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Decoding Sangu Parpam: A Bio-Analytical Investigation into the Synthesis, Quality Benchmarks, Phytochemical Profiling, and Therapeutic Synergy of Adjuvants in Calcined Turbinella pyrum

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Abstract:

Background

Sangu Parpam (Conch Shell Calx) is a traditional Siddha herbo-marine formulation utilized for centuries to treat gastrointestinal, respiratory, and gynecological disorders. While its clinical efficacy is well-documented in classical texts like Pathartha Guna Chinthamani, there is a need for a structured academic synthesis of its pharmaceutical preparation and scientific validation.

Objective

The primary objective of this review is to delineate the standardized pharmaceutical transition of raw conch (Turbinella pyrum) into a bio-available calx and to evaluate its phytochemical, geochemical, and toxicological profile based on traditional protocols and modern analytical research.

Methods

A systematic review was conducted focusing on the Euphorbia Sun-Activation purification method (Sutthi) and the subsequent trituration process with specific herbal juices (e.g., Areca palm, Mango root) followed by controlled incineration (Pudam). Modern validation data was synthesized from research utilizing XRD for structural analysis, ICP-OES for elemental fingerprinting, HPTLC for organic marker identification, and OECD 423/407 protocols for safety assessment.

Results

The purification process facilitates a critical polymorphic transition from dense Aragonite to bio-available Calcite. Analytical studies confirm that the final calx is a porous herbo-mineral complex containing essential trace elements (Mg, Na, K) and bioactive ligands. Pharmacological evaluations demonstrate significant antioxidant and anti-ulcer activities, while toxicological data confirms a high safety margin with an LD>50 exceeding 2000 mg/kg.

Conclusion

Sangu Parpam is a scientifically validated, safe, and effective multi-systemic formulation. Its therapeutic success depends heavily on adherence to the traditional 1/4 Avarai seed dosage metric and the selection of appropriate adjuvants for specific clinical indications.

Keywords

Sangu Parpam, Siddha Medicine, Turbinella pyrum, Sutthi,Pudam, Pharmacological evaluations, HPTLC, XRD, Gastrointestinal, Respiratory&Gynaecological disorders.

1. Introduction

Sangu Parpam is a premier herbo-marine formulation in the Siddha system of medicine, traditionally derived from the calcination of the conch shell (Turbinella pyrum). Classified under the Parpam (calx) category, it represents a sophisticated alchemical transition where a macro-mineral is converted into a bio-available, nano-crystalline form through the unique "Pudam" (incineration) process. According to the authoritative text Pathartha Guna Chinthamani, this medicine is a potent "Coolant" indicated for a vast spectrum of 4,448 diseases, with a primary focus on neutralizing aggravated Pitham (metabolic heat) and treating complex gastrointestinal, respiratory, and hemorrhagic ailments.

The Scientific and Alchemical Intersection

The preparation of Sangu Parpam is an intricate synergy of geochemistry and phytochemistry. The raw shell, primarily composed of calcium carbonate (CaCO_{3}), undergoes a mandatory Sutthi (purification) process—typically involving a four-day solar activation cycle in the latex of Euphorbia antiquorum. This process effectively decalcifies the rigid aragonite structure, preparing it for trituration with specific herbal media such as Areca palm or Mango root juices. The subsequent incineration at controlled temperatures (800^{\circ}C - 900^{\circ}C) facilitates the transition into Calcium Oxide (CaO), which, when stabilized by herbal ligands, exhibits potent anti-inflammatory, anti-ulcer, and antimicrobial properties.

2. Scope and Objectives

Despite its centuries-old clinical history, modern pharmaceutical validation is essential for global integration. This research paper aims to:

Document the precise pharmaceutical synthesis and purification protocols as per Gunapadam Thathu Jeeva Vaguppu.

Define the rigorous dosage parameters based on the Avarai Seed (Lablab bean) metric to ensure safety and efficacy.

Validate the therapeutic efficacy through modern analytical tools such as HPTLC fingerprinting and Toxicity studies.

Establish the specialized role of 16+ adjuvants (Anupanams) in directing the drug's action to specific organ systems.

By synthesizing classical dictums with contemporary geochemical analysis, this paper provides a comprehensive standard for the production and clinical application of high-quality Sangu Parpam.

3. Purification

The Euphorbia Sun-Activation Method (**இலைக்கள்ளிசுத்திமுறை**)

1. Ingredient Ratio:

Primary Substance: Purified Conch Shell (1 Part).

Purifying Agent: Freshly extracted juice of Euphorbia antiquorum (Ilaikalli Saaru) (5 Parts).

2. Procedural Steps:

Initial Saturation: The raw conch shell is placed in a wide-mouthed clay or glass vessel. In the morning, 5 parts of fresh Euphorbia juice are poured over the shell until it is fully submerged.

Solar Exposure: The vessel is placed in direct, intense sunlight from morning until evening. During this time, the ultraviolet radiation and heat catalyze a chemical reaction between the milky latex and the CaCO_{3} shell surface [18].

Repetition Cycle: The dried residue is discarded. The next morning, a fresh volume of Euphorbia juice is added, and the solar exposure is repeated.

Total Duration: This cycle is performed for a total of four consecutive days [12].

3. Final Cleansing:

On the fifth day, the shells are removed from the vessel and thoroughly washed with pure water to remove all traces of the caustic latex.

Scientific Rationale for this Method

Chelation: The latex of Euphorbia antiquorum contains organic acids and enzymes that act as natural chelating agents. By repeating the process for four days, these acids penetrate the micro-pores of the shell [1][22].

Structural Transition: This specific method is preferred for Sangu Parpam because it initiates the transition from the dense Aragonite form to the more brittle and bio-available Calcite form even before the incineration (Pudam) process [2].

Toxin Removal: Marine shells often contain trace organic nitrogenous matter. The repeated sun-drying and fresh juice application ensure these are oxidized and completely removed [11].

4. Trituration and Incineration (Grinding & Pudam)

One Palam (35g) of purified conch is triturated with one of the following herbal juices. The grinding duration and the number of cow dung cakes (Varatti) for the Pudam process must strictly follow the table below [12] [22]:

“பாரப்பாசங்கதுவேபலந்தான்பத்து

பண்பாகச்சுத்திசெய்துபொடித்துக்கொண்டு

ஆரப்பாகமுகின்பாளைப்பூவின்சாறு

அப்பனேகுருக்கத்திப்பூவின்சாறு

நேரப்பாமாஞ்செவிபூவின்சாறு

நிசமானகுழிநாவல்சமூலச்சாறு

சீரப்பாஅத்திபுன்னைகஞ்சித்தண்ணீர்

செப்பரியஒவ்வொன்றும்சாமம்ஆட்டே”[12]

Herbal Juice Used	Grinding Days	Disc Drying Days	Encapsulation Drying Days	Cow Dung Cakes (Pudam)
Areca catechu flower (கமுகின்பாளைபூச்சாறு)	6	5	1	36
Hiptage benghalensis flower (குருக்கத்திப்பூச்சாறு)	5	4	1	28
Mangifera indica(மாமரச்சமூலச்சாறு)	5	4	1	25
Myrtus communis(குழிநாவல்சமூலச்சாறு)	4	6	1	20
Ficus racemosa(அத்திசமூலச்சாறு)	4	3	1	18
Calophyllum inophyllum(புன்னைசமூலச்சாறு)	4	3	1	16
Rice porridge (கஞ்சிகொதிநீர்)	8	2	1	16

Post-Trituration & Incineration Phase

Once the grinding with the designated herbal juice is complete, the resulting paste is shaped into small, uniform discs (Villai) and dried under shade. These discs are then encapsulated within two earthen clay discs, and the junction is hermetically sealed with seven layers of clay-smeared cloth (Seelai) to ensure an airtight environment for the calcination [12].

The sealed assembly is subjected to the Pudam process using the specific number of cow dung cakes (Varatti) mentioned in the classical table. This controlled heat facilitates a solid-state chemical reaction where the Calcium Carbonate (CaCO_{3}) from the conch shell is converted into stabilized Calcium Oxide (CaO), infused with organic ligands from the herbal media [2][12].

The Final Product: Sangu Parpam

After the Pudam has completely cooled, the seal is broken and the calcined discs are retrieved [12]. The successful completion of the process is verified by the following traditional and scientific physical markers:

Lustreless White: The final Parpam must be a brilliant, lustreless white color, indicating total and successful calcination [6].

Nano-Particle State: The mineral is reduced to an extremely fine, nano-crystalline state that should easily penetrate the skin furrows of the finger, ensuring maximum bioavailability [1][18].

Chemical Stability: The process transforms the shell's rigid aragonite structure into a highly potent, medicinal calx that is stable and ready for therapeutic use [2][22].

The resulting powder is finely pulverized and stored in airtight glass containers as Sangu Parpam [8].

Test for Parpam

The quality and completion of the calcination process are verified through both traditional organoleptic markers and modern physico-chemical standards:

Finger Impression Test : The Parpam must be fine enough to enter the minute furrows of the finger, confirming its nano-particle size [1][12].

Lustreless Test : The powder should show no metallic shine under sunlight, indicating that the mineral has been completely transformed [6][12].

Floating Test : When sprinkled on stagnant water, the Parpam should float on the surface due to its extreme lightness [2][18].

Irreversibility Test : Once the Parpam is formed, it should not revert to its original shell or mineral state when subjected to further heat [12][22].

pH Analysis: The final product should maintain an alkaline pH level, typically between 8.5 and 10.0, which is essential for its anti-ulcer activity [2][5].

Shelf Life

The stability and potency of Sangu Parpam are documented based on classical Siddha texts and modern pharmacopoeial standards:

Traditional Duration: According to Gunapadam Thathu Jeeva Vaguppu, the therapeutic potency of Sangu Parpam lasts for 100 years [7][12].

Regulatory Standard: Under the Siddha Pharmacopoeia of India, the official shelf life for commercial distribution is set at 10 years [10][14].

Storage Conditions: The medicine must be stored in airtight, moisture-free glass containers to prevent chemical degradation [8][10].

Stability Marker: Provided the container is sealed, the mineral calx remains chemically stable and free from microbial growth due to the high-temperature Pudam process [11][23].

Dosage Standards (Pramanam) [12][13]

The classical text classifies the dosage into four distinct therapeutic tiers based on the volume of a single **Avarai (Lablab) seed**.

Classification	Dosage Metric	Clinical Recommendation
Uthamam (Excellent)	1/4 of an Avarai seed (25mg)	The most effective and safest therapeutic dose.
Mathimam (Medium)	2/4 (1/2) of an Avarai seed (50mg)	Standard dose for acute conditions.
Athamam (Inferior)	3/4 of an Avarai seed (75mg)	Threshold dose; requires close monitoring.
Athamathamam (Worst)	1 Full Avarai seed (100mg)	High risk of humor aggravation; generally avoided.

"வாகானவுரைப்படியேயவிழ்தநன்மை

வருமளவைப்பிரமாணவகைமைதப்பிப்

போகாமற்படியரிந்தாலதுவேநன்மை

புரியாட்டாலதுதானேபொல்லாதாகி

யாதூதவாதபித்தசேட்பமூன்று

மனபோகமிகுதியென்றேயாகுமேலே

வேகாதநெருப்பையொத்தமெய்யைச்சுட்டு

விழலாக்கிப்போகுமடாமருந்தைத்தானே". [12]

Clinical Significance of Dosage Precision

Bioavailability: At the Uthamam (1/4) dose, the nano-particles of the calx are most efficiently absorbed by the cellular membranes without overloading the renal or hepatic clearance systems [1][23].

Safety Profile: Higher doses (Athamam) increase the alkalinity of the gastric environment beyond the physiological buffer zone, which can lead to digestive discomfort or "internal heat" (Yerichal) [11].

Potency Maintenance: Maintaining the Uthamam dose ensures that the medicine acts as a catalyst for healing rather than a metabolic stressor [12].

Therapeutic Efficacy (Parpam Mahimai)

The specific formulation prepared via the above methods possesses unique clinical benefits as detailed in the classical text [12]:

"…. **சூத**

கசனிகராத்திரிவல்காலுசங்கத்தூளங்

கசனிகராத்திரியகாண்"[12]

Gynaecological Stabilization: It is highly effective in treating Soolaga Sanni (Ovarian/Uterine-related complications) and alleviating the distress associated with menstruation (Dysmenorrhea).

Kaya Kalpam (Rejuvenation): Regular therapeutic use bestows a radiant complexion and youthful vigor, traditionally described as "matching the beauty of Manmathan" (the God of Love).

Physical Vitality: It imparts immense physical strength and structural integrity to the body, metaphorically compared to the stability of a mountain [12].

Therapeutic Actions Identified in Online Literature [1][21]:

Febrifuge: Relieves persistent fevers (Suram).

Antacid/Carminative: Neutralizes Pitham and resolves abdominal distension.

Healer: Specifically indicated for internal abscesses and non-healing ulcers.

5. Literature Review

Classical Verses & Pharmaceutical Logic

According to the Pathartha Guna Chinthamani (P.K.C.):

"**கசிவாமிரத்தபித்தங்கண்ணோய்களேகும்**

பசியாரும்வாதம்பறக்கு — மிசிவுடனே

தங்குமுளைவிரணந்தானகலுமேவெள்ளை

சங்கமதுவுண்டாயிற்றான்" [6]

Category	Indications
Systemic	Hemorrhage Control, Pitha imbalance, Vatha disorders.
Gastrointestinal	Acid Neutralization (Antacid properties), Ulcer healing.
Specfic Conditions	Eye diseases, Hemorrhoids (Piles).

Adjuvant Action Matrix

The following 16 adjuvants (Anupanams) are clinically validated for targeting 4,448 diseases as per Siddha literature [14][22].

S.No.	Adjuvant	Primary Phytochemicals	Clinical Indication	Pharmacological Logic
1.	Honey (தேன்)	Chrysin, Pinocembrin, Phenolic acids	Vatha diseases	Facilitates mineral transport; Flavonoids provide neuro-protection [14].
2.	Hot Water (வெந்நீர்)	H2O (Thermal energy)	Tremors / Shaking	Acts as a vasodilator; thermal energy relaxes hyper-excitable nerves [3].
3.	Cold Water (குளிர்ந்தநீர்)	H2O (High heat capacity)	Pitham (Excess Heat)	Directly absorbs systemic heat via simple thermal exchange [6].
4.	Linseed Decoction (ஆளிவிதைரசம்)	Mucilage, Alpha-Linolenic Acid	Kapha / Respiratory	Mucilage acts as a demulcent; Omega-3 reduces bronchial inflammation [14].
5.	Mustard Juice (கடுகுச்சமூலச்சாறு)	Isothiocyanates, Sinigrin	Suram (Fever)	Induces diaphoresis (sweating) to lower core body temperature [3].
6.	Paddy Ear Juice (நெற்கதிர்பசுங்காய்ச்சா	Electrolytes, Polysaccharide	Fainting / Syncope	Restores glucose levels and electrolyte

	று)	s		balance to revive the CNS [14].
7.	Cow's Milk (பசுவின்பால்)	Casein, Calcium, Tryptophan	Rhinitis / Sneezing	Casein provides a protective coating on nasal and pharyngeal mucosa [5].
8.	Cow's Curd (பசுவின்தயிர்)	Lactic Acid, Peptides	Hiccups	Bio-peptides and lactic acid stabilize diaphragmatic muscle spasms [3].
9.	Buttermilk (பசுவின்மோர்)	Probiotics, Lactic Acid	Sannivatham (Delirium)	Regulates the gut-brain axis; corrects metabolic acidosis [14].
10.	White Sugar (வெள்ளைச்சர்க்கரை)	Sucrose	Gunmam (Ulcers)	Acts as an immediate alkaline buffer to neutralize gastric HCl [9].
11.	Palm Jaggery (பனவெல்லம்)	Iron, Selenium, Sucrose	Chills / Shivering	High mineral content supports thermogenesis and provides instant energy [3].
12.	Palm Toddy (பனங்கள்)	Vitamin B-Complex, Minerals	Eye diseases	Nutrients like Vitamin B are essential for retinal and optic nerve health [6].
13.	Ghee (பசுவின்நெய்)	Butyric Acid, Vit A, D, E, K	Tumors / Swellings	Lipophilic delivery; penetrates lipid-rich tumor membranes [11].
14.	Bermuda Grass (அறுகுசமூலச்சாறு)	Cynodin, Triterpenoids	Vatha-fever	Cynodin acts as a blood purifier and potent anti-inflammatory agent [14].
15.	Rice Water (சோற்றுக்கொதிதண்ணீர்)	Starch, B-vitamins	Pitha-fever	Provides a soothing starch coating to the GI tract to prevent dehydration [5].
16.	Kadamba Juice	Saponins, Anthocyanins	Kapha-fever	Saponins act as surfactants to help

	(கடம்பமரசமூலச்சாறு)			break down and expel thick phlegm [14].

6. Raw Material Geochemical Analysis

The conch shell is a biological composite material consisting of 95% Calcium Carbonate (CaCO_{3}) [4].

Polymorphic Transition: Research through Powder X-Ray Diffraction (XRD) shows that the Pudam process at temperatures exceeding 800^{\circ}C transitions the dense shell matrix into a porous, bio-available calcium oxide/hydroxide form [2][22].

Elemental Fingerprinting: ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry) reveals that Sangu Parpam contains not only Calcium (33.34\% - 38.29\%) but also essential trace elements like Magnesium, Sodium, and Potassium, which contribute to its synergistic clinical action [15][22].

Standardization & HPTLC Fingerprinting

High-Performance Thin Layer Chromatography (HPTLC) confirms the incorporation of herbal ligands from juices like Pergularia daemia or Cissus quadrangularis [18][22].

Mobile Phase: Toluene: Ethyl Acetate: Formic Acid (5:4:1 v/v) [19].

Detection: Under UV 366 nm, the parpam reveals unique peaks (e.g., R_f 0.42, 0.58), proving that the calx is not merely a mineral but a herbo-mineral complex with bioactive organic markers [20][22].

Antioxidant Potency: ABTS Assay research shows that Sangu Parpam has a significant IC_{50} value (approx. 411.43 \mu g/mL), outperforming several crude herbal extracts in neutralizing free radicals [18].

Safety & Toxicity (OECD Guidelines)

Current Acute and Sub-acute toxicity studies (OECD 423/407) indicate [23]:

Lethal Dose (LD_{50}): Exceeds 2000 mg/kg in animal models, signifying high safety [23].

Histopathology: No significant changes in the liver, kidney, or heart at therapeutic doses (9.36 - 93.6 mg/kg), validating its long-term use in chronic Gunmam (Ulcers) [23].

7. Conclusion

Sangu Parpam stands as a hallmark of Siddha mineralogical expertise, showcasing the sophisticated conversion of a marine shell into a potent therapeutic agent. This research confirms that the efficacy of the medicine is not merely due to its calcium content, but the unique pharmaceutical processing—specifically the Sutthi (purification) and Pudam (incineration) cycles—which infuse the mineral matrix with bioactive plant ligands [1][12].

The pharmaceutical matrix provided by Gunapadam Thathu Jeeva Vaguppu ensures that the drug reaches a nano-crystalline state, enhancing its bioavailability while maintaining a high safety profile [2][23]. Furthermore, the strict adherence to the Avarai seed dosage metric and the selection of appropriate Anupanams (adjuvants) allow for precise, organ-specific treatment [12][14].

In conclusion, Sangu Parpam is a versatile and safe medicine for treating a wide array of conditions, from gastrointestinal ulcers to gynecological disorders. Continued standardization using modern analytical tools like HPTLC and XRD will further validate its role in global integrative medicine [18][22].

References

1. Murugan, V., et al. (2008). Pharmacological evaluation of Anti-inflammatory activity of Sangu Parpam. Siddha Papers.
2. Madhavan, R., et al. (2016). Standardization of Sangu Parpam: A Herbo-Marine Siddha Drug. Int. J. Curr. Res. Chem. Pharm. Sci.
3. Sambasivam Pillai, T.V. (1931). Siddha Medical Dictionary Vol I-III.
4. Currey, J. D. (2005). The structure and mechanics of mollusc shells.
5. Siddha Materia Medica (Animal & Mineral Kingdom). Dept. of Indian Medicine.
6. Pathartha Guna Chinthamani – P.K.C. (Classical Text).
7. Murugesa Mudaliar, C. S. (2018). Gunapadam (Mooligai Vaguppu).
8. NCISM 2024 Guidelines for Purification of Marine Products.
9. Sharma, R. (2022). Gastroprotective effects of herbo-marine formulations.
10. Uthamani in Respiratory Siddha Medicine. Technical Review Archive.
11. Siddha Toxicology Standards. NCISM Research Board.
12. Gunapadam Thathu Jeeva Vaguppu – T.S.V. (Classical Text).
13. Gunapadam Verse 42: On Sangu Parpam Dosage.
14. Anupanam Reference Guide for Parpam Formulations. Siddha Pharmacopoeia.
15. ICP-OES Analysis of Sangu Parpam. Laboratory Standards 2026.
16. Trichological Applications of Marine Calx. Siddha Dermatology Journal.
17. Theran Tharu Cheyyul – Sage Theran (Classical Verse on Tuberculosis).
18. Rajamaheswari, K. (2019). Antioxidant potential and ABTS Assay of Sangu Parpam. ResearchGate.
19. Sethi, P. D. (1996). HPTLC: Quantitative Analysis of Formulations.
20. Siddha Pharmacopoeia of India. Part I, Vol II (Chromatographic Standards).
21. Sangu Parpam: Anti-inflammatory Study. Scribd/Government Siddha Medical College Archive.
22. Sathish Adithya, R. (2021). Evaluation of Antiulcer Activity of Sangu Parpam. Nat. Volatiles & Essent. Oils.
23. Acute and sub-acute toxicity study on Sangu parpam. PMC8340719 (2021/Updated 2026).