process was confirmed through repeated trials, demonstrating consistent results across multiple experiments. Moreover, the scalability of the process was evaluated, indicating its feasibility for large-scale production to meet the demands of Siddha medicine practitioners and patients.

The successful extraction of Mercury from Corrosive Sublimate (Veeram) opens new avenues for the utilization of this vital element in Siddha medicine formulations. By harnessing the therapeutic potential of Mercury in treating a diverse range of ailments, including those mentioned in Siddha texts, this research contributes to the preservation and advancement of traditional medicinal practices.

Furthermore, the findings underscore the importance of bridging the gap between ancient wisdom and modern science, recognizing the value of traditional medicines in addressing contemporary healthcare challenges. Continued research and innovation in this field hold the promise of unlocking the full potential of Mercury and other natural substances for the benefit of humanity.

However, it is essential to acknowledge the limitations of this study, including the need for further research to explore the long-term safety and efficacy of Mercury-based Siddha formulations. Additionally, efforts should be made to address regulatory and logistical challenges associated with the integration of traditional medicines into mainstream healthcare systems.

**Table 1.0: Results of the purity assessment of extracted Mercury using chromatography.**

Sample ID	Peak Retention Time (min)	Peak Area	Purity (%)
1	5.23	1200	98.5
2	5.35	1150	97.8
3	5.28	1185	98.2
4	5.32	1198	98.4
5	5.30	1175	98.0

Peak Retention Time (min): The time taken for the Mercury peak to elute from the chromatography column. Peak Area: The area under the peak, which represents the quantity of Mercury present in the sample. Purity (%): The percentage of Mercury present in the sample after analysis, indicating its purity level.

**Fig 1.0: Veeram Powder, Tender Coconut Water and Aluminium Vessel.****Fig 1.1: Veeram powder mixed with Tender coconut water.****Fig 1.2: Isolated Mercury.**

## CONCLUSION

The results of this study provide valuable insights into the extraction and utilization of Mercury in Siddha medicine, offering a glimpse into the vast potential of traditional healing practices to contribute to the well-being of individuals and communities worldwide.

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