# STANDARDIZATION OF RASAYANAM – A SIDDHA POLY HERBAL MEDICINE – A REVIEW

*Dr Zeenath Roshan Ara* *[1], *Dr. M. Thiruthani* [2]

1.PG Scholar, Department of PG Nanju Maruthuvam, 2. Head of the Department of Nanju Maruthuvam, Government Siddha Medical College, Palayamkottai, Tirunelveli.

## ABSTRACT

Present review deals with the standardization of Siddha Poly Herbal Formulation Rasayanam. Rasayanam is one of the 32 types of internal medicines. Till date, most of the Siddha formulations are lacking in the quality control parameters and method of its evaluation. Each traditional system of medicine has their own type of standardization for assuring quality most in human linguistic term and this method of evaluation has to be taken into consideration in standardization of Rasayanam – internal medicine. Standardization is an important step for the establishment of a consistent biological activity. A consistent chemical profile or a simple quality assurance program for production and manufacturing of herbal drugs. These protocols based on most common parameters such as Morphological evaluation, Microscopical evaluation, Physicochemical evaluation, Chemical evaluation, Test for heavy / toxic metals (Lead, Cadmium, Mercury and Arsenic), Biological evaluation. Various methods and parameters for the assessment of Rasayanam dosage forms are mentioned in different guidelines. So, this review is taken as a standard for quality control purpose to achieve optimum efficacy and safety of rasayanam.

### KEYWORDS

Rasayanam, Siddha polyherbal formulation, Standardization, Morphological evaluation, Physicochemical evaluation.

## INTRODUCTION

Siddha system is the foremost of all medicinal system and it is practiced in South India, especially in Tamil Nadu and Kerala. It is also called as Dravidian's System of medicine, since it is evolved along with Dravidian's culture. Siddhars' are the founder of the system of medicine possessed siddhic powers (supernatural powers). They have left their imprints in many disciplines like medicine, alchemy, philosophy, yoga, Varma and other external therapies]. They persist preparation of medicines, adjuvant, alchemy, kayakalpam and astrology.

Siddha system is a holistic science which aims at treatment of various infirmities of the body, mind and soul. Siddha treatment consists of preparation of herbs, minerals and metals in the form of decoction, paste, kizhi, powder, chenduram, chunnam, kattu, kazhanghu etc. As per Siddha texts, the medicine has been divided into 32 types of internal medicine and 32 types of external medicine.

Rasayanam, is one of the types of internal medicine. Till date, most of the Siddha formulations are lacking in the quality control parameters and method of it's evaluation. Each traditional system of medicine has their own type of standardization for assuring quality most in human linguistic term and this method of evaluation must be taken into consideration in standardization of Rasayanam – internal medicine. Standardization is an important step for the establishment of a consistent biological activity. A consistent chemical profile or a simple quality assurance program for production and manufacturing of herbal drugs. With respect to this, Department of AYUSH, Government of India gave some parameters for drug development, Standardization and quality of Ayurveda, Siddha and Unani drugs, which included 5 protocols as follows,

Protocol 1 – Standardization of single plant material

Protocol 2 – SOP of preparation of extracts

Protocol 3 – Standardization of plant extracts

Protocol 4 – SOP of finished product

Protocol 5 – Standardization of formulations

These protocols based on most common parameters such as

- Morphological evaluation
- Microscopical evaluation
- Physicochemical evaluation
- Chemical evaluation
- Test for heavy / toxic metals (Lead, Cadmium, Mercury and Arsenic)
- Biological evaluation

## GENERAL METHOD OF PREPARATION - RASAYANAM

It is one of the types of preparation in internal medicine mentioned in Siddha text. The ingredients mentioned in the formulations are taken and cleaned. Purification of the required raw drugs are done as per the text properly. After purification, the drugs are made to dry in shade completely. Then the raw drugs are powdered separately and then sieved. Add all the powdered drug together in pestle. Then cow's ghee is added little by little and grinded well, when necessary palm jaggery, honey can be added. The mixture must be in the form of granules (sand like).

## WHO GUIDELINES FOR ANALYTICAL SPECIFICATIONS OF HERBAL FORMULATIONS – PROTOCOL 5

| METHODS | EVALUATION PARAMETERS |
|---|---|
| Authentication | 1. Parts of the Plants collection like leaves, flower, root, stolen<br>2. Regional status – area of collection<br>3. Family<br>4. Biological Source<br>5. Chemical Constitution<br>6. Botanical Identity<br>7. Microscopic and histological analysis |
| Morphological or Organoleptic Evaluation | 1. Odour<br>2. Taste<br>3. Colour<br>4. Consistency<br>5. Texture |
| Chemical Evaluation | Assay for major ingredients – Phytochemical screening, Bio chemical screening |

| | |
|---|---|
| Physical Evaluation | 1. Loss on drying / Moisture content<br>2. Total Ash<br>3. Acid insoluble Ash<br>4. Alcohol soluble extractive<br>5. Water soluble extractive<br>6. Acid soluble extractive<br>7. pH<br>8. Total acidity<br>9. Specific gravity at 25*C<br>10. Total solid content<br>11. Fat content<br>12. Reducing sugar / Non reducing sugar<br>13. Total sugar<br>14. TLC / HPTLC / HPLC / LC - MS |
| Toxicological Evaluation | 1. Test for heavy metals / toxic metals – Lead, Cadmium, Mercury, Arsenic<br>2. Alpha toxin – B1, B2, G1, G2 |
| Biological Evaluation | 1. Microbial contamination<br>2. Test for specific pathogen – E. coli, salmonella spp., staphylococcus aureus, pseudomonas, aeruginosa<br>3. Pesticide contamination – Organo-chlorine pesticides, Organo-phosphorus pesticides, pyrethroids. |

## AUTHENTICATION

Herbal ingredients accurately identified by macroscopic and microscopic comparison with authentic materials or accurate description of authentic herbs. it is essential at herbal ingredients are referred by their binomial Latin name by genus and species: only permitted synonyms must be used. In India, 3 Government Organization – first Central Council for Research in Unani Medicine – CCRUM and Central Council for Research in Ayurveda and Siddha – CCRAS and Central Council for Research in Siddha – CCRS are working for quality control in authentication of the plant materials, metals and minerals.

- Stage of Collection
- Parts of the plant collected
- Regional status
- Botanical Identity like Phyto- morphology, microscopical and histological analysis, taxonomical identity etc.
- Foreign matter (Herbs collected should be free from soil, insect parts, animal excreta etc.)

## MORPHOLOGICAL OR ORGANOLEPTIC EVALUATION

In this method - description, general condition of the medicine is referred as sensory or organoleptic character describes color, odour, taste, consistency.

## CHEMICAL EVALUATION

This covers identification and characterization of drug with respect to phytochemical constituent. It employs different analytical techniques to deduct and isolate the active constituents. Phytochemical screening involves botanical identification, extraction with suitable solvents, purification and characterization of the active

constituents of pharmaceutical importance. It helps in determining the identity of the drug, substance and possible adulteration.

## PHYSICAL EVALUATION

1. DETERMINATION OF LOSS ON DRYING / MOISTURE CONTENT – Checking moisture content helps reduce error in estimation of actual weight of drug material. Low moisture suggests better stability against degradation of product.

DETERMINATION OF TOTAL ASH – It involves non-volatile inorganic components. Helpful in determining the quality and purity of crude drugs especially in powder form. The objective of cremating vegetable drugs is to remove all traces of organic matter, which may otherwise interfere in an analytical determination. The residue remaining after incineration is the ash content of the drug, which simply represents inorganic salts, naturally occurring in drug or adhering added to it in the form of adulteration. High ash value is the indicative of contamination, substitution, adulteration or carelessness in preparing the crude drug. Two types of ash determine – Acid insoluble ash value and Water-soluble ash.

- *Acid Insoluble Ash* – Ash insoluble in hydrochloric acid is the residue obtained after extracting the total ash with HCl. It gives idea about the earthy matter. WHO method: 25ml of HCl (70g/t)
- *Water Soluble Ash* – Total Ash content which is soluble in water. It's good indicator of presence of previous extraction of water-soluble salts in the drug or incorrect preparation or amount of inorganic matter.

2. DETERMINATION OF EXTRACTIVE VALUES – These are indicative weights of the extractable chemical constituent of the drug under different solvents environment. It includes
   - Alcohol soluble extractive
   - Water soluble extractive
   - Acid soluble extractive

There are the following methods for the determination of extractive values

- Cold method
- Hot method
- Soxhlet's method

3. DETERMINATION OF PH – The pH value of an aqueous liquid may be defined as the common logarithm of the hydrogen ion concentration expressed in grams. Potentiometrically, pH value determined by the glass electrode and suitable pH meter.
4. SPECIFIC GRAVITY AT 25*C – The specific gravity of the liquid is the given volume of the liquid at 25*C (unless otherwise specified, compared with the weight of an equal volume of water at the same temperature – all weighing being taken in air)
5. TOTAL SOLID CONTENT – Determination of total solid in Rasayanam is generally required. The residue obtained when prescribed amount of preparation is dried to constant weight under specified conditions (Residue on evaporation) . Powdered extract – NLT 98 %, semi solid extract – NLT 70 %.
6. TLC/ HPTLC / HPLC / GC – MS

CHROMATOGRAPHIC METHODS – Chemical and Chromatographic techniques may be used to aid in identification of an herbal material or extract. Separation, Identification, Impurity Detection and assay of herbal of herbal drug in the formulation or in the extract are carried out by the following methods - TLC, HPTLC, HPLC, GC – MS.

TLC – Thin Layer Chromatography is a simple, low cost, versatile and specific method for the identification of herbal medicine. The unique feature of picture - like image of TLC supplies an initiative visible profiling.

HPTLC – High Performance Thin Layer Chromatography is a routine, analytical technique. It has been well reported that several samples can be run simultaneously by use of smaller quantities of mobile phase than in HPLC. Consequently, HPTLC has been investigated for simultaneously assay of several components in multiple component

formulation. With this technique, authentication of various species of plants are possible as well as the evaluation of stability and consistency of their preparation from different manufacturers.

HPLC & HYPHENATED TECHNIQUES – High performance Liquid Chromatography has been employed to analyze several components in a medicinal preparation composed of several crude drugs among the analytical methods for standardization of Indian herbal medicine – HPLC is the most popular one due to its versatility, precision and relatively low cost. It represents a progress in comparison of one or two marker qualitative approach. One of the main advantages of the HPLC is that many detectors can be coupled with it such as UV, DAD, ELSD, FLD, RID, MS and NMR etc., which supplies much more possibilities for detecting different constituent types.

GC & HYPHENATED TECHNIQUES – Gas Chromatography (GC) and Gas Chromatography Mass Spectrometry (GC-MS) are unanimously accepted methods for the analysis of volatile constituents of herbal medicine due to their sensitivity, stability and high efficiency. Especially the hyphenation with MS provides reliable information for the qualitative analysis of the complex constituents. Nowadays the analysis turns to Gas Chromatography as a powerful separation method and combined it with Mass Spectrometry to aid identification.

## TOXICOLOGICAL EVALUATION

### TEST FOR HEAVY METALS / TOXIC METALS – LEAD, CADMIUM, MERCURY, ARSENIC

Contamination of medicinal plant materials with arsenic and other heavy metals can be attributed to many causes including environmental pollution and traces of pesticides. The contents of lead and cadmium may be determined by inverse voltammetry or by atomic emission spectrophotometry. The following maximum amount of heavy metals present in dried plant materials -

Lead – 10 ppm

Mercury – 01 ppm

Arsenic – 03 ppm

Cadmium – 0.3 ppm

### ALPHA TOXIN – B1, B2, G1, G2

Alpha Toxins are naturally occurring mycotoxins produced mainly by aspergillus flavus and aspergillus parasiticus. The presence of Alpha toxins can be determined by Chromatography methods using standard alpha toxins B1, B2, G1, G2 mixtures.

B1 – 0.5 ppm

B2 – 0.1 ppm

G1 – 0.5 ppm

G2 – 0.1 ppm

## BIOLOGICAL EVALUATION

### LIMIT FOR MICROBIAL CONTAMINANTS IN FINISHED PRODUCT AND RAW MATERIALS

| Micro Organism | Finished Product | Raw materials |
|---|---|---|
| **E - coli** | $10^1$ | $10^4$ |
| **Salmonella** | Absent | Absent |
| **Total Aerobic Bacteria** | $10^5$ | Absent |
| **Enterobacteria** | $10^3$ | Absent |

### TEST FOR SPECIFIC PATHOGEN

| Pathogen | Limit |
|---|---|
| Total Yeast and mold | $10^3$/g |
| E-coli | Absent |
| Salmonella spp. | Absent |
| Staphylococcus aureus | Absent |
| Pseudomonas aeruginosa | Absent |
| Total microbial plate count | $10^7$/g |

Shelf Life – 3 hours

### PESTICIDE CONTAMINATION

Pesticide is any substance or mixture of substances indented for preventing, destroying, controlling any pest, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of vegetable drugs. The limit as prescribed in ASU pharmacopeias.

| Substance | Limit (mg/kg) |
|---|---|
| **DTT** | 1.0 |
| **Malathion** | 0.2 |
| **Parathion** | 0.5 |
| **Diazinon** | 0.5 |

Not more than 1 %

An ARL (in mg of pesticide/kg of plant material) can be calculated based on maximum acceptable daily intake of the pesticide for human (ADI) as recommended by the WHO and the mean daily intake (MDI) of the medicinal plant material.

ARL = (ADI * E * 60)/(MDI*100)

Where E is the extraction factor, which determines the transition rate of the pesticide formed.

## CONCLUSION

The first and foremost challenge to the alternative system of medicine for its globalization is to ensure uniformity and quality of drugs. Various methods and parameters for the assessment of Rasayanam dosage forms are mentioned in different guidelines. So, this review is taken as a standard for quality control purpose to achieve optimum efficacy and safety of Rasayanam.

## ACKNOWLEDGEMENT

The author sincerely thanks the family and HOD and Faculties of Nanju Maruthuvam, Government Siddha Medical College, Tirunelveli for their support and continuous motivation.

## REFERENCE

1 – WHO Guidelines for assessing quality of Herbal Medicine with reference to contamination and residues – ISBN 97892415941594498 in WHO 2007.

2 – Seema Rani, Khaleequrrahman , Mohd. Younis, Sadiya Noorul Basar – Physio Chemical and Microbiological Standardization of sufoofesailan – A Unani Polyherbal formulation. World Journal of Pharmacy and Pharmaceutical Science – Vol 4 Issue 06 , 1554-1563.

3 – General Guidelines for Drug Development of Ayurvedic Formulations – CCRAS – Central Council for Research in Ayurvedic Sciences – Ministry of AYUSH – Government of India – Vol 1 – 2018 – ISBN No 978-93-83864-23-2

4 – General Guidelines for Safety and Toxicity Evaluation of Ayurvedic Formulations - CCRAS – Central Council for Research in Ayurvedic Sciences – Ministry of AYUSH – Government of India – Vol 2 – 2018 – ISBN No – 978-93-83864-24-9