



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203



Human Journals

Research Article

November 2021 Vol.:22, Issue:4

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Pharmaceutico – Analytical Study of Kottamchukkadi Kuzhambu – A Traditional Kerala Formulation



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals



ISSN 2349-7203

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Submitted: 20 October 2021
Accepted: 25 October 2021
Published: 30 November 2021

Keywords: *Kottamchukkadi Kuzhambu, Sneha Kalpana, Sahasrayogam, Pharmaceutico-Analytical*

ABSTRACT

Kuzhambuis one of the developed dosage forms of Sneha Kalpana described in Ayurveda. Kottamchukkadi Kuzhambu consists of nine kalka dravyas starting from Kushta (Kottam in Malayalam) and Sunti (Chukku), 2 drava dravyas (Dadhi and Chincha Sawrasa), and three different sneha dravyas (Tila taila, Eranda taila, and Goghrita). Even though this formulation is practiced commonly, standardization of formulation is always important to maintain the quality of a product. Hence, the current study was conducted to understand the pharmaceutical and analytical parameters of Kottanchukkadi Kuzhambu for its standardization. In the pharmaceutical study, it showed 83 % yield and in the analytical study, the values of loss on drying, refractive index, saponification value, acid value, and iodine value, total solid was found to be 0.898 %, 1.465, 128.6440, 6.67, 90.49,70 and the rancidity test showed negative. These parameters can be set as standard values to derive quality constants for Kottanchukkadi Kuzhambu.



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1. INTRODUCTION

Ayurveda is a systematically codified health science since the Vedic period. *Rasa Shastra and Bhaishajya Kalpana* is a branch of this Holistic science, which explained pharmaceutics and pharmacy in detail. *Sneha Kalpana* (Oleaginous preparations) has a widely used dosage form described in *Ayurveda Samhitas* for both external and internal use. Even though there are four different *snehas* (Oleaginous substances) that are explained by *acharyas*, including *ghrita, taila, vasa, majja*¹; *Ghrita Kalpana* (Ghee Preparations), and *Taila Kalpana* (oil preparations) are most commonly used in the daily practice of *Ayurveda*.

Kuzhambu was one of the developed dosage forms of *Sneha Kalpana* preferably *taila Kalpana* done by Kerala vaidyas through long-term practice. It is a combination of any three oleaginous materials exclusively used for external application. *Kuzhambu* is a preparation of three different *Sneha dravyas*, *Kalka* (fine paste) of drugs, and *Drava dravya* (liquid media) are being boiled in a specific quantity for a specific time to obtain an optimum result². *Kottamchukkadi* is one of the market available samples of *Kuzhambu*, which is developed from *Kottamchukkadi taila* preparation explained in *Sahasrayoga*³. *Kottamchukkadi tailam* is indicated both internally and externally. To increase its effectiveness, the Kerala Vaidyas added *Ghrita* and *Eranda taila* to the *taila* preparation and modified it into *Kottamchukkadi Kuzhambu*, exclusively used for external application. It is a widely used polyherbal formulation in Southern parts of India. It is indicated for *vataja* and *amavataja vikaras* (different musculoskeletal and neurological conditions) as *abhyanga, pizhichil*, etc.

LITERATURE REVIEW

No evidence or description of *Kuzhambu* is found in *Vedas* and *Classics*. *Kottamchukkadi Kuzhambu's* direct reference is not available. It is a developed form of *Kottamchukkadi taila* preparation explained in *Sahasrayoga*, mainly for external application.

2. MATERIAL AND METHODS

2.1 Aims and objective

- 1) To prepare *Kottamchukkadi Kuzhambu* as per classical *Sneha Kalpana* method.
- 2) To analyze the above-said preparations physicochemically.

2.2 Materials

Raw drugs are procured from G.M.P Certified KLE's Ayurveda Pharmacy at Belagavi. Before processing these were recognized and authenticated at the approved Drug Testing Laboratory for ASU drugs by AYUSH, Govt. of India, of KAHER's Shri. B.M.K. Ayurveda Mahavidyalaya and Department of Quality Assurance, KAHER's College of Pharmacy at Belagavi.

Table No: 01 Information of drugs

| Sr. No. | Ingredients | Botanical Name ^{4,5,6} | Part Used | Quantity taken |
|---------|-------------|---|-----------|----------------|
| 1 | Kustha | <i>Saussurea lappa Clarke</i> | Root | 29.4 gm |
| 2 | Shunthi | <i>Zingiber officinale Roscoe</i> | Rhizome | 29.4 gm |
| 3 | Vacha | <i>Acorus calamus Linn.</i> | Rhizome | 29.4 Gm |
| 4 | Shigru | <i>Moringa oleifera Lam.</i> | Stem Bark | 29.4 Gm |
| 5 | Lashuna | <i>Allium sativum Linn.</i> | Rhizome | 29.4 gm |
| 6 | Kartotti | <i>Capparis spinosa Linn.</i> | Root | 29.4 gm |
| 7 | Devadaru | <i>Cedrus deodara Roxb.</i> | Wood | 29.4 gm |
| 8 | Sarshapa | <i>Brassica campestris Var.</i> | Seed | 29.4 gm |
| 9 | Rasna | <i>Pluchea lanceolata Oliver & Hiern.</i> | Rhizome | 29.4 gm |
| 10 | Tila | <i>Sesamum indicum Linn.</i> | Oil | 600 ml |
| 11 | Eranda | <i>Ricinus communis Linn</i> | Oil | 300 ml |
| 12 | Goghrita | Cows' ghee | - | 150 ml |
| 13 | Dadhi | Curd from cows' milk | - | 4.2 L |
| 14 | Chincha | <i>Tamarindus Indicus Linn.</i> | Leaves | 4.2 L |

2.3 Methods

The procedure of preparation of *Kottamchukkadi kuzhambu*

Pre-operative procedure:

- Preparation of *Drava dravya* (liquid part) – Collect fresh leaves of *Chincha*, wash thoroughly, grind and express *swarasa* (juice) through a muslin cloth.

- Preparation of *Kalka* (paste) - Wash and dry all the herbal raw materials thoroughly. Take the ingredients (*Kalka dravyas*) except for *Lasuna* and *Sarshapa*, dry, powder, and pass-through sieve number 80. Grind *Lasuna* and *Sarshapa* separately, add the powdered ingredients and grind with a sufficient quantity of *Chincha swarasa* to prepare a homogeneous blend (*Kalka*).

Operative procedure:

- Take the mixture of *Tila Taila*, *Eranda taila*, *Goghrita* (ghee) in a stainless-steel vessel and heat it mildly.
- Add the *Chincha Swarasa* and *dadhi* to it.
- Later add *kalka* (bolus of the drug) and stir thoroughly.
- Heat it with constant stirring and maintain the mild temperature during the first hour of heating.
- Stop heating just before *mrudupaka* (*Kalka* shows stickiness to touch and traces of water) and allow standing overnight.
- Start heating the next day, stir and constantly check the *Kalka* by rolling between the fingers.
- Stop heating until *Kalka* breaks down into pieces on attempting to form a *varti* (wick - *Khara pāka Lakshana*) and obtain optimum smell and color (*gandha varnotpatti*).

Kalpasidhi pareeksha - Test for perfectness^{7, 8}:

These are the tests, which confirm the quality of final products and completion of the procedure.

- Expose the *varti* to flame and confirm the absence of crackling sound indicating the absence of moisture.
- *Taila* – Fire test - Burns without any crackling sound.
- *Kalka* - Consistency – Soft, non-sticky, made into *varti* (wick) form, the fingerprint is seen. Colour –Blackish

Post-operative procedure:

- Filter while hot through a muslin cloth and allow cooling. Pack it in tightly closed containers to protect it from light and moisture.

2.4 Analytical Study

Different Physicochemical parameters^{9, 10, 11} that were assessed at approved Drug Testing Laboratory for ASU drugs by AYUSH, Govt. of India, of KAHER's Shri. B.M.K. Ayurveda Mahavidyalaya, Belagavi were as follows:

- 1) Organoleptic examination
- 2) Refractive index
- 3) Loss of drying
- 4) Specific gravity
- 5) Saponification Value
- 6) Acid value
- 7) Iodine Value
- 8) Total solid



3. RESULTS AND DISCUSSION

3.1 Observation of Organoleptic characters of Kalka & Kuzhambu

Table No:02 Observation of organoleptic characters of Kalka & Kuzhambu

| Organoleptic characters | Observations | | | |
|-------------------------|--------------------|----------------|-------------------------------------|-----------------------|
| | <i>Kalka</i> | | <i>Kuzhambu</i> | |
| | Before | After | Before | After |
| Colour | Brown | Blackish | Yellowish | Greenish black |
| Consistency | Pasty | Slightly rough | Liquid with oily | Thick oil consistency |
| Appearance | Bolus form | Soft mass | Viscous | Highly viscous |
| Odor | Raw medicinal odor | Pleasant odor | The smell of curd and <i>chinha</i> | Characteristic |
| Taste | - | - | - | - |
| Touch | Soft | Soft, unctuous | Unctuous | Unctuous |

3.2 Observation during different stages of Sneha Paka (boiling)

Table No:03 Observation during different stages of Sneha Paka

| Day | Stages of Paka | Time taken | Observation |
|---------------------|--|--|---|
| 1 st day | Luke warm (After adding <i>kalka</i>) | At 10 mints | The smell of <i>eranda taila</i> was prominent, Yellowish color, <i>kalka</i> was floating in the oil. |
| | After adding <i>drava dravya</i> | After 15 mints | The smell of <i>chinha</i> was prominent along with <i>dadhi</i> , greenish-white color, <i>dadhi</i> is floating in the mixture. |
| | Start boiling | After 25 mints | Starting to darken the greenish color, the whole mixture becomes a thick consistency. |
| | | After 1 hour | The color becomes darker. The oil floats on the mixture. |
| 2 nd day | <i>Ama paka</i> | After 1 hour and 45 mints of 2 nd day | Dark greenish color, Profuse bubbling, and spillage of oil, <i>Kalka</i> becomes semisolid consistency |
| | <i>Mrudu paka</i> | After 2 hours and 20 mins | Oil started to separate from the <i>kalka</i> . <i>Kalka</i> started to stick on the vessel and spatula and becomes soft. |
| | <i>Madhyama paka</i> | After 3 and a half hour | The color of <i>kuzhambu</i> becomes dark greenish. Froth appeared. Oil separated from the <i>kalka</i> . |

3.3 Final quantity of *dravya*

Table No:04 Final quantity of *dravya*

| | Initial Quantity | Final quantity | Loss in % |
|-----------------|------------------|----------------|-----------|
| <i>Chincha</i> | 3 KG | 4.2 L | - |
| <i>Kuzhambu</i> | 1050 ml | 870 ml | 17% |
| <i>Kalka</i> | 264.6 gm | 421.8 gm | - |

3.4 Analytical study

Table No:05 Analytical study

| Tests | Kuzhambu |
|----------------------|----------|
| Refractive index | 1.465 |
| Loss on drying (%) | 0.898 |
| Saponification Value | 128.6440 |
| Acid value | 6.67 |
| Iodine Value | 90.49 |
| Total solid | 70 |
| Rancidity test | Negative |

Drava dravya (chincha swarasa) was prepared by taking fresh leaves of *chincha* and cut into small pieces. Then it grinds in a grinder by adding a very little quantity of water. The fresh *swarasa (juice)* was collected and filtered. From 3 kg *chincha* leaves, 4.2 L *swarasa*(extracted juice) was obtained. The *swarasa (juice)* was greenish with a strong smell and thick consistency. *Drava dravya* is taken 4 times of *sneha part*. *Kalka dravyas* are taken 1/4th part of *Sneha dravya* and are made into fine powder. The powder was mixed and made bolus by adding *chincha swarasa* to it.

Tila taila was the base of this combination. Out of *sneha dravya*, *Tila taila* was taken 1 part and *Eranda taila* was taken half of *tila taila* and *Ghrita* was taken half of it. All the oil was mixed and boiled. To the warm oil, *kalka* and *chincha swarasa* were added then later *dadhi*. When the *dadhi* was added, the whole mixture attained a very thick consistency with light greenish color because of the color of *drava dravya*. According to Sharangadharacharya when we add *swarasa*, *paka* will not complete in one day. So, the procedure was stopped after heating for one hour. The longer duration provides enough time to interact between the

ingredients and media in the preparation and repeated boiling may help to bring more therapeutic properties to the oil by increasing the solubility. The Colour of the mixture becomes dark on the next day and becomes darker, in the end, may show the solubility of active ingredients into the *sneha dravyas*.

To complete the *sneha* preparation 02 days were taken. There was continuous bubbling that appeared throughout the *mrudu and madhyama paka*, so constantly stirred the preparation to avoid stickiness and charring. Due to the spillage of oil, there was a loss of oily substances while heating, so to prevent that, the wide-mouthed vessel was adopted. The *siddha lakshanas* appeared after three and half hours of 2nd day like *Gandha-Varna-Rasotpatti*(desired smell, color, and taste), *Shabdahinatva* (no cracking sound on fire), *vartivat kalka* (sickness in bolus to get rolled into a wick), and *phenodgama*(appearance of froth). In classics, *pheneodgama* (appearance of froth) is indicated in *taila* preparations and *phenasanti*(disappearance of froth) for *Ghrita* preparations, because of the variations of saturated and unsaturated fatty acids. Even though it was a blend of saturated and unsaturated fatty material, it showed the *phenodgama*, which may be due to it containing more percentage of *tailathan Ghrita*. The final quantity of *kuzhambu* obtained was 870 ml with a 17 % loss. The *kuzhambu* attained was more viscous than individual *taila*. The weight of the residue *kalka* was comparatively more than the initial weight i.e., the weight gain was an average of 421.8 gm. and it may due to the presence of oily particles in the *kalka*.

In an analytical study, the refractive index was found to be 1.465 and the total solid is 70 indicating the density of *Kuzhambu*. The moisture content of the formulation is very less, attribute to the less value of LOD (0.898%). Higher the value of saponification (128.6440) and the less iodine value (90.49) are indicative of the stability of the final product. The rancidity test showed negative and the acid value was also very less (6.67) indicating less chance of rancidity and these parameters can be set as standard values to derive quality constants for *Kottanchukkadi Kuzhambu*.

4. CONCLUSION

Kottamchukkadi Kuzhambu is the best choice of drug for tridosha conditions, especially *vataja kaphaja* disorder as a remedy for external application. Because of its thick consistency, it retains more time in the body and provides more time for absorption. The presence of 3 different fatty materials increases its potency. The pharmaceutical study showed 83 % yield and also the *snehasidhi lakshanas*. An analytical study, it's showed a

higher value of saponification and the less iodine value indicates the stability of *Kottamchukkadi Kuzhambu*. All these parameters indicate the quality of *Kottanchukkadi Kuzhambu*.

5. CONFLICT OF INTEREST

None.

6. ACKNOWLEDGEMENT

We acknowledge contributions of the Drug Testing Laboratory for ASU drugs, Govt. of India, KAHER's Shri. B.M.K. Ayurveda Mahavidyalaya, Belagavi, Karnataka for providing knowledge for this study.

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1. *Kustha* 2. *Shunthi* 3. *Vacha* 4. *Shigru* 5. *Lashuna* 6. *Kartotti* 7. *Devadaru* 8. *Sarshapa* 9. *Rasna* 10. *Tila taila* 11. *Eranda taila* 12. *Goghrita* 13. After adding curd, before *mridupaka* 14. *madhyama paka* 15. Filtration of *kuzhambu*, 16 & 17. *Kottamchukkadi kuzhambu*

