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Characterization of Siddha Formulation *Rasa Karpoora Mezhugu*: A Physicochemical and Phytochemical Study

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ABSTRACT

The aim of this study was to investigate the physicochemical and phytochemical properties of *Rasa Karpoora Mezhugu* (RKM). All raw materials were identified and authenticated by Botanist and Gunapadam experts of the Government Siddha Medical College, Arumbakkam, Chennai, and specimen samples of *Purified pooram(Hydragyrum subchloride calomel), Purified lavangam(Syzygium aromaticum), Purified omam(Trachyspermum Ammi), Grated coconut (Cocus nucifera , Coconut milk (Cocus nucifera)* were labeled as

285–288/PGG/GSMC-CH/2023–2026 and preserved in the PG Gunapadam Department for future reference. The physicochemical analysis revealed a loss on drying at 105 °C of 12.23 ± 0.81%, total ash 0.43 ± 0.05%, acid-insoluble ash 0.04 ± 0.017%, alcohol-soluble extractives 10.5 ± 0.1%, water-soluble extractives 15.5 ± 1.08%, pH 6.88, and absence of volatile oil. Phytochemical screening confirmed the presence of carbohydrates, reducing sugars, flavonoids, phenolic compounds, and saponins. These findings indicate that the physicochemical and phytochemical characteristics of *Rasa Karpoora Mezhugu* have been systematically investigated, providing preliminary scientific support for its traditional use and a foundation for further pharmacological studies.

Keywords: *Siddha, Physicochemical analysis, phytochemical analysis, Rasa Karpoora Mezhugu, PLIM guidelines*.

INTRODUCTION

The Siddha system of medicine represents one of the oldest holistic healthcare traditions, with a long history of meticulously documented medicinal practices. It continues to be widely used among the population of South India. The advancement of this traditional medical system with a focus on safety, efficacy, and quality is essential not only for preserving cultural heritage but also for integrating natural products more rationally into modern healthcare. As outlined by the World Health Organization (WHO), herbal medicines must undergo rigorous standardization and safety assessments before being introduced to the market.

Herbal medicines are widely adopted across the world because they are affordable, easily available, and often perceived as safer alternatives to synthetic drugs. However, this perception does not always hold true, making the process of standardization critically important. India, with its rich biodiversity and traditional medical heritage, holds the potential to emerge as a global leader in the production of standardized, therapeutically effective herbal

formulations. This can only be achieved through systematic evaluation and application of advanced scientific techniques.

According to WHO estimates, over 80% of the global population relies on medicinal plants as a primary source of healthcare. Recognizing this significance, the WHO has acknowledged the role of traditional medicine in public health, especially in developing nations. The organization has formulated guidelines to aid member states in developing national policies, while also encouraging scientific studies that ensure safety, efficacy, and quality of herbal medicines.

This system categorizes treatments into two broad types: internal and external medicines. A mong the various internal formulations, *Mezhugu* holds a significant place. These are typically prepared by thorough grinding medicinal ingredients with specific herbal juices or extracts until a smooth, wax-like consistency is achieved. The present study focuses on the physicochemical and phytochemical evaluation of Siddha herbo-mineral formulation known as *Rasa Karpoora Mezhugu (RKM)*, traditionally used in the management of Rheumatoid Arthritis**.**

MATERIALS AND METHODS

SELECTION OF THE DRUGS

The test drug " *Rasa Karpoora Mezhugu*" is one of the Herbo mineral formulation for Rheumatoid arthritis which indicated in the *Siddha* literature "*Anuboga Vaithiya Navaneedam*", Author Hakkim P.Mohamed Abdul Sahib part 4, Page No 102,103.[1]

Table-1 Ingredients of *Rasa Karpoora Mezhugu*

S.NO	INGREDIENTS	WEIGHT
1	*Purified pooram(Hydragyrum subchloride calomel)*	3.5g
2	*Purified lavangam(Syzygium aromaticum)*	3.5g
3	*Purified omam(Trachyspermum Ammi)*	3.5g
4	*Grated coconut (Cocus nucifera)*	17.5 g
5	*Coconut milk (Cocus nucifera)*	28g

Figure: 01 - Ingredients of *Rasa Karpoora Mezhugu* (RKM)

Purified pooram (Hydragyrum subchloride calomel)

lavangam (Syzygium aromaticum)

omam (Trachyspermum ammi)

Grated coconut (Cocus nucifera)

Coconut milk (Cocus nucifera)

DRUG PROFILE

DRUG NAME : *Rasa Karpoora Mezhugu*

DOSE :1 to 2*kuntri yedai*(130-260mg)

VEHICLE : Palm sugar, Any type of *legiyam*

INDICATION : *Kai kal pidippu,Soolai Noi(*pain),*and Mega Noi.*

RESTRICTION OF DIET: Sour and Bitterness

Identification and Authentication of Drugs:

All raw materials used in the formulation were identified and authenticated by a Botanist and *Gunapadam* experts from the Government Siddha Medical College, Arumbakkam, Chennai. Specimen samples of each raw material-*Pooram, Lavangam, Omam*, grated coconut, and coconut milk-were labeled with the identification numbers **285–288/PGG/GSMC-CH/2023–2026**, and have been preserved in the Postgraduate Gunapadam Department for future reference.

Purification of raw drugs

All the above ingredients were purified according to classical Siddha literature. [2,3] The purification of *Pooram* was carried out as per *Gunapadam Thathu-Seeva Vakuppu*,[4] using betel leaf and pepper decoction.

Preparation of Rasa Karpoora Mezhugu

Equal quantities of *Pooram (Hydrargyrum sub-chloride Calomel*) 3.5 g, *Lavangam (Syzygium aromaticum)* 3.5 g, *Omam (Trachyspermum ammi*) 3.5 g was taken and finely powdered. Grated coconut 17.5 g was ground and coconut milk was extracted. The mixture was ground with coconut milk for 2 *samam* (6 hours) till waxy consistency. The prepared formulation was stored in an airtight container and labeled as RKM.

STANDARDIZATION OF THE DRUG

Standardization ensures the safety, efficacy, and consistency of herbo mineral formulation drugs. Physicochemical analysis assesses quality through parameters like moisture, ash and extractive values, while phytochemical screening identifies key bioactive compounds. These methods support the scientific validation of traditional herbo mineral formulations. Physio chemical analysis were done at Noble Research Solution, Perambur Chennai. Phytochemical analysis was done at Research and Development Wings for ISM, AAGHIM, West Campus, Arumbakkam, Chennai-106.

Physio Chemical Analysis [6,7]

Percentage Loss on Drying

Test drug was accurately weighed in evaporating dish. The sample was dried at 105°C for 5 hours and then weighed.

Determination of Total Ash

Test drug was accurately weighed in silica dish and incinerated at the furnace a temperature 400°C until it turns white in color which indicates absence of carbon. Percentage of total ash will be calculated with reference to the weight of air-dried drug.

Determination of Acid Insoluble Ash

The ash obtained by total ash test will be boiled with 25 ml of dilute hydrochloric acid for 6mins. Then the insoluble matter is collected in crucible and will be washed with hot water and ignited to constant weight. Percentage of acid insoluble ash will be calculated with reference to the weight of air-dried ash.

Determination of Alcohol Soluble Extractive

Test sample was macerated with 100 ml of Alcohol in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105°C, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Determination of Water Soluble Extractive

Test sample was macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand and for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105°C, to constant weight and weigh. Calculate the percentage of water-soluble extractive with reference to the air-dried drug.

pH determination

Required quantity of test sample was admixed with distilled water and the subjected to screening using pH meter.

PHYTOCHEMICAL ANALYSIS REPORT [9,10]

Phytochemical analysis was done at Research and Development Wings for ISM, AAGHIM, West Campus, Arumbakkam, Chennai-106.

PROCEDURE

Qualitative Tests for Phytochemical Screening

Test		Procedure
Detection of alkaloids		
1	Dragendroff's/ Kraut's test	Few ml filtrate + 1-2 ml Dragendorff's reagent
2	Hager's test	Few ml filtrate+ 1-2 ml Hager's reagent
Detection Of Carbohydrates		
1	Resorcinol test	2ml aq. extract solution + few crystals of resorcinol + equal volume of conc. HCl + heated
Detection of Reducing Sugar		
1	Fehling's test	1ml each of Fehling's solution A & B + 1ml filtrate + boiled in water bath
Detection Of Cardiac Glycosides		
1	Keller-Killani test	1ml filtrate + 1.5ml glacial acetic acid + 1 drop of 5% ferric chloride + conc.H2SO4 (along the side of test tube)
2	Kedee's test	4ml extract evaporated to dryness + 1-2 ml methanol + 1-2 ml alcoholic KOH + 3-4 drops of 1% alcoholic 3,5dinitrobenzene + heated
Detection Of Proteins And Amino Acids		

1	Biuret test	2ml filtrate + 1 drop of 2% Copper sulphate solution + 1ml of 95% ethanol + KOH pellets
2	Millon's test	2ml filtrate + few drops of Millon's reagent
Detection of Flavonoids		
1	Lead acetate test	Plant extract is dissolved in 5ml distilled water + 3ml of 10% lead acetate solution
Detection of Phenolic compounds		
1	Ferric chloride test	Extract aqueous solution + few drops 5% ferric chloride solution
Detection of Tannins		
1	Gelatin test	Plant extract is dissolved in 5ml distilled water + 1% gelatin solution + 10% NaCl
2	Braymer's test	1ml filtrated + 3ml distilled water + 3 drops 10% Ferric chloride solution
Detection of Saponins		
1	Foam test	0.5gm plant extract + 2ml water (vigorously shaken) 20ml water in measuring cylinder + 50gm extract (vigorously shaken for 15 min.) 0.2gm plant extract + 5ml distilled water; shaken well; heated to boiling
Detection of Phytosterols		
1	Salkowski's test	Filtrate + few drops of conc. H_2SO_4 (Shaken well and allowed to stand)

2	Liebermann -Bur chard's test	50gm extract is dissolved in 2ml acetic anhydride + 1-2 drops of conc. H2SO4 (along the side of test tube)
Detection of Terpinoides		
1		2ml chloroform + 5ml plant extract, (evaporated on water bath) + 3ml conc. H2SO4 (boiled on water bath)
Detection of Triterpinoides		
1	Salkowski's test	Filtrate+ few drops of conc. H2SO4 (Shaken well and allowed to stand)
Detection of Lignins		
1	Labat test	Extract solution + Gallic acid
2	Furfur aldehyde test	Extract solution + 2% furfur aldehyde solution
Detection of Quinones		
1	Alcoholic KOH test	1mL plant extract + few mL alcoholic potassium hydroxide
2	Conc. HCl test	Plant extract + conc. HCl

Detection of Emodins

1		Plant extract + 2mL NH4OH + 3mL benzene
Detection of Gums and Mucilage		
1	Alcohol test	Dissolve 100mg extract in 10mL distilled water + 25mL absolute alcohol (constant stirring)

RESULT

Physicochemical analysis:

The results of the physicochemical analysis of *Rasa karpoora mezhugu* (RKM)are summarized in the table below.

S.No	Parameter	Mean (n=3) SD
1.	***Loss on Drying at 105 °C (%)***	12.23 ± 0.81
2.	***Total Ash (%)***	0.43 ± 0.05
3.	***Acid insoluble Ash (%)***	0.04 ± 0.017
4.	***Water soluble Extractive (%)***	15.5 ± 1.08
5.	***Alcohol Soluble Extractive (%)***	10.5 ± 0.1
6.	***pH***	6.88

Solubility Profile

S.No	Solvent Used	Solubility / Dispensability
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble
4	Ethyl acetate	Insoluble
5	DMSO	Soluble

Result of Phytochemical analysis of RKM

S.NO	NAME OF THE PHYTO CONSTITUENTS	AQUEOUS EXTRACT OF RASA KARPOORA MEZHUGU
1	ALKALOIDS	-
2	CARBOHYDRATES	+
3	REDUCING SUGAR	+
4	GLYCOSIDES	-
5	PROTEINS AND AMINO ACIDS	-

6	FLAVONOIDS	+
7	PHENOLIC COMPOUNDS	+
8	TANINS	-
9	SAPONINS	+
10	PHYTOSTEROLS	-
11	TERPINOIDS	-
12	TRITERPINOIDS	-
13	LIGNIN	-
14	QUINONE	-
15	EMODINS	-
16	GUMS AND MUCILAGE	-

(+) -> Indicates Positive and (-) -> Indicates Negative

Discussion

The physicochemical analysis of RKM revealed a moderate moisture content, as indicated by the loss on drying at 105 °C (12.23 ± 0.81%)**,** suggesting that the formulation possesses good stability with minimal susceptibility to microbial contamination if stored properly. The total Ash value (0.43 ± 0.05%) and acid insoluble ash (0.04 ± 0.017%) were found to be low, which reflects minimal inorganic impurities and high purity of the formulation. The water-soluble extractive (15.5 ± 1.08%) was higher compared to the alcohol-soluble extractive (10.5 ± 0.1%)**,** indicating that the majority of active constituents of RKM are hydrophilic in nature. The pH of 6.88 shows that the formulation is nearly neutral, suggesting its suitability for internal administration without causing irritation.

The solubility profile of RKM revealed that it is soluble in ethanol, water, and DMSO, but insoluble in chloroform and ethyl acetate**.** This suggests that the formulation contains predominantly polar and semi-polar phytoconstituents, which may contribute to its pharmacological activity.

The phytochemical analysis demonstrated the presence of carbohydrates, reducing sugars, flavonoids, phenolic compounds, and saponins. These bioactive constituents are known for their diverse pharmacological properties. Flavonoids and phenolic compounds are strong antioxidants, capable of scavenging free radicals and thereby providing cytoprotective and anti-inflammatory benefits. Saponins are reported to have antimicrobial, immunomodulatory activities. The absence of alkaloids, glycosides, proteins, terpenoids, and other secondary metabolites indicates that the activity of RKM is primarily contributed by phenolic, flavonoid, and saponin components.

Taken together, these findings highlight the herbo-mineral nature of RKM, where both Siddha classical preparation methods and the phytochemical profile contribute to its therapeutic potential.

Conclusion

The present analysis confirms that *Rasa Karpoora Mezhugu* (RKM) is a stable formulation with favorable physicochemical parameters and rich in polar bioactive compounds. The presence of flavonoids, phenolics, and saponins supports its potential pharmacological activities, such as antioxidant, antimicrobial, and anti-inflammatory effects, in alignment with traditional claims. The solubility profile indicates good compatibility with aqueous and alcoholic media, which further supports its efficacy in therapeutic use.

Overall, the study provides a scientific basis for the traditional use of RKM and establishes preliminary data for further pharmacological and toxicological investigations.

Declaration by Authors:

Ethical approval

Approved

Acknowledgement:

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Conflict of interest

The author has no conflict of interest

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