

The Medicinal Mercury and Modern Engineering- An Analysis of *Rasa Shastra* to Find its Relevance in Modern Chemical Engineering and Technology

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Abstract: Mercury, according to modern science, is highly toxic. It is incredible to find that this element and its compounds have been used to cure several deadly diseases, in the past. There is a separate branch of ancient Indian medicine that deals with Hg-based preparations. To make this ancient science of Mercury (*Rasa/ Parad* in Sanskrit) relevant to the modern world, one has to find how engineering aspects could be employed to carry out the purification and processing of Mercury. 'Why Engineering?' and 'How? Engineering?!', have been answered in this article.

Keywords: Rasa, Siddha, Ayurveda, Dust, Malignancies

1. Introduction

Rasa Shastra, a branch of ancient Indian Medicine, provides great knowledge about Mercury. It is said that this metal, in its purified form, can cure several deadly diseases. As engineers of the modern world, it is our duty to exploit this knowledge for the betterment of society. Applying modern technology to old science can create wonders. We find people suffering from diseases that are unbearable. Philosophically, man is born to suffer and to find ways for himself to overcome his sufferings. A deep thinking will help us realize how good this statement holds in reality. Modern medicine has no solution for many such diseases. Limited knowledge about the past has had a large role to play in this. We have, for our convenience, just accepted the fact that Mercury is highly toxic and thus cannot be used in Medicine. A research into the Rasa Shastra can throw light, not only on the medicinal value of Mercury but also on the relevance of this ancient science in modern engineering. It is the branch of Chemical Engineering that deals with Chemical Processing and Chemical Process Control. These two sub fields of Chemical Engineering can help bring lost science to existence.

2. Rasa Shastra- An Overview

Rasa Shastra is the science of Mercury. The work deals with mercury and its compounds. Several techniques have been suggested in the work to purify this toxic element and its compounds. Rasa Shastra has a great influence on Siddha and Ayurvedic systems of Medicine. Many Siddha and Ayurvedic Preparations are Hg-based. This has not had a great reach because of limited Engineering R&D. The techniques employed for the purification and processing of Mercury are time consuming. The equipment used for these procedures are conventional and thus hard to handle.

3. Rasa Shastra and Chemical Engineering

As mentioned in the previous section, equipment handling and time are the major drawbacks of this science, for the

modern world. Engineering in general has evolved to make techniques less time consuming and more efficient. Chemical Engineering, in particular, deals with making chemical processing more convenient. Applying principles of Process Design and Control to this field can create a breakthrough in the Pharmaceutical Industry. Highly effective Hg-based drugs can be manufactured on a larger scale with greater ease. For this, a better understanding of facts stated in the Rasa Shastra is very essential.

3.1 Mercury- As described in the Rasa Shastra

Rasa in Sanskrit, means Mercury. With Mercury as the central element, doctors of the ancient times have prepared several drugs. Apart from elemental Mercury, Mercury compounds have also been used for several preparations. A few compounds are mentioned below.

| Name of the Compound | Ancient Name |
|------------------------|----------------|
| Mercury Chloride | Veeram |
| Mercury Subchloride | Pooram |
| Red Sulfide of Mercury | Jathilingam |
| Mercurous Chloride | Rasa Karpooram |

Contributions to Rasa Shastra have been made by several Ayurvedacharyas and Siththars. According to them, the toxicity of elemental Mercury is because of Dust and Malignancies present in it. There are seven types of dust and eight types of malignancies. Techniques have been suggested to remove these dust and malignancies, so as to make Mercury fit for use in Medicine.

3.2 Modern concepts of Chemical Engineering will be of great use here. Removing the dust and malignancies involves a number of Heat, Mass and Mechanical Operations. The processes involve heating, scrubbing, extraction, grinding etc. Carrying out these operations with conventional equipment can be time consuming and less efficient. There is no doubt that carrying out the procedures with conventional equipment, in the right way, can produce effective drugs. Efficiency in terms of quantity is a matter of concern here. Effective medicines should be available in large quantities so that they can be administered (in the right

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proportion) on every ailing individual in this world. This large scale production can be made possible by Chemical Process Engineers.

3. Technique Analysis

Let us consider the following technique suggested by a Siththar named Thirumoolar, for the purification of elemental Mercury.

Ingredients Required:

Elemental Mercury (Rasa)
Crystalline Salt
Aloe Barbadensis extract

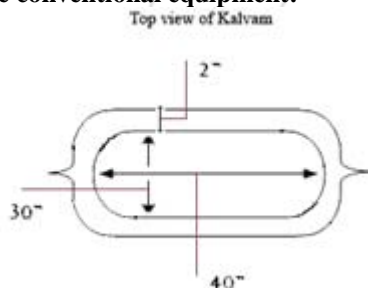
Procedure:

Equal amounts of elemental Mercury and crystalline salt are mixed together with extract of Aloe Barbadensis. The contents are ground for three days and pure Mercury is recovered through cleaning.

Equipment Description:

Kalvam is a kind of roller that is used by Siddha practitioners to grind ingredients. The Siththars have suggested the use of this equipment for grinding Mercury with other natural ingredients.

Design of the conventional equipment:



The design aspects of a Kalvam are clearly given in the work of another Siththar called Agathiyar. He says that the equipment should have a width of 30", a length of 40". The edge should have a dimension of 2". Both sides of this stone should be sharp. A separate roller is used for grinding the ingredients together in the Kalvam. The length of the roller should be 16" and the handle should have a dimension of 4". The grinding part of the equipment should have a size of 10".

3.1 Although specific details have been given clearly, it is not practically possible to employ the same technique for the purification process. A completely automated system for this procedure can help produce large quantities of purified Mercury in a short period of time. This article does not propose any particular design. An attempt has been made to give a different perspective for better research in the future.

4. Challenges

Several procedures have been laid down in the Rasa Shastra. The procedures have to be strictly adhered to, even if modern techniques are employed. Selection of materials for equipment construction is a major challenge. Most of the modern industrial equipment are made of metals or other

manufactured materials. If these materials are used for constructing equipment to purify Mercury, undesired products will be formed. Mercury, itself a toxic element in the ordinary form, may react with these synthetic materials and form poisonous products during the process. To overcome this challenge, a thorough analysis of materials suggested in the ancient texts, should be done. The next challenge will be the construction of equipment with these materials. Most of the materials suggested would be heavy in nature. Sometimes, availability of those materials will also be a challenge. This could be overcome by carrying out comprehensive research to find alternatives. This would involve materials testing and analysis.

5. Conclusion

This article has dealt with preliminary details given in the Rasa Shastra. An attempt has been made to give this ancient science a new perspective. Further engineering research will help bring this science, back to existence, completely.

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