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A review of *Mukta* : An Ancient drug in *Rasa Shastra*

Roshan Thakre,¹ Mayur Barve,² Sanjay Khedekar,³ Pandit Sawant.⁴

¹Post Graduate Scholar, ²Associate Professor, ³Assistant Professor, ⁴Professor, Department of Rasa Shastra and Bhaishajya Kalpana, Shree Saptashrungi Ayurved Mahavidyalay and Hospital, Nashik.

ABSTRACT

Rasa Shastra or preferably called as the ancient Indian Alchemy, deals with the preparation of medicines that has helped mankind since thousands of years. *Rasa* which means Mercury has been the chief area of interest for the Ancient Alchemists of *Rasa Shastra*. Along with safe use of Mercurial preparations as medicines since many years, *Rasa Shastra* also deals with preparation of other herbo-mineral compounds using varied drugs of plant as well as animal origin. One of the drug, that has been used widely in *Rasa Shastra* is *Mukta* or Pearl. There are several categories or groups of drugs (*Varga*) used in *Rasa Shastra* viz. *Maharasas*, *Uparasas* etc. whereas *Mukta* is classified under *Ratna* (precious gems) *Varga*. *Mukta* is a shining off white coloured hard spherical object found in sea shells. Due to its lucrative appearance it is widely used in jewelry, cosmetics, as well as in clothing. It is formed by deposition of several concentric layers of calcium carbonate and conchiolin around central nucleus. According to *Rasa Shastra* classics, *Mukta* has *Madhura*, *Sheeta* and *Laghu* properties. And so is widely used as a potent *Pitta Shamaka*. Its purification and *Pishti* processes are also mentioned in *Rasa Shastra* classics which makes pearl more potent to cure diseases. *Mukta* is also widely used in conditions like *Amlapitta*, *Jwara*, *Daha* etc.

Key words: *Rasa Shastra*, *Mukta*, *Ratna*.

INTRODUCTION

Rasa Shastra is one of the ancient sciences of alchemy that was developed in *India* many thousand years ago. There were two set of thinkers who used this profound knowledge for preparing higher metals and others used it for medicinal purposes. *Rasa* that chiefly means mercury was a particular area of interest for preparation of medicines for the

alchemists of *Rasa Shastra*. But there are also various other raw drugs from which effective medicaments were prepared. There was a good usage of certain metals, as well as minerals which were used in combination with raw drugs of plant origin to form herbo-metallic and herbo-mineral formulations. Many raw drugs were also procured from animals and were used effectively as medicines. Certain groups or *Vargas* were made to classify the raw drugs namely, *Maharasa*, *Uparasa*, *Dhatuvarga*, *Ratnavarga*, etc. One of the raw drugs that was particularly used from animal origin is *Mukta* or Pearl. According to *Atharvaveda*, *Mukta* is the substance that provides the body freedom from diseases and difficulties. *Garuda-Purana* says that when Sun moves into *Swati-Nakshatra*, the water drops that fall from the clouds gets into *Shukti* (Oyster shell) and transforms into *Mukta*^[1] (Pearl). It belongs to the class *Mollusca*, with latin name *Pinctada Margaritifera*. Pearl is an organic gem. It is obtained from the pearl shell or oyster found in the sea, river or different water sources. In

Address for correspondence:

Dr. Roshan Thakre

Post Graduate Scholar,

Department of Rasa Shastra and Bhaishajya Kalpana,

Shree Saptashrungi Ayurved Mahavidyalay and Hospital, Nashik.

E-mail: roshanthakare005.rt@gmail.com

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several European languages the word pearl is synonymous with bead. In simple terms, pearl is a whitish, hard and round object found within the soft tissue (specifically the mantle) of a living shelled mollusk, usually an oyster shell. It is made up of concentric layers of calcium carbonate in minute crystalline form. Almost all species of shelled mollusks are capable of producing pearls of lesser shine or less spherical shape.

Grahya Laxanas (desired characteristics)^[2]

Desired *Mukta* has luster like moon, it is bigger in size, good appearance, soft in touch, spherical, without any marks, with good weight. Its luster and color does not fade even after rubbing with *Gomutra* and salt.

Agrahya Laxanas (undesired characteristics)^[3]

The *Mukta* that is elongated in shape, undeveloped in one end, excessive dry, triangular, blackish, hampered lusture, with underdeveloped body is considered to be *Agrahya*.

Vernacular names

- Sanskrit - *Mukta*
- Bengali - *Mukta*
- Hindi - *Moti*
- Marathi - *Moti*
- Gujarati - *Moti*
- Arabi - *Lulu*
- English - Pearl

Synonyms^[4]

Mukta, *Mauktika*, *Shuktija*, *Muktaphala*, *Sauktikeya*, *Shashiratna*, *Shashipriya*, *Chandraratna*, *Chandrapriya*, *Shaktimani*, *Binduphala*, *Ambhasara*, *Saumyakara*.

Identification^[5]

- Chemical formula : CaCO_3
- Color : White, Pink, Silver, Cream, Golden, Green, Blue, Black, Yellow
- Cleavage : None
- Mohs scale hardness : 2.5-4.5
- Streak : White

- Specific gravity : 2.6-2.85

Sources of origin

According to *Ayurved Prakasha*, *Mukta* has eight sources. viz,

1. *Sukti* (Oyster shell)
2. *Shakha* (Conch-shell)
3. *Gaja* (Elephant)
4. *Varaha* (Pig)
5. *Sarpa* (Snake)
6. *Matrsya* (Fish)
7. *Dardura* (Frog)
8. *Venu* (Bamboo)^[6]

Shodhana of Mukta

Before using as a medicine, *Mukta* is purified before hand in order to eliminate any of its possible harmful or adverse effects. As such *Mukta* does not exhibit any potential poisonous alkaloid, but it is always better to follow the traditional procedures. *Shodhana* process is mentioned in various *Rasa Shastra* classics. For *Shodhana* procedure, *Mukta* is subjected to *Swedana* in *Dola Yantra* for 3 hrs in *Jayanti Patra Swarasa*^[7] or *Agasti Patra Swarasa*^[8] or *Churnodaka*^[9] (Lime-water).

Marana of Mukta^[10]

Purified *Mukta* is finely powdered and taken into mortar. Then some cow milk or rose water is added to it. Then this mixture is triturated into fine paste. Small *Chakrikas* are prepared and dried. These *Chakrikas* are then kept in earthen plates, sealed and subjected to incineration in *Laghu Puta*. Within three such *Putas*, *Bhasma* of *Mukta* is prepared.

Mukta Pishti^[11]

Purified *Mukta* is triturated in fine powder and is grinded well with rose water or *Nimbu Swarasa*. The mixture is triturated till it dries. This procedure is repeated for 21 times.

Pharmacological actions of Mukta^[12]

- *Rasa* - *Madhura*,
- *Virya* - *Sita*

- *Guna - Laghu*
- *Dosha – Pacifies Kapha and Pitta.*

It is very coolant, shows aphrodisiac effects, appetizer, useful in burning sensations, good for eyes and promotes complexion, useful in chronic fever and promotes growth to bones and teeth, good for heart, useful in diabetes, promotes intellect, useful in *Kshaya, Shwasa, Kaasa, Oseopenea, Vishahara*, etc.

Therapeutic dose^[13]

31.25 to 250mg (1/4 to 1 *Ratti*)

Charecteristics of Mukta

Luster

It is the most important characteristics, because it also shows the quality and depth of nacre. According to Rasa Paddhati, *Mukta* has three types of lusture, viz, *Madhuchaaya* i.e. just like honey, *Sitachaaya* i.e. just like sugar and *Shrikhandachaaya* i.e. just like a preparation made up of sugar and curd.^[14]

Shape

Shape can be round, baroque, oval, button, mabe, teardrop, etc. Round is the most favored and valuable. Baroque or irregular or potato shaped are some of the names given to odd shaped pearls. Oval shaped pearls are sort of like an egg. Button shaped are round but a little flat. Mabe are round on the top and flat on one side. Tear drop shapes lend themselves.

Size

Size is usually measured in millimeters; generally 7 mm - 7.5 mm is the most common size.

Color

Color for freshwater can be peach, black, lavender, white or pink.

Surface

Surface can be perfect or near perfect, contains small pits.

Physical Properties

- **Hardness:** 2.5-4
- **Texture:** Slightly rough; the age-old tradition of rubbing a pearl against ones teeth to detect this

roughness differentiates pearl from smooth imitations.

- **Luster:** Pearly
- **Specific Gravity:** varies with source and with the type of nucleus; the naturally occurring range from 2.66-2.78, whereas cultured pearl ranges from 2.72-2.78.
- **Toughness:** Fair, soft and easily damaged by acid and skin oil.

Occurrence and availability

It is available in natural and artificial forms.^[15] It is found in ocean, river, big lakes etc. The important sources of pearls are Sea coasts in India, China, Japan, Australia, Sulu Archipelago, Central America, and the rivers of Europe and North America. In ancient times the Red Sea was an important source.

Formation of Pearl

The formation of *Mukta* or Pearl is by two methods viz. Natural and Cultured. There is no human intervention in the natural method. Whereas cultured are prepared artificially.

- Natural Method:** When an irritating microscopic object gets trapped in oyster shell or any mollusk shell it causes irritation to the internal mantle fold of the oyster and in response to this irritation it starts to neutralize that object by secreting its secretions around that object. The mantle of the mollusk deposits layers of calcium carbonate (CaCO₃) in the form of the mineral aragonite or a mixture of aragonite and calcite held together by an organic horn like compound called conchiolin. The combination of aragonite and conchiolin is called nacre, which makes up the mother of pearl. The commonly held belief that a grain of sand acts as the irritant is in fact rarely the case. Typical stimuli include organic material, parasites, or even damage that displaces mantle tissue to another part of the mollusk's body. These small particles or organisms gain entry when the shell valves are open for feeding or respiration. As this process progresses, the shell itself grows, and the pearl sack seems to travel into the shell. However, it

actually stays in its original relative position within the mantle tissue.

- b. Artificial (cultured) Method:** A cultured pearl is formed in a pearl farm, using human intervention as well as natural processes. Cultured pearls are the response of the shell on a tissue implant. A tiny piece of mantle tissue of a donor shell is transplanted into a recipient shell. This graft will form a pearl sac and the tissue will precipitate calcium carbonate into this pocket. There are a number of options for producing cultured pearls: use freshwater or seawater shells, transplant the graft into the mantle or into the gonad, add a spherical bead or do it non-beaded.

Purity test

Cultured pearls (beadless or beaded) and imitation pearls can be distinguished from natural pearls by X-ray examination. Nucleated cultured pearls are often 'pre-formed' as they tend to follow the shape of the implanted shell bead nucleus. Once the pre-formed beads are inserted into the oyster, it secretes a few layers of nacre around the outside surface of the implant before it is removed after six months or more. When a cultured pearl with bead is X-rayed, it reveals a different structure to that of a natural pearl. A beaded cultured pearl shows a solid center with no concentric growth rings, whereas a natural pearl shows a series of concentric growth rings. A beadless cultured pearl (whether of freshwater or saltwater origin) may show growth rings, but also a complex central cavity, witness of the first precipitation of the young pearl sac.

Formulations of Mukta

Muktapancamrta,^[16] *Vasantakusumkara*,^[17]
Pravalapancamruta,^[18] *Kamdudha Rasa*,^[19]
Vasantatilaka Rasa,^[20] *Bruhatvatichintamani*,^[21]
Varishoshana Rasa,^[22] *Hiranya-garbhapottali*,^[23]
Navaratnarajmruganka Rasa.^[24]

CONCLUSION

A variety of drugs of plant, mineral and animal origin is been used effectively in *Rasa Shastra*, *Mukta* or pearl being one of them. Even though it is not toxic in origin, its *Shodhana* is advised to prevent any

untoward effects before processing it into any formulations. *Mukta* is used in many formulations of *Rasa Shastra* along with its *Pishti* chiefly administered in *Pittaj* and *Kaphaj* disorders. It occurs in natural and cultured form. *Mukta* is *Sheeta* in property hence used in *Daaha*, *Amlapitta*, *Jvara*, *Trishna*, etc. The main chemical constituent of *Mukta* is calcium carbonate along with traces of other elements that may be responsible for its variety of uses. Thus *Mukta* not only proves itself to be one of the most competent sources of sea calcium but also stands firm in ornamental usage.

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