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A CHEMICAL, PHARMACOLOGICAL AND THERAPEUTICAL OVERVIEW OF SHANKHA, SHUKTI AND VARATIKA

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ABSTRACT

Ayurveda is a treasure of remedies in which drugs from marine origin are also highlighted for their magnificent role in day to day practice of Ayurvedic physicians, in the cases of gastrointestinal disorders, bone disorders and mineral disorders. In this review an effort is made to gather knowledge about Shankha, Shukti and Varatika and its chemistry, its pharmacology and its role in therapeutics.

Key Words: Shankha, Shukti, Varatika, Chemistry, Pharmacology

INTRODUCTION

Rasashastra deals with the study of metals, minerals, precious stones and drugs of animal origin and drugs of marine origin, poisons. Among which Shankha, Shukti and Varatika (the drugs marine origin) are classified together with other calcium containing compounds under the umbrella of ShudhaVarghaDravyas.

AIM AND OBJECTIVE

The main aim and objective of the study is to highlight the chemistry, pharmacology and therapeutical efficacy.

DESCRIPTION OF THE DRUGS

SHANKHA

Shankha or Conch shell is a spirally coiled shell found very commonly on the coast of Indian Ocean. Shankha is home

to an organism turbenellarapha belonging to Mollusca group. Gastropodais the largest class of Mollusca containg species including snails, slugs,limpets. They are enclosed within a shell and visceral mass.On the basis of size conch can be divided into two varieties, big size conch and small size conch. The big one mesures 8 -10" in length and 6-7" in breadth, weight around 2.5 kg. Small size conch is generally 4' in length and 2-3" in breadth.¹Varieties:According to Rasa-tarangini two types of Shankha² – Dakshinavartaand Vamavarta. Dakshinavarta is rare to find and is considered for Pooja and Archana. Vamavarta is used for medicinal purpose Grahya Lakshanas³:(Acceptable variety) the Shankha which is round, smooth in touch, big and heavy should be used in medicinal purpose.

Purification⁴: small chunks of Shankha are taken and a poultice is tied and its subjected to purification in DolaYantra apparatus for three hours with Kanji. On self-cooling the Shankha chunks are washed with warm water.

Therapeutic uses⁵: Ajeerna, Agnimandya, Amlpitta, Grahani and Netraroga.

Shukti

Shukti refers to oyster shell or pearl oyster. It is the house to Mollusca group

of organism called pinctadamargaritifera.generally come under ostreidae.It is subdivided into three genera.One among which is Crassostrea found abundantly in india. They are harvested for pearl which is produced within their mantle and possess straight long hinge uniting the two valves. The lower valve being little deeper than than the upper. The surface of the shell is coarse, irregular and ruffled. The internal surface of the valve have brilliant lustur⁶. According to Ayurveda the Shukthi⁷ are of two varitiesMukthaShukti and JalaShukti. MuktaShuktiare pearl oysters generally not eaten by humans and JalaShukti are comparatively small shells and edible too.

Purification⁸:

Shukti pieces are taken in DolaYantra apparatus with Kanji as medium for three hours.

Therapeutic uses⁹: Daha, Jwara, Aanaha,Raktapita.

Varatika

It is the shell of marine creature called Cypream montea¹⁰. Its found in coastal areas of the sea and often collected by fisherman. The collected animals are dipped in boiling water and fleshy portion is taken out and used as a diet. The remaining shell is collected and called as Varatika. The upper face of

Varatika is smooth, shining and convex. base is compressed with a cleft in the center which runs longitudinally. The margin of the cleft is serrated on one side and depressed on the other. Varatika has rich antiquity in Ayurveda. According to Rastangini¹¹Varatika which is yellowish in colour, nods at their back and having a long periphery re considered good. According to the external morphology and heaviness they are of three types. Vartika weighing about 5 gms is considered as best than Varatika weighing 3 gms to 2 gms.

Purification¹² – varatika are taken in dolayantra for swedana karma with kanji as

Medium for three hours.

Therapeutic uses¹³-parinamashoola (duodenal ulcer),grahani(colitis),kshayaroga

(tuberculosis),netrarogas(eye diseases).

Pharmaceutics

Purification and incineration has special place in Ayurveda pharmacutics.Aurvedic marine drugs are at first purified by standard purificatory methodology which is known as Shodhana and then on specific pharmaceutical processing is performed i.e.Bhasmikiranana or incinernation. In Bhasmikiranana at firststep the drug is triturated with herbal extracts and uniform size pellets are prepared. They

are enclosed in a clay casket known as Sharavasamputa and is heated in a special arrangement of heat which is known as Puta, to prepare calx known as Bhasma of the drug. The calx is therapeutically more relevant and biocompatible because of the particles getting converted to nano or sub nano sized particles.

Chemistry of Shankha,Shukti and Varatika

Most of the marine drugs (namely Shankha, Shukti and Varatika) that are mentioned in Ayurveda are rich source of calcium.Shankha's outer epithelium contains aragonite which form chambers. These chambers hold and bound to the crystals of aragonite, giving the Shankha's shell its stiffness. Itschemical constituents are carbonates of calcium, iron, magnesium sulphate, phosphate and chloride. Calcium present is55-90% as CaCO_3 ¹⁴.In Shukti, nacre (natural biomaterial osteogenic property) is found as inner shell layer. Nacre is composed of hexoganal plate of aragonite (a form of calcium carbonite) 10-20mm wide and 5 mm thick arranged in a continuous parallel lamina. These layers are seprated by sheets of organic matrix composed of elastic biopolymers(such as chitin, lusterin and silk like protein). The mineral of nacre is calcium carbonate

which is highly crystallized as aragonite. The FT-IR spectra showed amine and carboxylic acid in the organic matrix of the whole nacreous-layer with HCO_3 possibly at organic mineral interference. The insoluble organic matrix remaining after decalcification contains amide, amine and carboxylic group. On heating during Bhaskar process in Shukti aragonite mineral structure of nacre underwent two transformations. Aragonite to calcite at $300\text{-}400^\circ\text{C}$ and calcite to calcium oxide at $500\text{-}600^\circ\text{C}$. the organic matrix of nacre gets destroyed at $550\text{-}600^\circ\text{C}$ ¹⁵. calmodulin – like protein is also believed to be involved in the shell formation of MuktaShukti. The fresh shells of Varatika consist of a cellular gelatinous tissue filled with calcareous matter. They contain carbonate of calcium, manganese phosphate, manganese, fluoride and sodium chloride¹⁶

Pharmacology of Shankha, Shukti and Varatika

As these drugs are rich in calcium salts. They are highly effective in combating hyperacidity, dyspepsia and osteoporosis. The calcium salts aids in acid neutralization and bone mineralization. Some are useful in combating mental disorders, paralysis and blood disorders, eye disorders and even acts as aphrodisiac.¹⁷

Modern pharmacological evidences:

1. Antiulcer activity¹⁸- A study revealed that ShankhaBhasma rendered dose dependent protection against experimental gastric ulcers induced in rats by indomethacin and cold restraint stress model. ShankhaBhasma caused significant reduction in ulcer index in both the indomethacin and cold restraint models. Thiobarbitur-acid reacting substances of stomach in ulcer induced rat were also reduced by ShankhaBhasma.
2. A Study revealed that MuktaShuktiBhasma produced significant protection in cold restraint stress induced gastric ulcer and diclofenac induced ulcer in low doses of therapeutic range when compared with control. Thiobarbitur-acid reacting substances of stomach in ulcer induced rat were also reduced by Mukta, ShuktiBhasma. It also possesses variable reduction in free and total acidity, peptic activity¹⁹ and acid output in pyloric ligated rat model.
3. Anticataract activity²⁰- A study revealed that Ayurvedic eye drops containing MuktaShukti has significant anti cataract activity. Anticataract potential was evaluated by using steroid induced cataract in rat pups and chick embryos. Result revealed significant anticataract activity by inducing noticeable delay in progression of cataract. In the selenite and galactose induced cataract models.

Conclusion

Ayurveda has rich heritage of utilization of marine drugs which are processed to biocompatible Bhasma (Calx) form causing great enhancement in their bio ability. The main chemical constituents of Shankha, Shukti and Varatika are calcium carbonate but they also contain trace amount of other minerals which result in difference of therapeutic efficacy. The classical role of Shankha, Shukti, Vratika in treatment of gastric disorders, hyperacidity, dyspepsia etc is supported by modern pharmacological findings validating the ancient claims of the Ayurveda classics.

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