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EVALUATION OF MACROSCOPIC AND PHYSIOCHEMICAL PROPERTIES OF RASNAADI GUGGULU

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ABSTRACT

Rasnaadi Guggulu is a classical Ayurvedic formulation widely prescribed in disorders predominantly involving *Vata* and *Kapha Dosha*, particularly musculoskeletal, neurological and inflammatory conditions. The formulation is described in classical Ayurvedic texts such as *Bharat Bhaishajya Ratnakar* in *Chaturtha Bhaga*. Owing to its *Shothahara*, *Vedanasthapana* and *Vatanulomana* properties, *Rasnaadi Guggulu* has gained increasing attention in contemporary clinical practice. This review aims to compile classical references, pharmacological actions, therapeutic indications, macroscopic and physio-chemical properties of *Rasnaadi Guggulu*.

KEYWORDS: *Rasnaadi Guggulu*, *Vata-Kapha*, *Ayurveda*, Anti-inflammatory, *Guggulu Kalpana*.

INTRODUCTION

Rasnaadi Guggulu is a classical *Guggulu* based Ayurvedic

formulation described in authoritative texts such as *Bharat Bhaishajaya Ratnakar*.[1] The formulation contains *Rasna*, *Eranda*, *Devadaru*, *Guduchi*, *Shuṇṭhi* and *Guggulu*. Most of the ingredients of *Rasnaadi Guggulu* have *Madhura* (12.5%), *Katu* (25%) and *Tikta Rasa* (50%), *Snigdha Guna* (25%), *Laghu Guna* (18.75%) followed by Guru Guna (12.5%), *Ushna Virya* (100%), *Katu Vipaka* (50%), followed by *Madhura Vipaka* (50%) and *Vata Shamaka* (50%) followed by *Kapha Shamaka* (41.66%) properties.

Guggulu Kalpana occupies a unique place in Ayurvedic therapeutics due to its *Lekhana*, *Yogavahi*, and *Rasayana* properties, enabling deep tissue penetration and enhanced drug delivery. *Rasnaadi Guggulu* is traditionally indicated in conditions such as, *Vata Roga*, *Karna Roga*, *Shiro Roga*, *Nadi Vrana and Bhagandar.*

In recent years, *Rasnaadi Guggulu* has gained clinical importance not only in musculoskeletal disorders but also in selected ENT and neurological conditions, where *Vata* predominance plays a central role. Experimental studies on its individual ingredients have demonstrated anti-inflammatory, analgesic, antioxidant, and neuroprotective activities, supporting its classical indications. However, systematic documentation and scientific evaluation of *Rasnaadi Guggulu* remain limited.

METHODOLOGY

Pharmaceutical study Collection of drugs

The raw material like *Rasna*, *Eranda*, *Devadaru*, *Guduchi*, *Shuṇṭhi* and *Guggulu* (Table 1) for the preparation of *Rasnaadi Guggulu* was collected from the market and after proper verification in the Dept. of Dravya Guna, the final drug was prepared under the guidelines of the Dept. Of Rasa Shastra and Bhaisajya Kalpana in Rajiv Gandhi Government Postgraduate Ayurvedic Medical College pharmacy, Paprola.

Table No. 1: Ingredients of *Rasnaadi Guggulu*.

Sr.no.	Common name	Botanical name	Famiy	Part used	Composition
1.	*Rasna*	*Pluchea lanceolata* C. B. Clarke	Asteraceae	Leaf	1 part
2.	*Guduchi*	*Tinospora cordifolia* Willd Miers ex Hook f. & Thoms	Menispermeaceae	Stem	1 part
3.	*Erand*	*Ricinus communis* Linn.	Euphorbiaceae	Root	1 part
4.	*Devdaru*	*Cedrus deodara* (Roxb.) Loud.	Pinaceae	*Kandsar*	1 part

5.	*Shunthi*	*Zingiber officinale* Roxb.	Zingiberaceae	Rhizome	1 part
6.	*Shudh Guggul*	*Commiphora mukul* (Hook ex Stocks) Engl.	Burseraceae	Extract	5 part
7.	*Ghee*				According to the need

Preparation of *Rasnaadi Guggulu*

Rasnaadi Guggulu was prepared in the pharmacy of Department of *Rasa Shastra* and *Bhaishajya Kalpana*, Rajiv Gandhi Government Postgraduate Ayurvedic Medical College pharmacy, Paprola.

Preparation of *Rasnaadi Guggulu* was done as per the general method of preparation i.e. all herbal drugs are taken in equal proportion (1 part each) and *Shudha Guggulu* is taken equal to the total weight of all powdered drugs (5 parts).

METHOD OF PREPARATION

1. Purification of *Guggulu* (*Guggulu Shodhana*)

Guggulu is purified according to classical guidelines:

- Medium (*Shodhana Dravya*): *Triphala Kvatha*[2] or *Godugdha*
- Raw *Guggulu* is tied in a cloth and suspended in boiling *Triphala* decoction.
- After complete dissolution and filtration, the residue is discarded.
- The filtrate is concentrated to obtain *Shuddha Guggulu*.

2. Method of Preparation (*Nirmaṇa Vidhi*)

1. All herbal ingredients except *Guggulu* are dried properly and powdered separately.
2. Fine powders are sieved through cloth to obtain uniform particle size.
3. *Shuddha Guggulu* is gently heated until it becomes soft and pliable.
4. The powdered drugs are gradually added to the softened *Guggulu*.
5. The mass thoroughly (*Mardana*) to obtain a homogeneous mixture.
6. Pills (*Guṭika*) are rolled while the mass is warm.

Classical Dose Size: - Each pill: 1 *Karṣha* / 500 mg – 1 g

Anupana

- *Uṣhṇa Jala*
- *Dashamula Kwatha*

- *Gomutra* (in *Vata-Kapha* conditions).

Analytical Study

A. Macroscopic Description (Organoleptic characters)

Various parameters of the material such as appearance, colour, odour, taste of the formulations was observed and recorded.

B. Physio-Chemical Analysis

Physio-chemical analysis was carried out based on the following parameters:

1. Loss on drying
2. pH
3. Total solid
4. Total Ash
5. Acid insoluble ash.
6. Water soluble extractive

C. Identification Tests

1. Thin layer chromatography.

1. Loss on drying (Determination of Moisture Content)

The Procedure here determines the amount of volatile matter (i.e., water drying off from the drug). For substances appearing to contain water as the only volatile constituent, the procedure given below is appropriately used. Place about 10 g of the drug (without preliminary drying) after accurately weighing (accurately weighed to within 0.01 g) it in a tared evaporating dish. After placing the above said amount of the drug in the tared evaporating dish, dry at 105^0 C for 5 hours, and weigh. Continue the drying and weighing at one-hour intervals until the difference between two successive weighing corresponds to not more than 0.25 percent. Constant weight is reached when two consecutive weighs after drying for 30 minutes and cooling for 30 minutes in a desiccator, show not more than 0.01 g difference. The petri dish was taken out, self-cooled and weighed immediately. The weight loss i.e. loss on drying was calculated and expressed as % w/w.[3]

2. DETERMINATION OF pH VALUES

The pH value of an aqueous liquid may be defined as the common logarithum of the reciprocal of the hydrogen ion concentration expressed in g per litre. Although this definition

provides a useful practical means for the quantitative indication of the acidity or alkalinity of a solution, it is less satisfactory from a strictly theoretical point of view. No definition of pH as a measurable quantity can have a simple meaning, which is also fundamental and exact.

The pH value of a liquid can be determined potentiometrically by means of the glass electrode, a reference electrode and a pH meter either of the digital or analogue type.[4]

3. DETERMINATION OF ACID VALUE

The acid value is the number of mg of potassium hydroxide required to neutralize the free acids in 1 g of the substance, when determined by the following method:

Weigh accurately about 10g of the substance (1 to 5) in the case of a resin into a 250 ml flask and add 50 ml of a mixture of equal volumes of alcohol and solvent ether, which has been neutralized after the addition of 1 ml of solution of phenolphthalein. Heat gently on a water-bath, if necessary until the substance has completely melted, titrate with 0.1 N potassium hydroxide, shaking constantly until a pink colour which persists for fifteen seconds is obtained. Note the number of ml required. Calculate the acid value from the following formula:

$$\text{Acid Value} = \frac{a \times 0.00561 \times 1000}{W}$$

Where 'a' is the number of ml of 0.1 N potassium hydroxide required and "W' is the weight in g of the substance taken.[5]

4. SOLUBILITY IN WATER

Take 100 ml of distil water in a Nessler cylinder and add air-dried and coarsely powdered drug up to saturation. Then stir the sample continuously by twirling the spatula (rounded end of a microspatula) rapidly. After 1 minute, filter the solution using Hirsch funnel, evaporate the filtrate to dryness in a tared flat bottomed shallow dish and dry at 105^0 to constant weight and calculate the solubility of the drug in water (wt. in mg/100ml).[6]

Identification tests

1. Thin layer chromatography (TLC)

Thin-layer chromatography is a technique in which a solute undergoes distribution between two phases, stationary phase acting through adsorption and a mobile phase in the form of a liquid. The adsorbent is a relatively thin, uniform layer of dry finely powdered material

applied to a glass, plastic, or metal sheet or plate. Precoated plates are most commonly used. Separation may also be achieved based on partition or a combination of partition and adsorption, depending on the particular type of support, its preparation, and its use with different solvent. Identification can be effected by observation of spots of identical Rf value and about equal magnitude obtained, respectively, with an unknown and a reference sample chromatographed on the same plate. A visual comparison of the size and intensity of the spots usually serves for semi-quantitative estimation.[7]

OBSERVATIONS AND RESULTS

The analytical studies like macroscopic and physio- chemical were carried out results are given in Table 3.

Table No. 3.

Sr. No.	Test	DTL Result
1.	**Macroscopic tests**	
a.	Appearance	Pills
b.	Colour	Black
c.	Odour	Characterstics
d.	Taste	Bitter, astringent & slightly sour
2.	**Physiochemical tests**	
a.	Loss on drying	8.54%
b.	pH	4.21
c.	Average weight	443mg
d.	Total solid	91.46%
e.	Total ash	08.46%
f.	Acid insoluble ash	02.07%
g.	Water soluble extractive	37.40%
3.	**Identification tests**	
a.	Thin Layer Chromatography	Rf Value 0.20, 0.48, 0.74, 0.84, 0.52, 0.73, 0.83, 0.90, 0.94 Shows the presence of Guggul, Shunthi, Devdaru, Rasna, Guduchi

DISCUSSION

The results of the physicochemical parameters analysed were found to be in the normal reference range. The low acid value indicates the stability and minimal risk of decomposition. The loss on drying (8.54%) indicates a moderate moisture content in the formulation. This value suggests that the formulation is sufficiently dried and unlikely to support microbial growth.

The pH value of 4.21 denotes a mildly acidic nature of *Rasnaadi Guggulu*. This acidity may be attributed to the presence of phytoconstituents such as resins, phenolics, and organic acids present in drugs like *Guggulu*, *Shunthi,* and *Guduchi.* From an Ayurvedic perspective, this acidic pH may facilitate better digestion and absorption, especially in conditions involving *Ama* and *Vata-Kapha* dominance, for which *Rasnaadi Guggulu* is traditionally indicated.

The total solid content (91.46%) further supports the low moisture content and confirms the solidity and stability of the formulation. A higher total solid percentage is indicative of good shelf life and resistance to degradation.

The total ash value (8.46%) represents the total inorganic matter present in the formulation. This value is within acceptable limits and reflects the presence of natural mineral content inherent to herbal drugs, along with negligible extraneous inorganic contamination.

The acid-insoluble ash (2.07%) indicates a low proportion of siliceous matter such as sand and soil, confirming good quality of raw materials and proper cleaning during drug procurement and processing.

The water-soluble extractive value (37.40%) is relatively high, suggesting that a significant proportion of active constituents are water-soluble. This finding supports the traditional method of administration, as water-soluble phytoconstituents are more readily bioavailable and therapeutically active. It also correlates with the presence of polar compounds from *Guduchi*, *Rasna*, and *Shunthi*.

CONCLUSION

Pharmacognostical studies shows that authentic drugs were used for preparation of the formulation and the physiochemical analysis indicates that the formulation meets all the qualitative standards. Current literature review indicates that characterization parameters of *Rasnaadi Guggulu* are not reported anywhere so the parameters discussed here may be used as identification tools for the quality assessment of *Rasnaadi Guggulu*. The macroscopic tests revealed that *Rasnaadi Guggulu* has a black color and a characteristic odor. The physicochemical tests showed a loss on drying of 8.54%, pH was 4.21, average weight was 443mg, total solid 91.46%, Total ash 8.46%, acid insoluble ash was 2.07% and water soluble extractive was 37.40. The identification test, Thin Layer Chromatography (TLC) revealed the

presence of *Guggul, Shunthi, Devdaru, Rasna, Guduchi* with Rf values of 0.20,0.48, 0.74, 0.84, 0.52, 0.73, 0.83, 0.90, 0.94.

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