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A POTENTIAL SIDDHA MINERAL DRUG; PAVALAPARPAM

Thanuja N. K.[1], Mohammad Azamthulla[1]* and Sandhya K. V.[2]

[1]Department of Pharmacology and M. S. Ramaiah University of Applied Sciences, MSR Nagar, Bangalore, India - 560054.
[2]Department of Pharmaceutics Faculty of Pharmacy, M. S. Ramaiah University of Applied Sciences, MSR Nagar, Bangalore, India -560054.

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***Corresponding Author**
Mohammad Azamthulla
Department of Pharmacology and M. S. Ramaiah University of Applied Sciences, MSR Nagar, Bangalore, India - 560054.

ABSTRACT

Pavala parpam is a conventional Siddha therapeutic agent. This marine sourced medication is blended through calcination of Corals as described in the old-style Siddha writing – Anuboga Vaidhya navaneetham. This paper centers on its source, character, filtration and handling procedures and distinctive type of drug forms. The writing audit uncovered that Pavalam based medications are generally utilized for the administration of respiratory illnesses, bleeding issues, metabolic disorders like diabetes mellitus, malignant tumours and even used as an antioxidant. The different research gives an account of Pavalam through logical approval additionally featured for its future turn of events. The logical reports affirm the customary guarantee of Pavalam's viability.

KEYWORDS: Pavala parpam, Siddha medication, Pharmacological activity, Toxicity.

INTRODUCTION

According to Tamil mythology, there were originally 18 siddhars: Nandi, Agasthiyar, Thirumular, Punnakkeesar, Pulasthiyar, Poonaikannar, Idaikkadar, Bogar, Pulikai isar, Karuvurar, Konkanavar, Kalangi, Sattainathar, Azhuganni, Agappai, Pumbatti, Theraiyar, and Kudhambai. However, the Agasthiyar (Agastya) was at the very top. He is credited with developing Siddha medicine as well as the Tamil language. In modern western medicine, he holds the same status as Hippocrates. He appears to have settled in the South during the Ramayana era. Every Southern tradition, including language and culture, can be traced back to Agastya these people are often represented as having obtained their knowledge of the Siddha system through the deity Shiva. The Siddhas believed that the aim of their research was to conserve and extend life. A way of life they concluded that doing so necessitated humans living in accordance with natural rules. They lived simple lives and were unconcerned about caste, religion, colour, or race. They not only contributed to a medical system, but also to understanding of eternity, alchemy, and Yogic life. Some claim that the siddhas travelled widely around the world to spread their medical system and enrich the sciences. The eight great spiritual forces, asthma siddhi, were possessed by Siddhas. These abilities may have been gained at birth (as a result of one's previous karma), by 2 Chemical means, the power of words, or focus are all options. On the topic of meditation beginning with the "gross" and ending with the "subtle," The siddhas were able to learn the elements.[1]

The Siddha system of medicine is a complicated system of science since it has a comprehensive collection of pharmacopoeias as well as Alchemy in its works of medicine. Various forms of internal medicines and external therapies are in practise, with expertise in iatro-chemistry much before the advent of modern science, according to the Siddha system. According to Siddha philosophy, the human body is a mirror of the universe, and food and drugs, regardless of their source, are made up of five essential elements: Earth, Water, Fire, Air, and Ether. The proportion of elements found in drugs varies, and their preponderance or lack thereof determines their behaviour and therapeutic outcomes. The Pancha bhootham (five elements), Arusuvai (six tastes), and Uyirthathu (three humours) are all interconnected in Siddha philosophy. That is, salty taste is expressed by the predominance of fire and water element, whereas pungent taste is expressed by the predominance of fire and air element. Both elements have a high potency, and their consumption causes vitiation of Azhal humour. Similarly, combining the earth and water elements creates a sweet-tasting material that can vitiate Iyya humour. As a result, the formulations are based on the Siddha system's fundamental principles.[2]

All diseases, according to humoral pathology theories, are caused by a discordant combination of vata, pitta, and kapha. Their body proportions affect a person's physical and mental health. The elements serve as a connection between the microcosm (the human) and the macrocosm

(the universe) (the world).[1] As a consequence, the external air refers to the internal vata, the external heat to the internal pitta, and the external water to the internal kapha. When things are routine, Vata, according to Siddha theory, resides in areas associated with the pelvis. Pitta resides in areas connected to the stomach and viscera, as well as the rectum. The kapha chakra is located in the areas of the body that deal with breathing and digestion. Vata, according to the Siddhas, is self-generated and similar to divine energy.

A vata imbalance may be the origin of all disease. Pitta was thought to reflect all aspects of fire, such as burning, boiling, and heating, as well as others impressions it was the name given to the heat found in liquid bile, which causes it to boil. Waste matter expulsion in the form of urine and faeces was thought to bring beauty to the face, sight to the eyes, and happiness to the mind. Kapha was thought to provide moisture to the body and provide cohesion, enhancing the body's strength by increasing the firmness of the limbs and thereby holding them in tune with one another. It was often thought to help with digestion and sensation by giving the tongue a taste. The nature of these humours in the system, as well as their proportions, are indicated by the pulse, which is essential for accurate diagnosis.

Various psychological and physiological roles of the body are due to the combination of seven elements in Siddha medicine: the first is saram (plasma), which is responsible for growth, development, and nourishment; the second is saram (plasma), which is responsible for growth, development, and nourishment; and the third is saram (plasma), which is responsible for growth, development, and nourishment. Cheneer (blood) nourishes muscles, adds colour, and enhances appearance. The third is ooun (muscle), which is responsible for the body's form. The fourth is kollzuppu (fatty tissue), which is in charge of maintaining oil balance and lubricating joints; the fifth is enbu (bone), which is in charge of body structure, posture, and movement. Moolai comes in sixth place (nerve), which is in charge of strength; and sukila (semen), which is in charge of sexuality.

Disease is triggered when the natural balance of the three humours (vatha, pitha, and kapha) is disrupted. Climate, climatic conditions, diet, physical activity, and stress are all factors that influence this equilibrium. The ratio is usual under normal circumstances. There is a 4:2:1 ratio between these three humours (vatha, pitha, and kapha).

Diet and lifestyle, according to the Siddha medicine scheme, play a major role not only in health but also in disease cure. This siddha medicine term is known as pathya and apathya, which is basically a collection of dos and don'ts.

The therapy in Siddha medicine aims to maintain the balance of the three humours as well as the seven elements. For a healthier life and to restore equilibrium, proper diet, medication, and a disciplined lifestyle are recommended in humours in a diseased state Saint Thiruvalluvar discusses the four requirements for success. Treatment was successful. The patient, the attendant, the practitioner, and the medicine are the members of this group.

And serious diseases can be easily healed when the practitioner is well trained and the other agents have the requisite qualities. The protocol should be followed. After determining the course and origin of the disease, treatment began as soon as possible.

There are three types of treatment: devamaruthuvum (Divine method), manuda maruthuvum (rational method), and asura maruthuvum (human method) (surgical method). Medicines made of mercury, such as parpam, chendooram, guru, and kuligai, are used in the Divine system. Sulphur and pashanams are used in this recipe. Herbal medicines such as churanam, kudineer, and vadagam are used in the logical form. Incision, excision, heat application, bloodletting, and leech application are all used in the surgical process. Purgative therapy, Emetic therapy, Fasting therapy, Steam therapy, Oleation therapy, Physical therapy, Solar therapy, Bloodletting therapy, Yoga therapy, and so on are some of the therapies used by Siddha medicines.[1]

Plant and mineral expertise from all branches of science is used in the preparation of medicine. Chemistry had been discovered to be well developed into a science auxiliary to medicine in the Siddha system.

Furthermore, the information in this system is not static; it is necessarily dynamic and evolves in response to environmental challenges.[2]

The Siddha system of medication has begun from South India. It is perhaps the most established system of restorative practice. It's a blend of antiquated clinical practice, profound controls, unidentified and transformation. Siddha, it implies accomplishment. This act of medication was increased through practicing yoga and having bhakti by the holy people so called as Siddhas. Siddha medication system has been practiced from pre-Vedic period but, there is no definite proof when this system was conceived, yet it is informed that the advancement was during the Indus civilization that was between 2500-1700 BC. This was distinguished and prospered by Dravidians who speak Dravidian language and Tamil is one of its guideline. The writing for siddha medication practice is in Tamil language mostly. Shangam writing is a composition containing Tolkappiyam and Tirukural (contributed by holy person Tiruvalluvar). The extraordinary holy person who added to siddha system of medication was Agastiyar. Still his composing is been utilized as a standard framework of medication for treating diseases. Astama siddhi these are the eight excessively regular powers that were controlled

by Siddhas. These forces might be gotten or accomplished by birth, or by contemplation, or by focus on the elements. Siddha system of medication is like Ayurveda yet some specialization in latro-science. It expresses that human body is copy of universe. Also, the body is made out of five components as that told in Ayurveda or the panchamahabootham that is Nilam (earth), Neer (water), Thee (fire), Kaatru (air), Aagayam (space).

Ethno medication gives numerous proficient medications for human infirmities. The writing accessible in marine ethno medication is very limited.[3] Exploration on marine living beings started in the 19th century, but various marine items are being used in Siddha system of medications.[4] Pearl, coral, shellfish shell, conch shell, turtle and cowry shell are a few models utilized as drugs in this framework. Pavalam is utilized to treat Kaba sicknesses, Diabetes, Bleeding issues, Cough, Insect chomp, Spermatorrhoea, Bronchial asthma and Osteoporosis. It is arranged under the subject Uparasam by Sage Bogar.[5] Corals are little inactive marine creatures that happen in thick settlements in warm shallow water of the seas. Coral reefs are called as "Tropical rain forest of the deep", since they are the most assorted, gainful, delightful marine life form giving significant logical bits of knowledge into the nature of submerged ecology.[6]

Corals are marine organisms belonging to the Anthozoa class of the phylum Cnidaria that live in dense colonies of several similar human "polyps." The significant reef builders that live in tropical oceans are included in this category. Calcium carbonate is secreted to form a rigid skeleton.[6]

Corals come in a wide variety of colors, shapes, and sizes. Red corals, black corals, white corals, blue corals, stony corals, horny corals, soft corals, and organ pipe corals are among the many types of corals.[1]

A colony of genetically identical polyps makes up a coral "head." A polyp is a spineless species that is usually just a few millimeters in length. A central mouth opening is surrounded by tentacles. Near the base, an exoskeleton is excreted. The colony thus develops a huge skeleton that is typical of the species for several generations. (Figure 1).

Figure 1: Corals.

Polyps reproduce asexually to form individual heads. Corals reproduce as well. Polyps of the same genus reproduce sexually by spawning release gametes at the same time over the course of one-to-many nights. While corals may use stinging cells on their tentacles to capture small fish and plankton, most corals get the majority of their energy and nutrients from the sun. Zooxanthellae, photosynthetic unicellular algae that live in the ocean, provide nutrients within the tissue of the coral these corals need sunlight to grow and must be kept in a clean environment. Further detail on hermatypic corals can be found at Scleractinia, Millepora, Tubipora, and Heliopora are all species of Scleractinia.

Hermatypic corals of the Scleractinia subclass are stony corals that form reefs. They get the majority of their nutrition from zooxanthellae, which are symbiotic photosynthetic microalgae. To form a strong skeleton, they secrete calcium carbonate.

Hexacorallia or Zoantharia refers to those who have six or less lines of symmetry in their body structure. Scleractinia, Millepora, Tubipora, and Heliopora are Hermatypic genera that include reef-building corals (scleractinians), sea anemones, and Hermatypic genera like Scleractinia, Millepora, Tubipora, and Heliopora. Ahermatypic corals are those that lack zooxanthellae. They are also known as octocorallia because they have eight tentacles.

Perforate corals: There are two types of perforate corals: those are perforate and those that are imperforate. Perforate corals have porous skeletons, allowing their polyps to communicate with one another through the skeleton. The skeletons of imperforate corals are sturdy and strong.

Polyp

Although the coral head appears to be a single organism, it is actually a collection of several individual but genetically similar multicellular organisms known as polyps. Polyps are produced by a layer of outer epithelium and inner jellylike tissue known as the mesoglea, which is normally a few millimeters in diameter. They have tentacles that circle a central point

and are radially symmetrical.

Exoskeleton
The stomach closes at the polyp's base, where an exoskeleton called the basal plate or calicle is produced by the epithelium. A thickened calcareous ring (annular thickening) with six supporting radial ridges forms the calicle. These structures grow vertically and extend into the polyp's base. When a polyp is under physical extreme stress, the tentacles retract into the calyx, leaving almost no exposed surface above the skeletal platform. The organism is thus protected from predators and the elements.

Reproduction
Sexual
Corals are mostly sexually reproducing. Hermatypic corals (stony corals) develop single sex (gonochoristic) colonies in around 25% of cases, while the rest are hermaphroditic.

There are three 3 types

Distributors
Around 75% of all hermatypic corals "broadcast spawn" by releasing gametes (eggs and sperm) into the water in order to disperse offspring. To decide the proper time to release gametes into the water, corals depend on environmental cues that differ by species. Temperature shifts, the solar cycle, the duration of the day, and probably chemical signaling are among the signals.

Brooders
In areas of high current or wave action, brooding animals are most often ahermatypic (not reef-building). Brooders only release negatively buoyant sperm, which sinks to the waiting egg carriers, who harbor unfertilized eggs for weeks.

Planulae
A planula is a microscopic larva formed when 43 gametes fuse during fertilization. Planulae are positive phototoxic, swimming towards light to enter surface waters, where they drift and expand before descending to find a hard surface to stick to and start a new colony.

By asexual budding and development, the larva develops into a polyp, which then develops into a coral head.

Asexual
The genetically identical polyps within a coral head reproduce asexually, either by gemmation (budding) or longitudinal or transversal division, as shown in the Orbicella annularis photo.

Budding occurs when an adult polyp is broken into smaller polyps.

There are a variety of ways to blossom:
Intratentacular—produces polyps of the same size inside the ring of tentacles from the oral discs.
Extratentacular—produces a smaller polyp from its base.

The original polyp is divided into two polyps, each of which is twice the size of the original. Longitudinal division occurs when a polyp broadens and then splits its coelenteron, similar to breaking a log down the middle. As polyps and the exoskeleton divide transversally into two sections, this is known as transversal division.

Division of colonies
Fission occurs in some corals, especially those in the Fungiidae family, where the colony splits into two or more colonies during the early stages of growth. Bailout happens when a single polyp leaves the colony and establishes a new colony on a different substrate. Fragmentation Individuals are separated from the colony as a result of hurricanes or other disturbances. Individuals who have been removed from their colonies will form new colonies. It's thought that coral calcium contains up to 70 essential minerals. However, since these minerals come from the sea, it's impossible to rule out the possibility that coral calcium contains poisonous elements. Corals and seashells are porous structures that absorb everything in their environment, including toxic substances.[7] Red coral corallium rubrum (Order Gorgonacea; Family Coralliidae) is an anthozoan species, prevailing segment of the "Coralligenous" gatherings. Its living space goes from shallow to profound (up to 300 m) ocean. It has a moderate development rate (0.2–2 cm/year) and late proliferation (7-10 years).[8] Red coral is the generally important of the valuable corals and economically significant beds are presently found in India.[9]

Constituents: The body of coral is made of up calcite form of calcium carbonate that is 85% wet weight and also it includes Fe, Sio_2, Mg, P_2O_5, Pb, and Zn that is 5% along with organic matrix.[10]

Components included[1]
The calcareous skeleton or shell.
Red corals' composition Red coral pigments are iron-based organic compounds
86.974% Calcium carbonate, 6.804% Magnesium carbonate, 1.271% Calcium sulphate, 1.720% Ferrous oxide, 1.350% Organic matter, 0.550% Water, 1.331% Phosphoric acid, silica and other minerals.

Zoological classification[11]
- Kingdom - Animalia
- Subkingdom - Radiata
- Phylum - Cnidarians
- Subphylum - Anthozoa
- Class - Anthozoa
- Subclass - Octacorallia
- Order - Alcyonaceae
- Suborder - Scleraxonia
- Family - Coralliidae
- Genus – Corallium

- Species - Corallium rubrum.

Vernacular names
English: Sardinia coral, Telugu: Pagadamu, Kannada: Havala, Tamil: Pavalam, Bengali: Pravala, Punjabi: Marjan, Hindi: Parvara, Munga.[12]

Biology and habitat
A rocky bottom species occupies depths of low luminosity, predominantly between 20 and 200 meters. They have a slender depth distribution. It is found in the bio cenosis of semi-dark caves and is typical of the Corallium rubrum faicies. Coral exploitation is reducing their abundance in the deeper parts of their bathymetric distribution. C. rubrum is a slow-growing, long-living plant that grows just a few centimeters each year. Tiny zooplankton species are caught using the polyps tentacles as food. A number of endobiotic dull sponges infest the C. rubrum population.[1]

Dimensions
Some colonies exceed a height of 20 cm. The largest specimens' bases will grow to be 3 cm in diameter. Intensive mining, on the other hand, limited the overall size of colonies.

Characteristics
Rigid colonies can branch out in any direction, giving them a bushy appearance. The branches are covered in short, hemispherical calyces. Polyps that have expanded in a living organism. The colonies are translucent white and have eight tentacles with fine pinnules but no sclerties. Once corals have been captured, polyps are retracted within calices. Calcareous spicules (seleries) from the crust are warty with a short stick shape and are radially symmetrical.

Colour
Usually dark red, but sometimes pink or even white and P^H: 8.751

Pavala parpam contains aromatic compounds, alkynes and phenolic compounds, alkene, alkyl halide, alcohol, acyl chloride, esters, carboxylic acids, amides and amines. Pavala parpam has a particle size of 2-1 microns.[1]

Synthesis
The synthesis process of Parpam involves 2 steps
1. Cleansing (Suthi seithal): The Pavalams were taken in the mud pot and lime juice was added into that mud pot until the Pavalam got flooded and the mouth of the mud pot was shut with the other authentic mud plate. It was kept without unsettling influence for 24 h and at that point, Pavalam was taken from the mud pot and washed with luke warm water and permitted to dry well. In the air tight container, the dried Pavalam was stored.

2. Calcination (Maranam): The contents are Purified Pavalam 35 g, powdered sugar candies (Karkandu) 105 g. In earthen vessels, a piece of Sugar candies was taken. Over the Sugar candies, the whole amount of decontaminated was spread to get even layer. At that point, another portion of the Sugar candies was set over the refined Pavalam. This arrangement must to be kept firmly without any spaces above it. The mouth of the pot was shut with another earthen gut and the joining space between the two insides were shut with the five moves of mud stuck fine cotton cloth roll and dried under daylight. This well dried device was set for Pudam (Calcination) with 100 No's of cow dung cakes. For this Pudam, measure a circular pit was delved in the ground with width and profundity of 90cm. In the pit, 75 No's of cow compost cakes were set and organized in round way. Over this, the dried device was kept and covered with staying 25 No's of cow fertilizer cakes in cone shaped way. Presently, the cycle of Pudam was finished by consuming the compost cakes until it consumed totally. After this cycle of Pudam, the apparatus was permitted to cool and it was opened cautiously. The Sugar confections present inside the contraption got vanished and the Pavalam present as the buildup in the device as a white debris material. The pale Pavalam was taken and ground well in the Kalvam (Stone mortar), until it got into fine powder. This fine powdered Pavalam was supposed to be Pavalam Parpam and overloaded for conventional tests to affirm whether it is appropriately completed or not. The completed type of PP was put away in a sealed shut glass holder.[13]

***In vitro* Study**
The antibacterial activity of Pavala parpam was estimated in five bacterial strains with the use of disc diffusion method. The bacterial strains like S. aureus, P. aeruginosa, S. mutans, K. pneumonia and E. coli has been destroyed by Pavala parpam with the dilution factor of 25 µl/disc.[14]

Preclinical studies
Anti-atherosclerotic activity
The impact of orally given Anna pavala chendooram, was researched on trial atherosclerosis. Animals were provided with a cholesterol rich (0.5%) diet for a half year to instigate atherosclerosis. These animals were partitioned into different groups of treatment. The treated group was given 50 mg of Anna pavala chendooram/day/animal for a time of additional a half year. Toward the finish of the analysis, plasma and aortic lipid segments were assessed and the atherosclerotic injuries of the aorta were evaluated by histological assessment. Changes in the digestion of plasma and aortic phospholipids were concentrated by fractionation into singular lipids following the consolidation of radiolabel from 14 C-acetic acid derivation into phospholipids. The plasma cholesterol level was diminished up to 65 % and the HDL level was expanded. The atheroma arrangement was moreover repressed. Anna pavala chendooram diminished the plasma sphingomyelin levels.[15,16]

Haemostatic Activity

Swiss albino mice was used to evaluate the haemostatic action of Pavala parpam, 2000 mg/kg body weight in Swiss albino was safe as per the acute toxicity results so the 500 mg/kg body weight through intraperitoneal route was administered, later on the animals exhibited decrease in the clotting time and in the bleeding time as than untreated animals, the bleeding time was significant than the standard haemostatic drug.[17]

Hepatoprotective Activity

According to the OECD guidelines of acute and the oral toxicity reports of Pavala parpam is safe at 4000 mg/kg. But mild diarrhea was observed in repeated oral toxicity and there was no any toxic signs from animals. Wistar rats were used to evaluate the hepatoprotective action of Pavala parpam. The inducing agent use was CCI_4 to damage the liver then were measured for the biochemical and haematological parameters. The reports exhibited that the animals with Pavala parpam treated had normal levels of bio chemical and haematological parameters.[14]

Anti-osteoporotic activity

The Female Sprague-Dawley rats were used to induce the bone loss by ovariectomy and low calcium diet. 65 mg/kg of drug was given 2 times a day for 16 weeks. There was reduced amount of calcium and phosphorus in urine but improvement was seen in femoral weight and density. Increase in cross sectional area, cortical thickness, Ca/P ratio and medullary width in ovariectomised animals.[18]

Toxicity Studies

Toxicity studies concluded that pavala parpam is safe and did not cause any toxicity in rats up to a dose of 2000 mg/kg. As a result of subacute toxicity According to the findings, Pavala parpam did not cause any lethality or adverse changes in general behaviour in rats and there were no observable negative effects over a 28 day period.[9]

CONCLUSION

Pavala parpam has aluminium, arsenic, cadmium, copper, mercury, nickel, and lead and also includes aromatic compounds, alkynes, alkenes, alkyl halides, alcohol, acyl chloride, esters, carboxylic acids, amides and amines. The particle size are in the range of 1-2 micron. Pavala parpam biochemical study shows the presence of calcium, sulphate, chloride, carbonate, and ferrous iron. Form this study, it is concluded that pavala parpam is safe and can be used for used for the treatment of diseases like bleeding disorders, asthma, etc.

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CONFLICTS OF INTEREST

There are no conflicts of interest among the authors.

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