

**SCIENTIFIC EVALUATION OF SIDDHA FORMULATION MUTHUCHIPPI PARPAM –A REVIEW****N. Senthil Velu Kanthal<sup>1\*</sup>, V.Chitra<sup>1</sup>, V.A. Rahul<sup>1</sup>, S.Usha<sup>1</sup>, R.Jeeva Gladys<sup>2</sup>**<sup>1</sup>RMO, National Institute of Siddha, Tambaram, Chennai, Tamil Nadu, India.<sup>2</sup>Lecturer, Velumailu Siddha Medical College, Sriperumbudur, Kancheepuram, Tamil Nadu, India.**ABSTRACT**

The traditional *Siddha* system of medicine was made available to common people by saints of south India called as *Siddhars*. While the timeline of its origin seems to be unpredictable, this ancient medicine interrelates nature and human beings in terms of five basic elements or *Pancha bootham* viz, earth, water, fire, air and space. Presence of all these five basic elements in the human body and universe in a balanced proportion seem to govern the three vital humours of our body called *Vatham*, *Pitham* and *Kapham*. Any alterations in any of these humours is said to be the cause of *Dosham* or disease. Hence the Material Medica of this system consists of herbal origin (*Mooligai*), Mineral origin (*Thathu*) and animal origin of both land and ocean (*Jeevam*). According to the *Siddha* philosophy, these natural resources are the constitutions of these five basic elements and therefore have the ability to prevent and treat the *Doshams* (diseases) that are caused due to the altered humours. *Parpam* a potent *Siddha* formulation with a shelf life of 100 years is usually prepared by grinding mineral or animal sources with herbs followed by a process called *Pudam* (Incineration). *Muthuchippi parpam* (Calcinated shell of Pearl oyster) is one such drug of marine origin which has been indicated in the *Siddha* literature for a wide variety of diseases. This review article analysis the scientific facts behind the traditional use of *Muthuchippi parpam*.

**KEYWORDS:** *Muthuchippi parpam*, *Siddha*, Marine drugs, Traditional medicine.**INTRODUCTION**

In recent years drug discovery from sea products has been an area of increased interest [1]. Approximately 10-15 marine natural products are currently under clinical trial mostly in the areas of cancer, pain and inflammations [2]. *Muthu chippi* (Pearl oyster shell) is one among the *Siddha* drugs derived from the sea. These shells contain Calcium Carbonate, phosphate and sulphate of calcium and magnesium, Iron oxide, alumina and Silica. The pearl oyster is valuable in *Siddha* system since it has been specifically indicated to increase the strength, nutrition and energy of weak patients, palpitations, digestive, cardiac tonic, and appetizer [3]. Traditionally it is also regarded as demulcent and an antacid in heart burns and bilious diseases, abdominal tumors and pain [4,5]. The gem pearl is indicated for otorrhoea, otitis media and chronic illness such as asthma, diabetes, eye diseases, piles and urinary diseases and various neuro muscular diseases [6]. It is noteworthy that *Siddha* literature equates the medicinal value of this cost effective *Muthuchippi parpam* with that of the expensive *Muthu parpam* (Calcinated pearl) [7].

*Pinctada margaritifera* is the zoological name of black lipped Indian pearl oyster. The natural sources of pearl oyster are sea beds. The species *Pinctada margaritifera* are widely distributed throughout the indo-pacific region. They are invertebrates and have axo-skeleton in the form of shell. The inner layer is iridescent with a silvery sheen for the most part except distally. It is very beautifully tinged. The shell of the pearl oyster is

reddish brown in colour. The shell valves are moderately convex. There are externally 6 -8 radial reddish brown and segmented towards the free margin. The white spots represent the basal portion of successive growth process. The nacreous portion of the shell has bright metallic luster. The non-nacreous border as brownish or reddish patches corresponding to the external radial markings. The crystals of calcium carbonate and magnesium carbonate present in the shell is responsible for the medicinal property of these shells [5, 8].

**Method of Preparation of Muthu Chippi Parpam<sup>[3]</sup>****Ingredients (Shown in Fig-1)***Muthu Chippi* (Pearl oyster shells)*Adathodai* leaves (*Adathoda vasica* leaves)*Notchi* leaves (*Vitex negundo* leaves)*Nilapanai kizhanghu* (Rhizome of *Curculigo orchoides*)**Procedure**

A mixture of lime stone and fullers earth, to be added in water and the extract is taken. Raw *Muthu chippi* (Pearl oyster shells) are to be immersed in this extract and boiled 5-8 times to be purified from impurities. Then the purified *Muthuchippi* is triturated with the fresh leaf extract of *Adathoda* followed by *Vitex negundo* and then by using the rhizome extract of *Curculigo orchoides*. The grounded mixture is then subjected to *Pudam* process by using clay smeared ribbon on earthen ware vessels and cow dung cakes.

Scientific analysis of ingredients of *Muthuchippi parpam*

S.No	Ingredients	Scientific name	Constituents	Uses
1.	<i>Muthu Chippi</i>	Pearl oyster shells	Calcium carbonate 85-95%, Phosphate and Sulphate of Calcium and Magnesium [1, 9]	Cough, asthma, arthritis, rheumatism, conjunctivitis, Antacid, Piles, fistula <sup>[1, 9]</sup> .
2.	<i>Adathodai</i> leaves	<i>Adathoda vasica</i>	Saponin, Alkaloids, Tannins, Flavonoids, Steroids, Carbohydrates, Vitamin C, Cardiac Glycoside, vasicine, vasicinolone and vasicinol <sup>[10,11]</sup>	Anti-inflammatory, analgesic, Antimicrobial Antidiabetic activity, Wound healing, Antiulcer Cardiac depressant <sup>[10,11]</sup>
3.	<i>Notchi</i> leaves	<i>Vitex negundo</i>	Alkaloids, flavonoids, saponins, phenols, terpenoids, anthraquinones, proteins and aminoacids, carbohydrates and glycosides <sup>[12,13]</sup>	Expectorant, Ophthalmopathy, anti inflammatory, antipyretic, diuretic, antihemorrhagic and for cardiac disorders <sup>[12,13]</sup>
4.	<i>Nilapanai kizhanghu</i>	<i>Curculigo orchoides</i>	Yuccogenin, sapogenin, tannin, lycorin <sup>[14]</sup>	Appetizer, carminative, asthma, bronchitis, ophthalmia and gonorrhoea <sup>[14]</sup>

**Siddha analytical parameters for Parpam**

The parameters specific to *Parpam* are mentioned in the guidelines of *Siddha* classical texts. *Parpam* is usually lusterless, white or pale white on naked eye examination. A pinch of *Parpam* when kept on the tongue should be tasteless and it should float on the water. When placed between the thumb and index finger it should enter the furrows of the finger and must show a clear fingerprint<sup>[14]</sup>.

**Sophisticated Instrument Analysis of *Muthuchippi parpam***

Studies on chemical analysis of raw as well as purified and processed MCP using characterization techniques such as FTIR, Particle size analyser, Scanning electron microscope and X-ray diffractometer was performed by Rajalakshmi et al., The results revealed the reduction in the amount of heavy metals like copper and zinc and increase in inorganic constituents such as tannins and flavones. Increase in carbon content was found in the calcinated MCP which suggested the formation of co-ordination complex. The XRD patterns showed the crystalline nature and SEM analysis further confirmed the nano size of particles<sup>[15]</sup>.

**Antimicrobial activity**

*Muthuchippi parpam* was tested against the pathogenic strains of *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Salmonella typhimurium*, *Escherichia coli*, *Klebsiella pneumoniae*. *S. typhi* and *K pneumoniae* showed minimum inhibitory concentration (MIC) at 3.125 mg/ml. For *E coli* and *P. aeruginosa* the MIC was 6.25 mg/ml and 12.5mg/ml. Antifungal activity of MCP was found against *Aspergillus fumigates* which showed MIC at 25 mg/ml whereas, *Aspergillus flavus* and *Aspergillus Niger* showed MIC at 12.5 mg/ml each<sup>[16]</sup>.

**Antioxidant activity**

The study on free radical scavenging effect of MCP showed that it had significant DPPH radical scavenging ability at 100 µg/ml concentration which was 89.19% when compared to the standard BHA 63.01%. *Muthuchippi parpam* showed significant ABTS scavenging activity (90.72%) at 100 µg/ml concentration when compared with the scavenging ability of standard, Gallic acid (69.18%). Thiobarbituric acid reactive substances scavenging activity for *Muthuchippi parpam* was found to

be 51.82% at 100 µg/ml when compared with the standard antioxidant Vitamin E<sup>[16]</sup>.

**Antiulcer activity**

A Study on Ayurvedic formulation *Mukta sukta Bhasma* prepared from pearl oyster shell, showed highly significant anti ulcer activity than standard group (Sucralfate). This may be contributed by the alkaline pH and chemical components which might have inhibited the secretions, neutralized the acidity and reduced size of the ulcerative lesions<sup>[17]</sup>.

**Anti osteoporotic and anti-inflammatory**

Recent studies have shown that heated oyster shells increased the bone mineral density of the lumbar spine in the elderly patients. *Muthuchippi parpam* is found to be one-third to one-half as potent an anti-inflammatory as the amino salicylic acid<sup>[18]</sup>.

**Critical Analysis of *Muthu chippi parpam***

Mineral based *Siddha* formulations in the form of *parpam* are comparatively more potent and biocompatible than herbal extracts. The calcinated shells of *Muthuchippi* (Pearl oyster shell) is a source of pearl and has similar properties as that of pearl. Calcium carbonate (CaCO<sub>3</sub>) constitutes 85-90% of Oyster's shell. It also contains phosphate and sulphate of Calcium and Magnesium, Oxide of iron, Aluminum and Silica<sup>[19-22]</sup>. According to *Siddha* literature, *Parpam* can be derived from animal products such as horns, feathers, shells, metallic and non-metallic minerals by a process called incineration. During purification process of grinding with herbal extracts and incineration in the furnace, the herbal extracts are incorporated in the reaction phase and resulting in nontoxic and biocompatible end product called as *Parpam*<sup>[23-28]</sup>.

Besides the presence calcium carbonate and other essential minerals, the results of physio chemical evaluation of *Muthuchippi parpam* showed the presence of tannins and flavones which proves the formulation to be potent antioxidants and bioactive nano sized particle of therapeutic efficacy<sup>[15]</sup>. The nano sized particles are small, easy to inject therefore inorganic nanoparticles can be integrated into biological molecules for targeted drug delivery system<sup>[27]</sup>. Oyster shells contain significant quantity of chitin which are the main marine source of

chitin. Chitin has biological properties like biocompatibility, accelerate the formation of osteoblast, haemostatic, fungistatic, spermicidal, antitumor, anticholesteremic and accelerate bone formation [29].

A recent study Showed that both Ca<sup>2+</sup> ions and Mg<sup>2+</sup> ions play a crucial role in stabilizing the native conformation of coagulation factor IX. Mg<sup>2+</sup> ions greatly augment the biological activities of factor IX and X. Hence it favours the coagulation [30].

Calcium present in herbs are less utilized due the presence of oxalate and phytates in them. The natural calcium preparations like *Muthuchippi parpam* are alkaline in nature and contain assimilable form of oxide, copper, zinc etc which are easily absorbable. The therapeutic uses of calcium salts according to modern science is to prevent and treat calcium deficiency or osteoporosis, antacid, urticaria, cardiac arrest and hyperkalemia. Owing to these facts, the *Siddha* system of medicine makes use of pearl and oyster shell for all kinds of fever, brain or nervous system disorder, opacity of cornea, iritis and other diseases such as night blindness, urinary discomforts. It is also said to increase strength, nutrition and energy. It can also be used for hyperglycemia, and diabetic neuropathy [24].

### Discussion

All the herbal ingredients used for the trituration process of *Muthuchippi parpam* are also found to contain similar medicinal properties that can be incorporated into the nano sized incinerated *Parpam*. The process of trituration is claimed to reduce the particle size. The process of *Pudam* (Incineration) and conversion into *bhasma* by application of specific heat using traditional methods converts the drug into nano sized particle of therapeutic efficacy for easy assimilation into the body. Therefore even a smaller dosage is sufficient to have the targeted therapeutic action. Owing to these eminent screening of *Muthuchippi parpam* using modern tools, the scientific facts have been unravelled. Upon considering the above results of the previous research works, the traditional claims on the potency of marine sources such as *Muthuchippi parpam* have been proved it to be an efficient drug for the management of respiratory diseases, nervous diseases, musculoskeletal disorders and bilious diseases pertaining to any alteration in the three humours *Vatham*, *Pitham* or *Kapham*.

### CONCLUSION

The marine ecosystem provides an enormous source of flora and fauna with huge potential of natural pharmacopeia. Although research in marine natural products has started only 50 years ago, traditional system of medicine like *Siddha* had made use of these marine products much before that. In the lime light of scientific facts analysed through this review, it is crystal clear that *Muthuchippi parpam* is a cost effective drug for several indications as mentioned in the *Siddha* literature. Further preclinical and clinical studies may be necessary to validate the potential of this single formulation.

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