

### ***Mukta*: Drug of Animal Origin used in Ayurvedic Medicines**

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#### **Abstract**

*Mukta* (Pearl) is a shining pearly white hard object found in some sea shells. Due to its attractive appearance it is widely used in jewelry, cosmetics as well as in stylish clothing. Pearl is also considered as *ratna* or gemstone corresponding to planet moon. Pearl is formed by deposition of several concentric layers of calcium carbonate and conchiolin around central nucleus. A Pearl which spontaneously occurs in nature usually on sea shores is called as Natural Pearl. Cultured pearl or artificial pearl is formed after human intervention in natural pearl formation. Round shaped pearl is considered as good but round pearl is rare. An oval and other shape of pearl is usually found.

Uses of Pearl in ayurvedic medicine are mentioned since time of *charaka* and *sushruta*. In Rasashastra classics Pearl is mentioned in *Ratnavarga*. *Mukta* or pearl is having *sheeta*, *Madhur*, *laghu* properties. Hence beneficial to cure *pitta* and *kapha* vitiated diseases. Purification and incineration processes are also mentioned in Rasashastra classics which makes pearl more potent to cure diseases. *Mukta* is very useful in *Amlapitta*, *Jwara*, *Chhardi*, *trishna*, *Daah* diseases.

#### **Keywords**

*Mukta*, *Pearl*, *RatnaVarga*, *Rasashastra*



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## INTRODUCTION

According to *Atharva-veda*, *Mukta* is defined as that substance which provides the body freedom from diseases and difficulties. It is said in *Garuda-Puran* that when sun moves into *Swati-Nakshatra*, the water drops that fall from the clouds get into the *shukti* (oyster shell) and transform into *Mukta*<sup>1</sup> (pearl).

A 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. A Pearl is made up of concentric layers of calcium carbonate in minute crystalline form. Good quality pearl is perfectly round and smooth, but many other shapes of pearl also occur. The finest quality natural pearl is considered as gemstone and object of beauty for many centuries. Because of this, the word pearl has become a metaphor for something very rare, fine, admirable and valuable. Almost all species of shelled mollusks are capable of producing pearls of lesser shine or less spherical shape. Although these may also be legitimately referred to as "pearls" by gemological labs and are formed in the same way, most of them have no value, except as curios.

### Pearl Formation –

When an irritating microscopic object gets trapped in oyster shell or any mollusk shell it causes irritation to internal mantle fold and in response to this irritation it starts to neutralize

that object by secreting its secretions around that microscopic object. The mantle of the mollusk deposits layers of calcium carbonate ( $\text{CaCO}_3$ ) 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 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. After a couple of years, a pearl will have formed and the shell might be found by a lucky pearl fisher.

In cultured pearls, the irritant is typically an introduced piece of the mantle epithelium, together or without a spherical bead (beaded or beadless cultured pearls).

Nacreous pearls, the best-known and most commercially-significant pearls, are primarily produced by two groups of molluscan bivalves or clams. A nacreous pearl is made from layers of nacre, by the same

living process as is used in the secretion of the mother of pearl which lines the shell.

Saltwater pearls can grow in several species of marine pearl oysters in the family Pteriidae. Freshwater pearls grow within certain (but by no means all) species of freshwater mussels in the order Unionida, the families Unionidae and Margaritiferidae.

There are two origins of Pearls, Natural and cultured<sup>2</sup>.

The difference between wild and cultured pearls focuses on whether the pearl was created spontaneously by nature – without human intervention – or with human aid. Pearls are formed inside the shell of certain mollusks as a defense mechanism against a potentially threatening irritant such as a parasite inside its shell, or an attack from outside, injuring the mantle tissue. Natural pearl-

Natural pearls are nearly 100% calcium carbonate and conchiolin. It is thought that natural pearls form under a set of accidental conditions when a microscopic intruder or parasite enters a bivalve mollusk, and settles inside the shell. The mollusk, being irritated by the intruder, forms a pearl sac of external mantle tissue cells and secretes the calcium carbonate and conchiolin to cover the irritant.

This secretion process is repeated many times. The most valuable pearls occur spontaneously in the wild, but they are extremely rare. These wild pearls are referred to as natural pearls

. A "natural pearl" or "wild pearl" is one that forms without any human intervention at all, in the wild and is very rare. Many hundreds of pearl oysters or pearl mussels have to be gathered and opened, and thus killed, in order to find even one wild pearl, and for many centuries that was the only way pearls were obtained. This was the main reason why pearls fetched such extraordinary prices in the past.

Cultured/Farmed Pearls-

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. The large majority of saltwater cultured pearls are grown with beads, the trade name of the cultured pearls are Akoya, white or golden South sea, black Tahitian. The majority of beadless cultured pearls are mantle-grown in freshwater shells in China, known as freshwater cultured pearls.

Cultured or farmed pearls from pearl oysters and fresh water mussels make up the majority of those that are currently sold. Imitation or fake pearls are also widely sold in inexpensive jewelry, but the quality of their iridescence is usually very poor, and generally speaking, artificial pearls are easily distinguished from genuine pearls. Pearls have been harvested and cultivated primarily for use in jewelry, but in the past they were also stitched onto lavish clothing. Pearls have also been crushed and used in cosmetics, medicines and in paint formulations.

#### **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.

#### **Vernacular names-**

Sanskrit	- <i>Mukta</i>
Hindi	- <i>Moti</i>
Bengali	- <i>Mukta</i>
Marathi and Gujrati	- <i>Moti</i>
Arabi	- <i>Lulu</i>
English	- <i>Pearl</i>

#### **Synonyms<sup>3</sup>-**

<i>Mukta,</i>	<i>Mauktika,</i>
<i>Shuktija,</i>	
<i>Muktaphala,</i>	<i>Sauktikeya,</i>
<i>Shashiratna,</i>	
<i>Shashi-priya,</i>	<i>chandra-ratna,</i>
<i>Chandra-priya,</i>	
<i>Shaktimani,</i>	<i>Bindu-phala,</i>
<i>Ambhasara,</i>	
<i>Saumyakara.</i>	

#### **Identification<sup>4</sup>-**

Chemical formula	: $\text{CaCO}_3$
Color	: white, pink, silver-, cream-, golden-colored, green, blue, black, yellow
Cleavage	: none
Mohs scale hardness	: 2.5-4.5
Streak	: white
Specific gravity	: 2.6-2.85

According to Ayurveda Prakasha it has 8 sources of origin<sup>5</sup>:

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)

### Shodhana- (Ayurvedic Purification Method)

Before using in Medicine, *Mukta* is purified to eliminate its harmful or adverse effects.

Method of Purification or Shodhana is mentioned in various Rasashastra classics.

जयन्तीस्वरसेनेहदोलायन्त्रेविधानतः।

यामैकंसततंस्विन्नमौक्तिकंशुद्धिमाप्नुयात्॥<sup>6</sup>

It is subjected to Svedana in dola-yantra for 3 hrs in the juice of jayanti plant. (clerodendronphlomis)

अगस्त्यद्रवयोगेनयामंस्विन्नमनारतम्।

दोलायन्त्रेपोट्टलीस्थंशुद्धिमायातिमौक्तिकम्॥

सुराप्रदीपवह्निनाशरावगंतुमौक्तिकम्।

सुधोदकेनपाचितम्विशुद्धिमेत्यनुत्तमाम्॥<sup>7</sup>

This process of svedana can also be done in juice of Agastyapatra (*sesbaniagrandiflora*) or Curnodaka (Lime-water).

### Marana-

विमलंमौक्तिकंगव्यपयसापरिपेषितम्।

त्रिधालघुपुटेपक्वंमृतंस्याच्छशिसुन्दरम्॥<sup>8</sup>

Purified *Mukta* was made into fine powder and taken into mortar. Then some cow milk is added to grind this mixture to fine paste. Then small coin shaped *chakrikas* were prepared and dried in shade. These *chakrikas* were kept amidst earthen plates, sealed and subjected to incineration in smaller puta. Within three such putas *Mukta* becomes *bhasma*.

Cow's milk can also be used in the place of rose water.

The colour of *Muktabhasma* is to be white and this *bhasma* should pass through all *parikshas* of *bhasma* like *rekha-purnatva*, *Apunarbhavata*, *Varitaratva* etc.

Chemically this becomes  $CaO_2$  and hence it has corrosive action on buccal cavity on direct use. Honey goes with *Muktabhasma* as a better vehicle to avoid this problem.

*MuktaBhasma* physical properties-

Colour - white

Odour - No Odour

Taste -Tasteless

*Bhasma* Analysis<sup>9</sup>-

Calcium as Ca -min. 40.0% w/w

Max 45.0% w/w

Calcium as CaCO <sub>3</sub>	-max.	99.39% w/w
Bhasmaquanity	-min.	54.25% w/w
	-max.	56.20% w/w
Acid insoluble ash	-1.5% w/w	
Loss due to heat	- 0.61% w/w	

### **Mukta Pisti<sup>10</sup>**

Purified *Mukta* was ground to fine powder, added with rose water and ground for 2 days. It was preserved on drying and used in the name of *Mukta-pisti*. This has no corrosive action as *Muktabhasma*.

Pisti Physical properties-

Colour - white

Odour - Aromatic

Taste -Tasteless

Pisti Analysis<sup>11</sup>-

Calcium as Ca	-max.	96.46% w/w
Sodium As Na	-trace	
Potassium	-trace	
Chloride	-trace	
Sulphate	-trace	

Pharmacological Action-

### **Important Formulations<sup>14</sup>**

मुक्ताफलं लघुहिमं मधुरं च कान्तिदृष्ट्यग्निपुष्टिकरणं विषहारिभेदि।

वीर्यप्रदं जलनिधेर्जनिता च शुक्तिर्दीप्ता च पक्तिरुजमाशुहरेदवश्यम्।<sup>12</sup>

कफपित्तक्षयध्वंसिकासश्वासाग्निमान्द्यनुत्।

पुष्टिदं वृष्यमायुष्यं दाहघ्नं मौक्तिकं मतम्।।

Rasa - *Madhura*,

Virya - *Sita* and

Guna - *laghu* in nature.

Also *Mukta* mitigates *Kapha* and *Pitta*.

It improves skin tone and vision. It also strengthens digestive fire. It act as *Vishaghna* and *bhedi*, bestows strength, kills pain. It also helps to cure *Kasa*, *Swasa*, *Agnimandya*. It acts as aphrodisiac and anti-pyretic also acts very well on burning sensation.

It is useful in bone-fracture, oedema, *ksaya*, weakness, especially given in *pradara*, jaundice, boils, wounds, diarrhoea.

**Therapeutic Dose<sup>13</sup>**- 125 – 250mg (1 to 2 ratti)

Formulations	Indications	Reference
<i>Muktapancamrta</i>	Kasa , Jirnajvara, RajayakSma, Ksaya	Rasamrutam, 9/ 137-139
<i>VasantaKusumakar</i>	Meha, ValiPalita, SmrtiBhramsa, Ksaya , Somaroga, Karçya	Rasendrasarasangraha, Rasayanavajikaranadhikara 80-85
<i>Pravalapancamruta</i>	Anaha, Gulma, Udararoga, PlihaRoga, Kasa, Svasa, Agnimandya, Ajirna, Grahani, Atisara , Hrdroga	Bhaisajyaratnavali, Gulmadhikara: 139-143
<i>BruhatKasturibhairava rasa</i>	Amatisara, Grahani, Kasa, Jvara, SannipataJvara, SarvaJvara, Visamajvara, Jvaratisara, Agnimandya, Meha, Halimaka ,Jirnajvara	Bhaisajyaratnavali, Jvaradhikara: 723-730
<i>Kamdudha rasa</i>	Pittavikara, Amlapitta, Daha, Murccha, Bhrama, Sirahsula, Somaroga, Pradara, Raktapitta	RasatantrasaraVa Siddha PrayogaSangraha, KharaliyaRasayana: 80
<i>Kanchanabhra rasa</i>	Ksaya, SlesmapittajaKasa , Prameha, Vataroga	Bhaisajyaratnavali, Rajayaksmadhikara: 264-269
<i>Grahanikapata rasa</i>	GrahaniRoga, Agnimandya, KÅaya, Svasa, Urahksata	Brhadyogatarangini, Saptasastitamastaranga, Grahanicikitsa: 67-68
<i>Vasantatilaka rasa</i>	Kasa, Svasa, Pandu, Ksaya ,Sula, Grahani, Visa (Poison), Prameha, Hrdroga, Jvara	Rasendrasarasangraha, Rasayanavajikaranadhikara: 78-79
<i>BruhatVataChintamani rasa</i>	VataPittajaRoga, Bhrama, Pralapa	Bhaisajyaratnavali, Vatavyadhyadhikara: 502-505
<i>Vasantamalati rasa</i>	JirnaKasa, Visamajvara, Jirnajvara	Siddhabhaisajyamanimala, Jvaraprakarana: 60-62
<i>Varishosana rasa</i>	Grahani, Pandu, Jalodara, Sotha, Urastoya, Kustha, Agnimandya, PlihaRoga, Sularoga, Udara, Daurbalya, Vaivarnya	Bhaisajyaratnavali, Udararogadhikara: 129-144
<i>Hiranya-garbhapottali</i>	Mandagni, Grahani, Visamajvara, Arsha, Atisara, Svasa, Kasa, Pinasa, Sotha, Pandu, Yakrut-pliharoga	Bhaisajyaratnavali, Grahanirogadhikara: 498-505

## CONCLUSION

Formulations having *Mukta* as one of the main ingredients are highly effective in various diseases. *Mukta* is having very sheet property hence can be used in *daah*, *amlapitta*, *jvar*, *trishna*. By its *MadhurRasa* and *sheetaviryaMukta* act as a *pittaghna*, *chhardighna*. While using *Mukta-bhasma* as a medicine, precautions should be taken by vaidyas because of corrosive nature of *Muktabhasma*. Generally in practice *Mukta* is used in a *pisti* form. *MuktaBhasma* is very rarely manufactured on commercial level.



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