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AYURVEDIC DRUGS FROM MARINE ORIGINATES

Arindam Mallick^{*1},

Siddhendu Bhattacharya¹, Sibasis Bhattacharya¹, Dileep Singh Baghel¹

¹Lovely School of Pharmaceutical Sciences, Lovely Faculty of Applied Medical Sciences, Lovely Professional University, Phagwara, Punjab, India.

ABSTRACT

Ayurveda is a treasure of remedies in which various medicinal preparations are widely prepared by using marine originated drugs. These are used by Ayurvedic physician in their day today practice in bone structure disorders, muscular movements, and regulation of gastrointestinal secretions. Majority of such formulation are used for oral (internal) administration purpose with negligible ill effect noticed and considerable safe. Sea is one of the richest natural sources of minerals like Calcium (Ca) , Phosphorus (P),Iron (Fe) and also some others trace elements in the form of Pravala(Coral),Mukta(Pearl),Shankh(Conch). Marine organisms which contribute their bio-active products are having profound applications in pharmaceuticals & cosmeceuticals. All the Marine originated drugs used in Ayurveda are to be kept under one specific group (as per occurrence/Utpatti sthan) with special reference to their uses and Other details of calibration and validation measure such as chemical Constituents, Structures, and Analytical techniques are also been discussed. This attempt has been made to accumulate all scattered literature in one place for easy and better understanding of all marine drugs of Ayurveda.

KEYWORDS : Ayurveda, Marine originated drugs, Minerals, Applications.

INTRODUCTION

Pharmaceutical market is growing rapidly and continuously. But, still the demand for new drug discovery is encouraged. The reason behind this motivation can be the growing numbers of drug-resistant infectious disease and more and more upcoming disorders. The terrestrial resources have

been greatly explored and thus academic and industry researchers are striving to get lead molecules from the inner space of oceans.

The marine resources are nowadays widely studied because of numerous reasons. One of the reasons is as the oceans cover more than 70% of the world surface and among 36 known living phyla, 34 of

Correspondence to Author

Arindam Mallick

Lovely School of Pharmaceutical Sciences, Lovely Faculty of Applied Medical Sciences, Lovely Professional University, Punjab-144411, India.

Email: arindam.mallick.dgv@gmail.com

them are found in marine environments with more than 300000 known species of fauna and flora. The rationale of searching for drugs from marine environment stem from the fact that marine plants and animals have adapted to all sorts of marine environments and these creatures are constantly under tremendous selection pressure including space competition, predation, surface fouling and reproduction.¹

Although research on marine natural products started only about 50 years ago, they have been used in traditional system of medicine much before that. In most countries with ancient civilizations, such as India, a system of medicine indigenous to the country concerned exists. In spite of all the recent advances in medicine, indigenous medicine still caters to the needs of a large section of population. Knowledge gained over trial and error over thousands of years in India has been systematized as different systems in Indian medicine. These drugs are used singly or in simple combinations or as compounds referred as polypharmaceuticals. The forms in which they are used are varied like extracted juices, decoctions, powders, tablets, pills, confections, syrups, fermented liquid, medicated oil (ash) and many more².

Marine products are those products or substances, which are obtained from sea. They have many properties due to which they are used therapeutically in Ayurveda since antiquity. The evolution and development of rasa shastra occurred due to the necessity for using the natural products in the field of medicine. Though some of these products were having used as a part of food yet others need to get purified and processed so that they can be used for medicinal purposes. Rasa shastra deals with the study of minerals, metals, precious stones, animal originates, marine originates poisons etc, which we are found in nature in crude form. These substances were purified, processed and converting them into a suitable form for therapeutical usage. Rasa shastra is an energetic division of Ayurveda which broadly classify various marine drugs like Sambuka, Samudra phen, Mukta, Sukti, Sankha, Praval

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(Vidrum), Samudra lavan, Varatika (Kapardak) into several Vargas (groups) like Shudha (Emblica/water), Ratna (Gem and Jewels), Sikta (Wetted), Lavan (Salt) varga, Sadharan rasa etc.

Sea is one of the richest mineral sources like calcium (Ca), Phosphorus (P), Iron (Fe) etc as it is seen maximum of these products are composed of CaCO₃. As per Utpatti sthana (Occurrence) all these scattered marine drugs used in Ayurveda can be kept under one Varga for better understanding of all the drugs. It is a very high time to regroup all the scattered marine originates which are described in Ayurveda with their full details. As we all know that maximum of the marine originates constitutes mainly with CaCO₃, so, first an overlook is necessary on the natural sources of calcium (Ca).

AIMS AND OBJECTIVES:

To highlight the therapeutic efficacy of marine originates in Ayurveda and explore the importance of marine originates and their safety profile.

DESCRIPTION OF MARINE ORIGINATES:

A. Shankha

Gastropoda is the largest class of molluscs containing species and includes snails, slugs, limpets, whelks etc. The most characteristic feature is spirally coiled shell. These are enclosed within a shell and visceral mass. It is found very commonly in Indian Ocean coasts (Fig. 1).³

In Indian mythology, the Shankha is regarded sacred and very auspicious. To initiate religious ceremonies, a shankha (conch shell) is blown. It is a major Hindu article of prayer. God Vishnu, the God of Preservation, is shown with a shankha in one hand and a disc or a chakra in the other. Each Hindu shankha has a specific name. Vishnu's shankha is called "Panchajanya". It is believed that when it is blown, it announces the victory of good over evil. In the epic war, Mahabharata, the conch shell held a significant place. Arjuna's shankha was called "Devdutta", Bhima's "Paundra", Yudhisthira's "Anantavijaya", Nakula's "Sughosa" and Sahadeva's was known as "Manipushpaka". The sacred conch shell is an integral part of Hindu symbolic and religious tradition. Even today, all

Hindus use the conch as a part of their religious practices. Whenever the conch shell is blown, it is said to purify the environment from all evil effects.

According to Ayurveda Sarsamgraha it is a kind of sea-insect found in sea or big rivers.⁴

Synonyms: Sanskrit- Sankha, Kambhu, Kamboj, Sankhak, Sunad, Haripriyo; Hindi- Sankh; English- Conch shell⁶.

Varieties: Acharya Madhav classified Shankha into two parts like Dakshinavarta and Bamavarta. Dakshinavarta variety was considered as the superior variety and it is termed as Laxmisukha Soubhagya Dayak. Bamavarta variety was considered as the medium variety and medicines are been prepared from this variety⁶. On the basis of size this can be divided into two varieties like, big size conch and small size conch. Big size Conch approximately measures 8"-10" in length and 6"-7" in breadth and weight about 2-5 kg. Small size Conch is generally 4" in length and 2-3" in breadth³.

Acceptable variety (Grayhya Lakshan): The acceptability of Sankha is like it has to be round, smooth in touch, Sudam mukha, clear like moon. It should be heavy, and big in size for the use of medicinal purpose.⁷

Sodhana (Purification): Small pieces of Shankha are bundled in a piece of cloth. Swedana in Dola yantra with Kanjika is given for 3 hours. When cool, the Shankha pieces are washed with warm water⁷.

Maran (processing): Sodhito (purified) Sankha is placed in Sarava samputa. Sandhilepa is done and dried and Gaja puta is given. This process is repeated twice⁷.

Dose: 250-300 mg.³

Anupan (Adjuvant): Nimbu swaras, Triphala Kwatha³.

Therapeutic uses: Ajirna, Agnimandya (loss of appetite), Grahani, Amla pitta (acidity), Netra roga (eye disorder).³

Formulation: Sankha-dravaka, Agnikumar rasa, Bhaskar Rasa, Maha Sankha Vati, Sankha Churnam, Sankha Bhasma.⁶

Chemical Constituents: Carbonate of Calcium, Iron, Magnesium, Sulphate, Phosphate and Chloride.³

Calcium percentage in Shankha: Calcium present in 54-95% as CaCO₃^{6,8}.

B. Kapardika

Kapardika is mainly originated in sea. It is external shell of sea animal called as *Cypraea moneta* linn. Usually after reaching the coastal areas it has been collected and dipped in boiled water. The fleshy portion is taken out and used as a diet. The cell consists of a cellular gelatinous tissue filled with calcareous matter. They contain carbonate of calcium, magnesium phosphate, manganese, sodium chloride. Varatika or kapardika (fig.2) is used to prepare medicine since ancient days in Ayurveda. This Kapardika is been kept under Shudha varga as well as under Sadharan-rasa. In the classification of Rasayana drugs (according to srotas) Kapardika was kept under Rasayana drug under Annavaha srotas with other drugs like Panchkola, Shankh bhasmas, Hing and Nagkesar⁹. *Cypraea moneta* shell has been used as Siddha medicine from ancient days. The antipyretic, wound healing as well as antimicrobial effect of the processed powder of *C. moneta* was tested in Wistar albino rats which showed antipyretic, wound healing as well as antimicrobial properties¹⁰.

Historical overview: Acharaya Charaka has included Kapardika in chikitsa at various places in Chikitsa – Sthan. Take Varatika and keep in a new earthen pot and give heat. Prepare ksharjala of Varatika bhasma and add rasanjan, sunthi kalka and sugandhidravaya yukta taila. Then the tailapaka has to be done to make it useful for karnashoola¹¹. Acharaya Susruta has included Kapardika in 'Koshastha Varga' in Sutra-sthan (46-adhyaya) and used Kapardika several times in Chikitsa. Here Bhalluka means Kapardika¹². In Rasa shastra Rasarnavam included Kapardika in 'Sukla Varga' for the first time¹³. According to Rasa Shastra, Kapardika included in 'Sadharan rasa dravyas' in various grantha's including Rasa Ratna Sammucchaya¹⁴.

Synonyms: There are various synonyms are mentioned in Bhavaprakasa Nighantu like Kapardi, Kapardika, Varatika, Varata¹⁵. There are also various synonyms are mentioned in Raja Nighantu

like Kapardok, Varat, Charachar, Varatika, Balakridanak etc¹⁶. Different names of Varatika are mentioned in Rasatarangini. They are Varatak, Varat, Varati, Varatika, Kaparda, Kapardak, Char, and Charachar etc¹⁷.

Vernacular names: Also the vernacular names for Kadi has been mentioned which are Hindi- Kadi; Karnataka- Kabadi; Bengali- Kori; Gujrati- Kadi¹⁶.

Sign of acceptability: The description, Grayhya lakshan, guna and sodhana of Varatika have been mentioned in Rasa Ratna Sammurchaya¹⁸. Kapardika is naturally whitish yellow in colour and pith like formation can be seen on its upper surface. Kapardika is also called as Charachar. The weight of Kapardika is also mentioned according which best, medium and inferior kadi can be classified like 1^{1/2} (der) niska or 6 masa is known as srestha (best), 1 niska is known as Madhyam (medium) and 3 masa is known as kanistha (inferior) Kadi¹⁸. Kaparda is chemically known as CaCO₃. As per Ayurvediya Rasashastra Kaparda is known as *Cyproea moneta*. Its weight may vary within 3-5 masa¹⁹. In this book details of Varatika has been mentioned like it kept under Molluska Varga, it is generally present in sea and also the acceptance (Bhoutik guna) of Varatika is mentioned like it should be of light yellow colour and it should be of triangle shape which can be taken as Rasashastriya Varatika. This book also describes about the Bhasma of Varatika and also the criteria of bhasma like it has to be white, sulakshan, rekha-purna and mridu¹⁹.

Sodhana (Purification): Usually in kanji Varatika are being purified¹⁸. Firstly Kanji are putted inside Dola yantra for swedan karma of Kaparda and kept for 1 prahar. After swedan Kapardika has been washed with hot water to remove the black spots¹⁸.

Swedan process of Kapardika is also mentioned in another way like Kullatha has to be put inside Dola yantra with Kapardika and has to be kept for one prahar which leads to the purification of Kaparda. Kanji and Bijora nimbu can also be used for sodhana of Kaparda in the same manner in dola yantra. If kadi kept under Citric acid water and put

in dola yantra for one prahar to boil then Kapardika became purified¹⁷.

Marana (processing): Purified Kapardika has to kept in one palle and then to be covered by another one to do Sarava samputa. After this they are been dried in sun light. Recommended puta is Gaja puta. After cooling it has to be triturated in Morter-pestle (Kharal). The bhasma is of white colour¹⁷.

Dose: 2-4 ratti (where, 1 ratti = 121 mg)

Formulations: Some of Ayurvedic formulation made from Varatika like Agnikumar rasa, Kapardak rasa, Grahani kapat rasa, Pravala Panchamrit rasa etc²⁰.

Therapeutic use: The Kapardika is used in Parinamsula (duodenal ulcer), Grahani (colitis), Kshaya roga (tuberculosis), Netra roga (eye disease), Vata-kapha vikar (disease related to vata and kapha)^{18, 19}.

Constituents: According to Adhotan Rasashastra, Kaparda (Covries) consists of Calcium, phosphate, carbonate, manganese, chloride. Ayurvedic rasa-panchak of Kaparda is also described²¹.

Properties: Rasa- Katu; Guna- Ruksha, Tikshna; Veerya- Ushna; Vipaka- Katu; Karma- Vata & kapha samak, Deepan, Pachan, Kapha niswarak, netra.

Anupan (Adjuvant): Anupan is also different from others like it has to be taken with water, madhu, ghrit and malai.

Calcium percentage in Kapardika: Kapardika content maximum 91.35% calcium¹⁰.

C. Pravala

Pravala (Coral) is the calcareous skeleton of the minute marine organism and belongs to *Corallium rubrum*. The skeleton is in the form of minute irregular deposits, called spicules which contain mainly calcium carbonate; the skeleton of coral is believed to possess a special affinity for iron which combines with a calcium organic complex to give colour pigments. Pravala is widely indicated in the form of bhasma for several ailments Timira, Yakshma, Kasa etc. and for Rasayana purpose also²².

Synonyms: Sanskrit- Pravala, Hindi- Muga, English- Coral²³.

Vernacular names: Angarak Mani, Praval, Vyomya Ratna, Raktanga, Vidruma, Raktangkur^{23, 24}.

Varieties: On the basis of colour there are 4 varieties of Praval. They are- White, Grey, Black and Red. On the basis of shape it is of 2 types i.e. Praval Sakha, Praval Mula²⁵.

Acceptable variety (Grayhya Lakshan): Praval which is red like ripe bimbi phala (fig. 3), long, round, smooth, thick, without holes and fissures is acceptable one. Praval is whitish or grey coloured, rough, thin, light and contains holes and fissures should not be accepted²⁶.

Shodhana (Purification): Praval (Muga) along with the Sarjika Kshar water kept in dola yantra for 3 hours and boiled. This is the procedure to obtain purified Praval²⁷.

Marana (processing): Purified Praval sakhas are to be put in the Kharal yantra to make their small pieces and then the trituration of the pieces has to be done until that forms into powder. And then the powder has to be taken in another mortar-pestle for trituration with Aloevera leaf juice (Kumari Swaras) and then the Sarava-samputikaran has to be done for three times until the white bhasma like moon is obtained²⁷.

Pharmacological property: Rasa: Kasaya, Madhur, Amla; Guna: Laghu, Snigdha, Sita; Virya: Sita; Vipak: Madhur; Karma: Deepan, Pachan, Balya, Chakhusya, Graha, Dosha-hara.

Dose: 250 mg^{28, 29}

Anupan (adjuvant): Tandulokdaka, Madhu, Ikshu rasa^{28, 29}.

Therapeutic Uses: Sotha (inflammation), Hrid kampa (weakness of heart), Rakta-pitta (bleeding disorder), Raja Yakshma (tuberculosis)²⁸.

Formulation: Pravalpanchamrit, Kasturibhairav rasa, Chudamani rasa, Unmadbhanjan rasa^{28, 29}.

Calcium percentage in Pravala: It content approximately 80-90% calcium as CaCO₃³⁰.

D. Mukta and Mukta-sukti

Pearl – ‘the queen of the sea’³¹ is a hard, rounded object produced by certain mollusks, such as oysters. The pearl is a valued gemstone and is cultivated or harvested for jewelry. Natural pearls are formed when a small foreign object, such as a parasite, grain of sand, or piece of food, lodges

itself in the gonad or mantle tissue of a mollusk or oyster. When the mollusk is invaded by a foreign object that the animal cannot eject, a process known as *encystation* entombs the offending entity in successive, concentric layers of 'nacre' (nay'ker). In a defensive response to the irritant, the mollusk secretes nacre as a smooth, protective coating.

As the nacre builds up around the irritant, it forms layers, eventually creating a pearl. Natural pearls that are both large in size (diameter), and have a very symmetrical shape are extremely rare. For pearls to form in nature it can take many years of near-perfect conditions for them to make a significant gain in size.³²

The principle difference between "natural pearls" and "cultured pearls" is the thickness of the nacre. Since natural pearls take longer to develop, there is generally a thicker layer of nacre surrounding the nucleus. It can take as long as two to five years for a quality pearl to fully develop in the oyster. Many lower quality cultured pearls are created by inserting a large nucleus and hastening the process of nacre development. This results in a pearl with a very thin layer of nacre that will not have a great deal of luster, and will not be very durable over a long period. The pearl harmonizes Chandra (the moon) which directly influences emotions, mind, affluence, and public. Wearing a pearl can bring harmony and stability to these influences. Chandra influences the seasonal, monthly and daily cycles and rhythms in the physiology and our emotions. Chandra, the moon, occupies a central role in the solar system and in our physiology. Based on the synonyms of Mukta it can be said that the origin of Mukta is Sukti (fig. 4)^{33, 36}.

Synonyms: Sanskrit- Mouktikam; Hindi- Moti; English- Pearl^{34, 35, 33}.

Vernacular names: Abhrasar, Mukta phala, Sashiratna, Mukta, Mouktik, Souktikeya^{33, 36}.

Varieties: According to origin it is 8 types viz. Meghaja, Sankhaja, Bhasmaja, Varahaja, Hastija, Minaja, Phanija, Sukija^{35, 36}.

Acceptable Variety: The pearls which are rough, uneven, and blackish in colour, lusterless, dirty, opaque and half white should be rejected³⁷. The pearls which are like a star or ray, smooth, clear,

round, light, big in size, pleasing, looking like clear water are superior and this should be acceptable³⁷.

Shodhana (Purification): If Mukta is boiled (swedan) in dola yantra in a pottali with the juice of Jayanti patra for three hours the purified Mukta can be obtained³⁸.

Marana (processing): Purified Mukta should be taken in a Kharal yantra and have to be triturated well with rose water (Ark gulab jala) in presence of moon-light, until it dries up totally. Then it has to be given laghu puta for 3 times performing the Sarava samputa. The white coloured bhasma can be obtained by this³⁸.

Pharmacological Properties: Rasa: Madhur; Guna: Sita, Laghu, Snigdha; Virya: Sita; Vipak: Madhur; Karma: Bramhana, Vrisya, Balya, Medhya, Deepan, Chakhusya^{33, 34}.

Dose: 1-4 ratti^{33, 36} (where, 1 ratti = 121 mg).

Anupan (Adjuvant): Madhu^{33, 36}.

Therapeutic uses: Rajyakshma (tuberculosis), Kasa (cough), Swas (cold), Daha (burning sensation), Jwar (fever), Prameha (diabetes), and Dristiroga (vision problems)^{33, 34, 36}.

Formulations: Muktadi churna, Hemgarbha pottali rasa, Amra kalanidhi rasa^{33, 36}.

Calcium percentage in Mukta: It content calcium as CaCO₃ is generally 70-80%³⁶.

E. Sambuka

In Indian system of Medicine Sambuka is seldom used. The action of Sambuka (fig. 5) is almost similar to Sankha and Kapardika³⁹. It has been kept under Koshastha Varga which means covered by cell⁴⁰.

Synonyms: Sanskrit- Ksudra Sankha; Hindi-Sambuka, Choti shankha^{39, 41, 42}.

Vernacular name: Sankhanaka, Swalpa Sankha, Sullaka, Nakha Sankha^{39, 41, 42}.

Shodhana (purification): Sambuka has to be taken in a clay pot with the Nimbuka swaras or any other amla dravya and has to be boiled for one and half hour to obtain pure Sambuka⁴².

Maran (processing): Sambuka has to be triturated with Kumari swaras and then it has to be sun dried and after that Gaja puta has to apply to complete

the Marana of Sambuka and to obtain the bhasma⁴².

Pharmacological properties: Rasa: Katu, Kasaya; Guna: Tikshna, kshara; Virya: Sita; Vipak: Madhur; Karma: Dipana, Pachana, Grahi⁴⁰.

Dose: 2 Ratti.³⁹ (where, 1 ratti = 121 mg).

Anupan (adjuvant): Nimbu Swarasa or Usna jala³⁹.

Therapeutic use: Samgrahi (astringent), Udar sula (abdominal colic), Netra roga (eye disease), Rakta atisar (blood dysentery)³⁹.

Formulations: Sambuka taila, Sambuka bhasma^{39, 43}.

Calcium percentage in Sambuka: It content 50-80% calcium as CaCO₃⁴⁴.

F. Samudraphena

Animals and products derived from different organs of their bodies have constituted part of the inventory of medicinal substances used in various cultures since ancient times. Samudraphena is often found floating on sea-water. It is 1 to 3 inches in width and 5 to 10 inches in length. The skeleton is an oblong, elliptical or oval, flat substance, of whitish colour, very hard and brittle. It can be easily scratched with the nails and is highly pulverisable.

Cuttle fish (Samudraphena) are common on the Indian coasts. Among the cuttle fish (fig. 6), *Sepioteuthis arctiprinnis* Gould, *Loligo indica* Pfeffer, *Loligo affinis* Koning, *Loligo hardwickii* Gray and *Loligo duvancelii* d' orb are commonly used as food. The chief commercial species caught is *Sepioteuthis arctiprinnis*, which is in the high demand for food and fetches a good price in the Ramnad district of Madras state, India. It comes under family Cephalopoda and class Mollusca⁴⁵. The description of Samudra phena is available from Samhita period. In Caraka Samhita, it has been widely used in the form of Varti that is Sukhavati Varti and Dristipradana Varti, to treat Kaca and Timira (Eye disorder)⁴⁶.

Synonyms: Sanskrit- Samudra phena; Hindi-Samudra phen; English- Cuttle fish^{47, 48, 49, 50}.

Vernacular names: Samudra phena, phena, Saphena, Phenak, Adhija, Dindira, Abdhija, Samudraja^{47, 48, 49, 50}.

Shodhana (purification): The hard external part of Samudraphena has to be scrapped and make powder. Later triturate with Nimbu swaras for one day and dry it⁵¹.

Pharmacological properties: Rasa: Kasaya; Guna: Laghu; Virya: Sita; Vipak: Katu; Karma: Kapha Nasaka, Lekhan, Deepan, Pachana^{47,48,49,50}.

Dose: 2-8 Ratti⁴⁸ (where, 1 ratti = 121 mg).

Anupan (adjuvant): Madhu, Jala⁴⁷.

Formulation: Sukhavati Varti, Dristipradana Varti, Danta Varti, Lekhana Anjan, Mahanila Gutika^{47, 52}.

Calcium percentage in Samudraphena: Content 80-85% calcium as CaCO₃⁴⁸.

G. Samudra Lavan

Sea salt, salt obtained by the evaporation of seawater, is used in cooking and cosmetics. It is also called bay salt or solar salt.⁵³

Synonyms: Sanskrit- Lavana, Samudra Lavana, Hindi- Namak, Nun, English- Sea salt, Latin- Sodi muris^{54, 55, 56}.

Vernacular name: Samudraka, Samudralavana, Siva, Vashira, Akshiva, Asura^{54, 55, 56}.

Pharmacological Properties: Rasa: Lavana; Guna: Snigdha, ruksha, guru; Virya: Nati Usna; Vipak: Madhur; Karma: Dipana, Bhedana⁵⁶.

Therapeutic uses: Antiseptic, anthelmintic, Galaganda nasak (hypothyroidism), Pandu

(anemia). Internally in small doses it increases the secretion of Gastric and Salivary glands, sharpens appetite. It is also an important dietary agent^{54, 55, 56}.

Chemical constituent in Samudra Lavan: Sodium chloride 91.39%, sodium sulphite 0.12%, calcium sulphate, magnesium sulphate and magnesium chloride are present in minor quantity^{56, 57}.

DISCUSSION AND CONCLUSION:

There are various Marine originated drugs are used in Ayurveda for medicinal purposes which are not under the same class or varga and moreover these drugs are full of Calcium and can be used in several diseases. So, the up to importance has been given on the Calcium content and also to keep those all drugs in a class. Sometimes the purification is a big issue in case of medicinal preparation from those drugs, so the purification procedure of each drug is also given a lot of value in this article. This attempt has been made to accumulate all scattered literature in one place for easy and better understanding of all marine drugs of Ayurveda and also to compare them with other calcium containing drugs from various origins.



Fig. 1: Sankha



Fig 2: Kapardika



Fig.3: Praval



Fig. 4: Mukta & Mukta-sukti

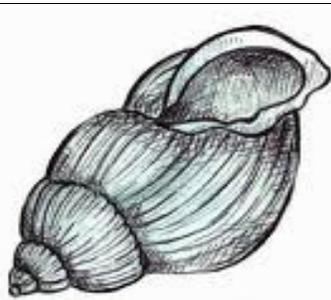


Fig. 5: Sambuka



Fig. 6: Cuttle fish

Table 1: Natural sources of calcium

Mineral sources	Animal originates	Marine originates	Plant source
Churnaka(Quick lime)	Mrig shringa (Antlers)	Shankha. (Conch shell)	Arjuna (Terminalia arjuna)
Khatika (Chalk)	Kikkutanda twak (Egg shell)	Varatika (Cowries shell)	Karanja (Pongamia glabra)
Dugdhapashana (Talc)	Ajasthi (Goat's Bone)	Pravala (Corals)	Arka (Calotropis procera)
Godanti (Selanite)	Hasti Danta (Ivory)	Mukta (pearl) and Mukta Shukti (Pearl oyster shell)	Kumari (Aloe vera)
Kousheyashma (Magnesium silicate)	Kurmaprishta (Tortoise bone)	Shambuka	Ashoka (Saraca indica)
Badarashama (Fossile Norinite)		Samudraphena.	
		Samudra Lavan	

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