



A COMPARATIVE PHARMACEUTICAL STUDY OF MUKTA PISHTI PREPARED FROM NATURAL PEARL AND CULTURED PEARL

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ABSTRACT

Background: Mukta (pearl) is an animal-origin substance classified under Ratna Varga in Rasa Shastra and is used as Mukta Pishti and Mukta Bhasma. Natural pearls are scarce and costly, whereas cultured pearls are readily available. Differences in pearl formation and nacre may influence pharmaceutical behaviour. **Aim:** To prepare and comparatively evaluate Mukta Pishti from natural and cultured pearls. **Materials and Methods:** Both pearl samples were separately purified by Swedana in Jayanti Patra Swarasa using Dola Yantra for three hours. The purified samples were powdered and subjected to repeated Mardana with Gulab Jala. Three standardization batches containing 100 g purified Mukta and approximately 750 mL Gulab Jala were processed for 21 days. Pharmaceutical observations, yield, loss and organoleptic characteristics were recorded. **Results:** Final yields were 89%, 88% and 89%. From 300 g initial material, 266 g final product was obtained, giving an average yield of 88.67% and loss of 11.33%. Natural pearl-based Mukta Pishti was white, while the cultured preparation was greyish-white. Both were fine, smooth, homogeneous, odourless and chalk-like. **Conclusion:** Natural and cultured pearls were successfully processed by the same method with only 1% batch-yield variation. Their pharmaceutical characteristics were broadly comparable, but analytical and therapeutic studies are required before confirming equivalence.

KEYWORDS : Mukta, Mukta Pishti, Natural Pearl, Cultured Pearl, Shodhana, Pharmaceutical Standardization

INTRODUCTION

Rasa Shastra is a specialised branch of Ayurveda concerned with processing metals, minerals, gems and animal-origin substances into safe, stable and therapeutically suitable forms. Mukta (pearl), included under Ratna Varga, is traditionally recognised for cooling, nourishing and Pitta-Shamaka properties and is used in conditions associated with burning, acidity, bleeding, cardiac weakness and mental irritability.¹

Pearl is an organic gem formed in molluscan tissue through deposition of calcium carbonate and conchiolin. Natural pearls develop without deliberate intervention, whereas cultured pearls form after introduction of a nucleus or irritant. Although their main mineral composition is similar, they may differ in nacre thickness, growth pattern, density and organic content.² Cultured pearls are more readily available and economical for pharmaceutical use.³

Mukta Pishti is a non-incinerated preparation produced by purification, powdering and prolonged trituration with Gulab Jala. Repeated wet grinding reduces aggregates and creates a smooth, fine and homogeneous product. Raw-material quality, purification medium, Swedana duration, liquid quantity, Mardana, drying and handling may affect the final formulation.⁴ This study therefore compared natural and cultured pearl preparations under uniform pharmaceutical conditions.

Aim and Objectives

Aim

To prepare and comparatively evaluate Mukta Pishti obtained from natural pearl and cultured pearl.

Objectives

1. To authenticate and process natural and cultured pearls separately.
2. To perform Shodhana of both samples through Swedana in Jayanti Patra Swarasa.
3. To prepare natural pearl and cultured pearl-based Mukta Pishti through repeated Mardana with Gulab Jala.
4. To document the pharmaceutical observations and practical difficulties encountered during preparation.
5. To assess batch reproducibility, percentage yield and pharmaceutical loss.
6. To compare the organoleptic and pharmaceutical characteristics of both final preparations.

MATERIALS AND METHODS

Study Design

This was a comparative pharmaceutical standardization study.

Place of Study

All procedures were performed hygienically in the Department of

Rasa Shastra and Bhaishajya Kalpana. Separate, clean and labelled equipment was used for natural and cultured pearls.

Procurement of Raw Materials

Natural and cultured pearls were procured from the Pearl Market, Hyderabad. Fresh Jayanti Patra was authenticated before use. Fresh Rosa indica L. petals were used for Gulab Jala, with clean water used for liquid media.

Table 1. Raw Materials Used in the Study

S.No.	Raw material	Identity or source	Pharmaceutical use
1	Natural pearl	Pearl Market, Hyderabad	Preparation of natural pearl-based Mukta Pishti
2	Cultured pearl	Pearl Market, Hyderabad	Preparation of cultured pearl-based Mukta Pishti
3	Fresh Jayanti Patra	Authenticated leaves	Preparation of Swarasa for Mukta Shodhana
4	Fresh rose petals	Authenticated Rosa indica petals	Preparation of Gulab Jala
5	Water	Clean potable or purified water	Maceration and preparation of liquid media

Apparatus

Equipment included Dola Yantra, stainless-steel vessels, muslin cloth, a heating device, Khalva Yantra, balance, measuring cylinder, drying trays, distillation apparatus, spatula and airtight glass containers.

Preliminary Examination of Raw Pearls

Before Shodhana, both pearl samples were assessed for colour, surface, consistency, odour, taste, cracks, discolouration and visible impurities.

Table 2. Preliminary Characteristics of Raw Pearls

Character	Natural pearl	Cultured pearl
Colour	Whitish	Whitish
Surface	Smooth and lustrous	Smooth and lustrous
Consistency	Hard	Hard
Odour	None	None
Taste	Chalk-like	Chalk-like
Visible cracks	Absent	Absent
Abnormal discolouration	Absent	Absent
Visible impurities	Absent	Absent

Both samples were hard, smooth, lustrous and clean, without visible cracks, foreign matter or abnormal discolouration, and were suitable for processing.

Preparation of Jayanti Patra Swarasa

Five hundred grams of cleaned Jayanti Patra was initially macerated with 1933 g water. After absorption, the saturated leaves weighed 2433 g. A further 4866 g water, twice the saturated weight, was added for overnight soaking. Total water use was 7299 g. The softened leaves were crushed and pressed to obtain Swarasa.

Table 3. Quantitative Details of Jayanti Patra Swarasa

Parameter	Quantity
Fresh Jayanti Patra	500 g
Water used for initial maceration	1933 g
Saturated weight of leaves	2433 g
Water used for overnight soaking	4866 g
Total water used	7299 g

The extraction was performed in three cycles.

Table 4. Batch-wise Yield of Jayanti Patra Swarasa

Extraction cycle	Yield
Batch 1	5775 g
Batch 2	5950 g
Batch 3	5775 g
Total yield	17,500 g
Average yield	5833.33 g

Batch 2 produced the highest extraction yield. The 175 g difference between maximum and minimum yields was attributed to manual pressing and liquid retained in the plant residue.

Shodhana of Natural and Cultured Mukta

Natural and cultured pearls were tied separately in muslin Pottali and suspended in Jayanti Patra Swarasa using Dola Yantra. Controlled mild heating and Swedana continued for three hours, with each Pottali immersed but not touching the vessel bottom. Liquid level was monitored. Samples were then cooled, washed, dried and stored separately. This procedure is described for Mukta Shodhana.⁵

Table 5. Comparative Details of Mukta Shodhana

Parameter	Natural pearl	Cultured pearl
Purification medium	Jayanti Patra Swarasa	Jayanti Patra Swarasa
Apparatus	Dola Yantra	Dola Yantra
Process	Swedana	Swedana
Duration	3 hours	3 hours
Heating	Controlled mild heating	Controlled mild heating
Post-processing	Washing and drying	Washing and drying
Storage	Separate airtight container	Separate airtight container

Observations During Shodhana

During heating, the Swarasa warmed and gradually evaporated while the suspended Pottali moved continuously. After washing, adherent plant matter was removed. Both samples remained hard but became clean and suitable for powdering.

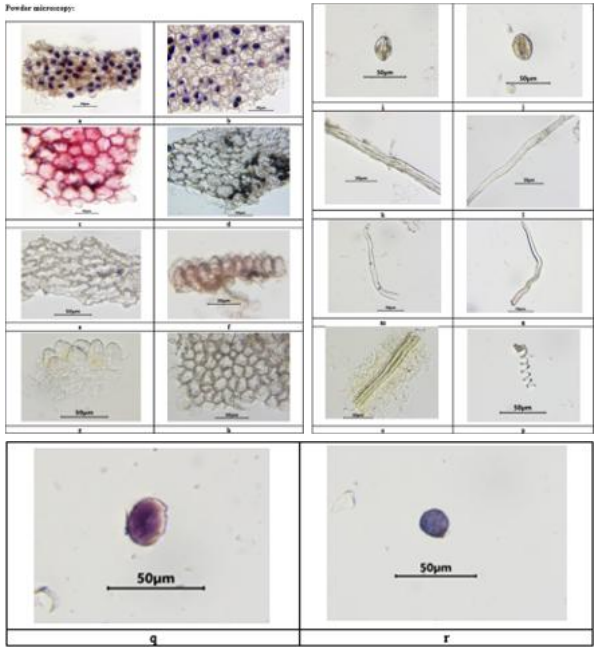
Preparation of Gulab Jala

One hundred twenty grams of cleaned rose petals was mixed with 3 L water and distilled for about two hours, yielding 1.9 L Gulab Jala.

Table 6. Quantitative Details of Gulab Jala

Parameter	Observation
Fresh rose petals	120 g
Water added	3 L
Duration of distillation	2 hours
Final quantity obtained	1.9 L
Colour	Clear, colourless to faintly coloured
Odour	Characteristic aromatic rose odour
Form	Liquid

Recovery of Gulab Jala from added water was approximately 63.33%. The aromatic distillate was stored in tightly closed containers. Rose-derived media may contribute soothing and antioxidant properties.⁶



Powdering of Purified Mukta

After drying, the pearl samples were separately broken and repeatedly ground in a clean mortar. Careful grinding and minimum transfer reduced handling loss.

Preparation of Mukta Pishti

For each batch, 100 g purified pearl powder was placed in a clean Khalva Yantra. Gulab Jala was added gradually and Mardana continued for 21 days, with further liquid added when the mass became dry. Approximately 750 mL was used per batch. Processing continued until the material became fine, smooth and homogeneous. It was dried, gently powdered and stored in airtight containers. Wet trituration assists size reduction, uniform mixing and contact with the processing medium.⁷

Observations During Mardana

Table 7. Stage-wise Observations During Mardana

Stage	Observation
Beginning	Powder was relatively coarse and dry
After addition of Gulab Jala	Wet mass or paste was formed
Continuous trituration	Particle aggregates gradually reduced
Intermediate stage	Material became smoother and more uniform
Repeated wetting and trituration	Fineness and homogeneity increased
Near completion	Paste became soft, smooth and evenly trituated
After final drying	Fine and free-flowing Pishti was obtained
Final character	Smooth, odourless and chalk-like powder

Gradual, divided addition of Gulab Jala maintained suitable consistency and avoided excessive wetness and prolonged drying.

Batch-Wise Pharmaceutical Results

Three batches were prepared to evaluate process reproducibility.

Table 8. Batch-wise Preparation and Yield of Mukta Pishti

Parameter	Batch 1	Batch 2	Batch 3
Initial weight of purified Mukta	100 g	100 g	100 g
Approximate Gulab Jala used	750 mL	750 mL	750 mL
Duration of processing	21 days	21 days	21 days
Final weight	89 g	88 g	89 g
Weight loss	11 g	12 g	11 g
Percentage yield	89%	88%	89%
Percentage loss	11%	12%	11%
Final form	Fine Pishti	Fine Pishti	Fine Pishti

Table 9. Overall Pharmaceutical Yield and Loss

Parameter	Natural pearl-based Mukta Pishti	Cultured pearl-based Mukta Pishti
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Raw material	Natural pearl	Cultured pearl
Shodhana medium	Jayanti Patra Swarasa	Jayanti Patra Swarasa
Apparatus	Dola Yantra	Dola Yantra
Duration of Shodhana	3 hours	3 hours
Triturating medium	Gulab Jala	Gulab Jala
Main process	Repeated Mardana	Repeated Mardana
Final form	Fine Pishti	Fine Pishti
Colour	White	Greyish-white
Odour	None	None
Taste	Chalk-like	Chalk-like
Texture	Fine and smooth	Fine and smooth
Homogeneity	Homogeneous	Homogeneous

The 1% batch-yield range indicated good reproducibility.

Comparative Pharmaceutical Observations

Table 10. Comparison of Natural and Cultured Pearl-based *Mukta Pishti*

Parameter	Result
Number of batches	3
Total initial weight	300 g
Total final weight	266 g
Total pharmaceutical loss	34 g
Average initial weight per batch	100 g
Average final weight per batch	88.67 g
Average percentage yield	88.67%
Average loss per batch	11.33 g
Average percentage loss	11.33%
Total approximate Gulab Jala used	2250 mL
Processing duration per batch	21 days
Highest yield	89%
Lowest yield	88%
Yield variation	1%

Both formulations were comparable in fineness, smoothness, taste, odour and homogeneity. Natural *Mukta Pishti* was white, whereas cultured *Mukta Pishti* was greyish-white.

Practical Difficulties and their Management

Table 11. Practical Difficulties Encountered During Preparation

Practical difficulty	Management
Hardness of purified pearl	Prolonged and careful grinding
Difficulty in obtaining fine powder	Repeated pulverisation and trituration
Adherence to mortar and pestle	Periodic scraping with a clean spatula
Rapid drying during Mardana	Gradual addition of Gulab Jala
Excessive wetness	Addition of liquid in divided quantities
Risk of sample mixing	Separate labelled equipment and containers
Loss during transfer	Minimum transfer and careful collection
Fine-powder loss	Gentle handling and covered drying
Long processing duration	Regular daily schedule and documentation
Moisture absorption	Storage in airtight containers

Probable Causes of Pharmaceutical Loss

Average pharmaceutical loss was 11.33%, mainly from adherence to equipment, transfer, drying, sieving, repeated handling, sampling and cleaning. Similar loss across batches suggested consistent handling loss rather than a major process defect.

DISCUSSION

Natural and cultured *Mukta Pishti* were prepared under identical conditions to minimise procedural variation. Both underwent three hours of *Swedana* in *Jayanti Patra Swarasa* using *Dola Yantra*. Uniform medium, apparatus, heating and duration provided a valid comparative basis. *Shodhana* is considered a transformative process that removes unwanted matter and improves suitability for later processing.⁸ Both purified samples remained hard but were clean and suitable for mechanical reduction.

Approximately 750 mL *Gulab Jala* was used per 100 g pearl powder, a liquid-to-solid ratio of 7.5 mL/g. Repeated addition during 21 days of *Mardana* supported progressive reduction of aggregates and formation

of smooth, homogeneous *Pishti* without incineration. The colour difference may reflect variations in nacre, growth environment, nucleus, organic matrix or minor impurities.⁹ Other organoleptic characteristics were comparable.

Yields of 89%, 88% and 89% demonstrated satisfactory reproducibility, with an average yield of 88.67% and only 1% variation. Slightly greater loss in Batch 2 may have resulted from wet-mass adherence, transfer and fine-powder loss. These close values support the procedure as a practical standardization basis. Control of raw material, heating, liquid quantity, grinding and drying remains necessary because these variables may influence final quality.¹⁰ The adopted procedure also supports clear documentation, controlled handling, separate processing, reproducible wet trituration, careful drying, accurate weighing, and secure storage during routine pharmaceutical standardization.

Standardization of this procedure should include recording the identity and weight of each raw material, the quantity of purification medium, heating duration, daily trituration time, liquid consumption, drying conditions, final weight, percentage yield and handling loss. Separate equipment and labels are essential to prevent mixing of natural and cultured samples. The same operator, apparatus and endpoint criteria should be maintained across batches. Such documentation improves traceability and helps identify whether variation arises from raw material, manual grinding, liquid addition, transfer or drying. These controls are especially important when a traditionally prepared formulation is compared with an alternative source material for pharmaceutical use.

Limitations

The three-batch yield data were reported collectively and not separately for natural and cultured pearl preparations. They therefore cannot demonstrate a source-wise recovery difference. Future studies should prepare at least three independent batches from each source and statistically compare yield, processing time, *Gulab Jala* consumption and loss.

CONCLUSION

Natural and cultured pearls were successfully converted into *Mukta Pishti* through three hours of *Swedana* in *Jayanti Patra Swarasa*, followed by powdering and 21 days of *Mardana* with *Gulab Jala*. About 750 mL liquid was required per 100 g batch. Yields were 89%, 88% and 89%, averaging 88.67%, with 11.33% average loss. Natural *Mukta Pishti* was white and cultured *Mukta Pishti* greyish-white; both were fine, smooth, homogeneous, odourless and chalk-like. Cultured pearl showed broadly comparable pharmaceutical processing, but source-wise replicated batches, analytical testing and therapeutic assessment are required before declaring full equivalence.

Conflict of Interest - Nil.

Source of Support - None

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