International Standard Serial Number (ISSN): 2249-6807

International Journal of Institutional Pharmacy and Life Sciences 10 (1): January – February 2020

INTERNATIONAL JOURNAL OF INSTITUTIONAL PHARMACY AND LIFE SCIENCES

Pharmaceutical Sciences **Review Article……!!!**

Received: 04-12-2019; Revised: 24-12-2019; Accepted: 01-01-2020

SAMUDRAPHENA (CUTTLEFISH BONE) A DRUG FROM MARINE SOURCE: A REVIEW

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Keywords:

Samdraphena, ,

Cuttlebone, Cuttlefish

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ABSTRACT

The sources of drugs are assorted and belong to diverse groups. The group includes plants, animals and minerals. In the course of last hundred years, marine species have been demonstrated to be a wealthy resource of ample variety of valuable compounds for medicine.

Samudraphena (Cuttlefish bone) is one of the animal origin drugs which owns huge medicinal value and used different diseases from ancient time. It contains mainly calcium carbonate including organic and inorganic elements. It is an effortlessly obtainable and cost efficient drug which has pinched attention of lots of researchers and is screened for different aliments and researches are searching novel uses of Samudraphena. This review makes a small effort to review and collect information about Samudraphena a potential marine drug.

INTRODUCTION:

Marine origin products are those substances which are obtained from sea. They have many remedial properties and due to this they are used therapeutically from ancient times. Nature is one of the greatest givers of phenomenal godsend to all the livelihood of the Earth. World population is always depends on the natural resources for medicines. More than 80 percent of the Earth surface is covered by water and marine life has an enormous potential to supply the drugs. Drugs marine source always remained a subject of interest for promising researchers in 21st century.

Samudra Fen

Samudra Fen is obtained from the Cuttlefish and is also recognized as Cuttlefish bone. Cuttlefish gigantic quantity of bones floats over the ocean. These Cuttlefish bones are hard, straightened, oval or circular in shape having pale white or ivory white color depending upon the area of collection. Samudra Fen is having 80% calcium carbonate and mixture of phosphate, sulfate and silica. The bone of the fish floats on the sea water after the death of the fish. When large number of bones floats together over the surface of sea water, it looks like froth of sea water from a distance. Hence the name samudraphena; samudra indicating sea and phena indicating froth.

In India generally samudraphena (Cuttlefish bone) are obtained from four species of Cephalopods (cuttlefishes) S. aculeate, S. elliptica, S. pharaonis and S. prashadi [1-3]

Table 1: Classification of Samudra Fen (Sepia Officinalis)

Kingdom	Animalia
Phylum	Mollusca
Class	Cephalopoda
Order	Sepiida
Family	Sepiidae
Genus	Sepia
Species	S. Officinalis

Methods of purification of Samudraphena:

For internal usage of samudraphena purification is necessary. The outer surface is scrapped and remaining is powdered in Mortar and pestle. Then triturating is done using juice of Citrus lemon for one day and dried.

Table 2: Names of Samudra fen (Sepia officinalis) in different Indian languages

Sr.No.	Language	Name
1	Hindi	Samudra fen
2	English	Cuttle Fish Bone
3	Arabian	Jubadullahere, Jabdul Bahe
4	Bengali	SamudrerPhena, Samudraphe
5	Gujarati	Samudraphin
6	Kannada	Samudra nalig
7	Malayalam	Kadala neer
8	Marathi	Samudraphe
9	Punjabi	Samundrajha
10	Tamil	Kadala neer
11	Telugu	Soru penaka, Samudra Punarug

Table 3: References of samudraphena in ayurvedic books

Sr. No.	Classical text name	Reference	Edition
1	Charaka samhita	Ch. su. 4/20	7th
2	Sushruta samhita	Su.chi. 1/38-40 & 20/33-36	14th

Traditional uses of Samudraphena

It is used externally I dushta vrana, pootikarna etc. this has the action of lekhana, deepna, pachana. It increses peristalsis of the intestine. Good for eyes and skin disorders. Powdered samudraphena is mixed with honey in a dose of 250 – 500 mg and given to patients suffering from cough associated with phlegm. Powder of samudraphena is used like a dusting powder in conditions of suppuration of wounds and pus discharge from the ear and other wounds. Powder of samudraphena is mixed with goat milk and applied as collyrium to the eyes for improving the vision and removal of excess kapha dosha from the ocular region. In condition of eczema and other fungal condition affecting the skin, the powder of samudraphena is sprinkled over the affected area or applied by mixing with any ‘kushtahara’ dravya juice. The powder of samudraphena, in a dose of 500 mg is given to treat condition of Irritable bowel syndrome. Samudraphena powder is mixed with rose water and applied as collyrium to treat conjunctivitis and burning sensation of the eyes. Samudraphena powder is used like tooth powder to

treat gingivitis and dental caries. To relieve burning sensation of the body, samudraphena powder is mixed with rose water and consumed in a dose of 500 mg.

In Ayurveda it is used in treatment of Karnapaka – pus discharge from ears, Netraroga – eye disorders with discharge, Visha – Toxic conditions, poisoning, Raktapitta –Bleeding disorders such as nasal bleeding, heavy periods, etc, Gulma – Tumors of the abdomen, Pleeha – Disease of the spleen, Splenomegaly, Kanthamaya – throat disorders, voice disorders. [4-13]

Apart from these uses now it is being used in different filled mentioned below

Recently Bala, S., & Fiaz reported case study in which The signs and symptoms were studied before and after treatment and result of the study indicates that Samudraphena churna is effective in curing Karnasrava. In detail they mentioned Chronic suppurative otitis media is one of the most common complaint encountered in clinical practice and involves 65–330 million individuals with draining ears, 60% of whom (39–200 million) suffer from significant hearing impairment. Chronic suppurative otitis media is common infectious ailment affecting mostly children all over globe. It is one of the commonest causes of preventable deafness and can be correlated to Karnasrava which is characterized by discharge from Karna and occurs mainly due to Aavarana of Vata Dosha. The management strategies are limited in conventional system of medicine. Aural toileting remaining one of the basic and safe measure to achieve dry ear. Medicinal and surgical options are not free from side effects and many times may not be beneficial. Ayurveda stipulates a multimodal approach to this problem with use of various local procedures and oral medications. In present case study, 74 year old female patient came with complaints of recurrent ear discharge, pain and itching in both ears since 5 years and was diagnosed as Karna Srava or Chronic suppurative otitis media. She was treated by Karnapichu with Samudraphena churna (Cuttlefish bone powder).[14]

Palaveniene, A et al., studied cuttlebone as a marine-derived material for preparing bone grafts, In detail In their study, the endoskeleton of the mollusc *Sepia*, i.e. cuttlebone (CB), was used with regenerated cellulose (RC) to prepare three-dimensional composite bone grafts. CB microparticles were mechanically immobilised within a cellulose gel, resulting in a macroporous structure upon lyophilisation. The interconnected porous structure of the regenerated cellulose/cuttlebone (RC/CB) composite was evaluated by micro-computed tomography. The porosity of the composite was 80%, and the pore size predominantly ranged from 200 to 500 μm. The addition of CB microparticles increased

the specific scaffold surface by almost threefold and was found to be approximately 40 mm^{-1}. The modulus of elasticity and compressive strength of the RC/CB composite were 4.0 ± 0.6 and 22.0 ± 0.9 MPa, respectively. The biocompatibility of the prepared RC/CB composite with rat hepatocytes and *extensor digitorum longus* muscle tissue was evaluated. The obtained data demonstrated that both the composite and cellulose matrix samples were non-cytotoxic and had no damaging effects. These results indicate that this RC/CB composite is a novel material suitable for bone tissue-engineering applications. [15]

Jia, X. et al., prepared of silver nanoparticles in cuttlebone-derived organic matrix for catalytic applications. They reported on the use of cuttlebone-derived organic matrix (CDOM) as scaffold and reducer for the formation of silver nanoparticles (AgNPs). The experiment was carried out by simple immersing of CDOM in tollen's reagent and incubating at 80 °C. UV–vis spectra and TEM were utilized to characterize the AgNPs and investigate their formation process. Results demonstrate that the size and distribution of AgNPs are influenced by the incubation time and protein component in CDOM. Furthermore, the AgNPs–CDOM composite was applied to catalyze the reduction of 4-nitrophenol in the presence of $NaBH_4$, and it can be easily separated from the liquid-phase reaction system during the reusing cycles. [16]

Ramasamy, P et al., performed Screening of antimicrobial potential of polysaccharide from cuttlebone and methanolic extract from body tissue of Sepia prashadi Winkworth . In their study they studied the activity of polysaccharide and methanolic extract was investigated against *Vibrio cholerae, Pseudomonas aeruginosa, Klebsiella pneumoniae, Vibrio alginolyticus, Staphylococcus aureus, Vibrio parahaemolyticus, Streptococcus sp., Streptococcus pneumoniae, Salmonella sp*. and *Escherichia coli***,** and five fungal strains such as *Alternaria alternata, Candida tropicalis, Penicillium italicum, Fusarium equiseti* and *Candida albican* using disc diffusion method and minimum inhibitory concentration (MIC) were also calculated. And result indicated that both polysaccharide and methanolic extract was active against gram positive than that of gram negative pathogenic bacteria but inactive against fungi. The MIC of both the extract ranging from 60 to 100 mg/mL [17]

Cadman, J., Zhou, S., Chen, Y., & Li, Q. perfomed characterization and researched application and development of biomimetic materials according to them Cuttlebone signifies a special class of ultra-

lightweight cellular natural material possessing unique chemical, mechanical and structural properties, which have drawn considerable attention in the literature. The aim of this paper is to better understand the mechanical and biological roles of cuttlebone. First, the existing literature concerning the characterisation and potential applications inspired by this remarkable biomaterial is critiqued. Second, the finite element-based homogenisation method is used to verify that morphological variations within individual cuttlebone samples have minimal impact on the effective mechanical properties. This finding agrees with existing literature, which suggests that cuttlebone strength is dictated by the cuttlefish habitation depth. Subsequently, this homogenisation approach is further developed to characterise the effective mechanical bulk modulus and biofluidic permeability that cuttlebone provides, thereby quantifying its mechanical and transporting functionalities to inspire bionic design of structures and materials for more extensive applications. Finally, a brief rationale for the need to design a biomimetic material inspired by the cuttlebone microstructure is provided, based on the preceding investigation.[18]

Jang, J. K., Lee, O. S., Kang, T. J., & Lim, S. C. studied Wound healing effect of cuttlebone extract in burn injury of rat in study they evaluated the effect of cuttlebone (CB) extract in thermal burn wounds in rats and compared its effects with those of silver sulfadiazine (SSD), the most widely used burn treatment. Burn injury was produced in rats by immersion of the shaved dorsal area to hot water. CB or SSD was applied topically after burn injury. Histological analysis, CBC counts and malonialdehyde (MDA) activities were evaluated 1, 4, 7, and 14 days post-treatment. CB and SSD significantly increased re-epithelialization in burn wounds and decreased WBC levels after 14 days of treatment. These drugs also reduced expression of pro-inflammatory cytokines, such as tumor necrosis factor (TNF)-α and interleukin (IL)-6. By FT-IR, we characterized chitin the main component of CB. Taken together, these results suggest the wound healing effects of CB and its therapeutic value in the treatment of burn injury.[19]

Nandigoudar, S. N and his colleges determined effect of samudraphena on infertility ant I was found to be effective in treatment of same. [20]

Nagendrakumar: Evaluation of *karnapoorana kriya* in the management of *karnasrava* w.s.r. to *Samudraphena choorna* and *ksharataila*, 2001, Government Ayurvedic medical college, Department of shalakya tantra, Rajiv Gandhi university of health sciences Banglore.

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K. Vikas: Efficacy of *Samudraphena churnaanjana* in *avrana shukla* (corneal opacity), 2003, Tilak Ayurveda Mahavidyalaya, Department of shalakya tantra, Pune university, Pune [21]

Table 5: Formulations of samudraphena

Sl. No.	Type of formulation	Name of the formulation
01	*Churna*	*Samudraphena churna*
02	*Vati*	*Takramanduram*
03	*Rasayogas*	*Vadavanalarasa*
04	*Anjana*	*Nayanashanananjanam*

Conclusion: Samudraphena (Cuttlefish bone) is one of the animal origin drugs which owns huge medicinal value and used different diseases from ancient time and from literature review it was found that currently it is investigated by researchers in different fields and it has potential to become valuable substance in future.

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