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Standardization of herbomineral formulation *Thanga Uram*

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Abstract

Siddha medicine is one of the most ancient medical systems of India. Siddha is the mother medicine of ancient Tamils/Dravidians of peninsular South India. This system has enormous pharmacopoeia containing vegetable, animal and mineral products. Physico-chemical studies of the plant drugs are necessary for standardization, as it helps in understanding the significance of physical and chemical properties of the substance being analyzed in terms of their observed activities and especially for the determination of their purity and quality. The analysis includes the determination of ash value, Loss on drying of the sample at 105°C, pH value and Extractive value. These were carried out as per guidelines. Traditional remedies is advantageous, it does suffer some limitations. The main limitation is the lack of standardization of raw materials, of processing methods and of the final products, dosage formulation, and the non- existence of criteria for quality control. Standardization of the drug is more essential to derive the efficacy, potency of the drug by analyzing it through various studies. Following tables and charts are the results of physicochemical and chemical analysis. Physical characterization and estimation of basic and acidic radicals have been done and tabulated. pharmacological activity of the drug were derived. Its result has been tabulated below.

Keywords: thanga uram ,standardization , physio,chemical, analysis

Introduction

Physical characters

Color

A specific color is mentioned for each Chendhuram. They are generally reddish brown in

color. The color of the preparation primarily depends on the parent material.

Lusterless

Chendhuram must be lusterless before therapeutic application. For this test, *Chendhuram* is observed under bright sunlight whether luster is present are not, if luster is still present it indicates further incineration is required.

Lightness And Fineness

Chendhuram floats on stagnant water surface. This test is based on law of surface tension. Properly incinerated *Chendhuram* floats on water surface.

Tactile Sensation

Tactile sensation can be absorbed and assimilated in the body without producing any irritation to mucous membrane of gastro intestinal tract.

Physiologically, the particle fineness is of great importance. Most compounds of metals and minerals are not absorbed by the body from the digestive tract, because under ordinary circumstances, these substances could not be reacted upon by the secretions of the digestive system, so as to render them absorbable by the organism. This difficulty is overcome when the individual particles of these compounds are very minute. This concurrently has a say in the matter of dosage in that the dose could be reduced to a great degree as a major part of the finely particulate drug is absorbed into the system.

Texture

Prepared *Chendhuram* should be in powder form.

Quality Control Of Chendhuram

Traditionally, the end points of incineration of a metal and its conversion to a *Chendhuram* state are evaluated based on the following criteria.

When a *chendhuram* is spread between the index finger and thumb and rubbed, it should be so fine as to get easily into the lines and crevices of the fingers and should not be washed out from the lines of the fingers.

When a small quantity is spread on cold and still water, it should float on the surface.

The *chendhuram* should not revert to the original state.

Chendhuram should be tasteless.

The *chendhuram* should not produce nausea when administered.

The *chendhuram* if satisfactorily completed, is irreversible to its metallic waste when heated with a mixture of cane jaggery, hemp powder, ghee and honey.

Storage Of Chendhuram^[52]

✓ *Chendhurams* are usually stored in glass bottles when they are to be stored in bulk.

✓ For smaller retail packing, vials are convenient; capsulation could be tried if contrivances are available.

✓ It is highly desirable to store this form of medicine and retain it in relevant labelled containers.

✓ They are said to retain their potency for 75 years, if properly stored.

Analytical study of trial drug

The preliminary physicochemical screening test on thanga uram^{[53][54]}

Physicochemical Properties of *thanga uram* was carried out for each extract of *thanga uram* as per the standard procedure at National Institute of Siddha, Tambaram Sanatorium, Tambaram, Chennai-600047.

Physico-chemical studies of the plant drugs are necessary for standardization, as it helps in understanding the significance of physical and chemical properties of the substance being analyzed in terms of their observed activities and especially for the determination of their purity and quality. The analysis includes the determination of ash value, Loss on drying of the sample at 105°C, pH value and Extractive value. These were carried out as per guidelines.

1 Loss On Drying:

An accurately weighed 2g of thanga uram formulation was taken in a tarred glass bottle. The crude drug was heated at 105⁰C for 6 hours in an oven till a constant weight. Percentage moisture content of the sample was calculated with reference to the shade dried material.

2. Determination of total ash:

Weighed accurately 2g of thanga uram formulation was added in crucible at a temperature 600⁰C in a muffle furnace till carbon free ash was obtained. It was calculated with reference to the air dried drug.

3. Determination of acid insoluble ash:

Ash above obtained, was boiled for 5min with 25ml of 1M Hydrochloric acid and Filtered using an ash less filter paper. Insoluble matter retained on filter paper was washed with hot water and filter paper was burnt to a constant weight in a muffle furnace. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

4. Determination of water soluble ash:

Total ash 1g was boiled for 5min with 25ml water and insoluble matter collected on an ash less filter paper was washed with hot water and ignited for 15min at a temperature not exceeding 450⁰C in a muffle furnace. The amount of soluble ash is determined by drying the filtrate.

5. Determination of water soluble Extractive:

5gm of air dried drug, coarsely powdered thanga uram was macerated with 100ml of distilled water in a closed flask for twenty-four hours shaking frequently.

Solution was filtered and 25 ml of filtrate was evaporated in a tarred flat bottom shallow dish, further dried at 100⁰C and weighted. The percentage of water soluble extractive was calculated with reference to the air dried drugs.

6. Determination of alcohol soluble extractive:

2.5gm. of air dried drugs; coarsely powdered thanga uram was macerated with 50 ml. alcohol in closed flask for 24 hrs. With frequent shaking it was filtered rapidly taking precaution against loss of alcohol. 10ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 100⁰C and weighted. The percentage of alcohol soluble extractive was calculated with reference to air dried drug.

7. Determination of pH:

Five grams of *thanga uram* was weighed accurately and placed in clear 100 ml beaker. Then 50 ml of distilled water was added to it and dissolved well. After 30 minutes it was then applied in to pH meter at standard buffer solution of 4.0, 7.0, and 9.2. Repeated the test four times and average was recorded. The results were tabulated in Table-03

Chemical analysis of thanga uram

The chemical analysis of THANGA URAM was carried out in Bio chemistry lab, National Institute of Siddha.

Table no: 1 Chemical analysis of thanga uram

S.No	EXPERIMENT	OBSERVATION	INFERENCE
1.	Physical Appearance of extract	Straw colour	
2.	Test for Silicate A 500mg of the sample was shaken well with distilled water.	Sparingly soluble	Presence of Silicate
3.	Action of Heat: A 500mg of the sample was taken in a dry test tube and heated gently at first and then strong.	No White fumes evolved.	Absence of Carbonate
4.	Flame Test: A 500mg of the sample was made into a paste with Con. HCl in a watch glass and introduced into non- luminous part of the Bunsen flame.	No bluish green flame	Absence of copper
5.	Ash Test: A filter paper was soaked into a mixture of extract and dil. cobalt nitrate solution and introduced into the Bunsen flame and ignited.	Appearance of yellow color flame	Absence of sodium

Preparation of Extract:

5gm of Thanga uram was taken in a 250ml clean beaker and added with 50ml of distilled water. Then it was boiled well for about 10 minutes.

Then it was cooled and filtered in a 100ml volumetric flask and made up to 100ml with distilled water. This preparation was used for the qualitative analysis of acidic/basic radicals and chemical constituents in it.

S.No	Experiment	Observation	Inference
	I. Test For Acid Radicals		
1.	Test For Sulphate: 2ml of the above prepared extract was taken in a test tube to this added 2ml of 4% dil ammonium oxalate solution	No cloudy appearance	Absence of Sulphate
2.	Test For Chloride: 2ml of the above prepared extract was added with 2ml of dil-HCl until the effervescence ceases off.	No Cloudy appearance was formed	Absence of Chloride
3.	Test For Phosphate: 2ml of the extract was treated with 2ml of dil.ammoniummolybdate solution and 2ml of Con.HN _o 3	Cloudy yellow appearance present	Presence of Phosphate
4.	Test For Carbonate: 2ml of the extract was treated with 2ml dil. magnesium sulphate solution.	Presence of Cloudy appearance	Presence of carbonate
5.	Test For Nitrate: 1gm of the extract was heated with copper turning and concentrated H ₂ So ₄ and viewed the test tube vertically down.	No Brown gas was evolved	Absence of nitrate
6.	Test For Sulphide: 1gm of the extract was treated with 2ml of Con. HCL	No rotten egg smelling gas was evolved	Absence of Sulphide
7.	Test For Fluoride & Oxalate: 2ml of extract was added with 2ml of dil. Acetic acid and 2ml dil.calcium chloride solution and heated.	No cloudy appearance.	Absence of fluoride and oxalate

8.	Test For Nitrite: 3drops of the extract was placed on a filter paper, on that-2 drops of dil.acetic acid and 2 drops of dil.Benzidine solution were placed.	No characteristic changes were noted.	Absence of nitrite
9.	Test For Borate: 2 Pinches (50mg) of the extract was made into paste by using dil.sulphuric acid and alcohol (95%) and introduced into the blue flame.	No Appearance of bluish green color.	Absence of borate
II. Test For Basic Radicals			
1.	Test For Lead: 2ml of the extract was added with 2ml of dil.potassium iodine solution.	No precipitate obtained	Yellow was of lead
2.	Test For Copper: One pinch (25mg) of extract was made into paste with Con. HCl in a watch glass and introduced into the non-luminous part of the flame.	No blue colour appeared	Absence of copper
3.	Test For Aluminium: To the 2ml of extract dil.sodium hydroxide was added in 5 drops to excess.	No yellow Colour appeared	Absence of Aluminium.
4.	Test For Iron: a. To the 2ml of extract, added 2ml of dil.ammonium solution b. To the 2ml of extract 2ml thiocyanate solution and 2ml of con HNO ₃ were added	No Red colour appeared	Absence of Iron
5.	Test For Zinc: To 2ml of the extract dil. sodium hydroxide solution was added in 5 drops to excess and dil. ammonium chloride was added.	White precipitate is formed	presence of Zinc

6.	Test For Calcium: 2ml of the extract was added with 2ml of 4% dil.ammonium oxalate solution	Cloudy appearance and white precipitate is formed	presence of calcium
7.	Test For Magnesium: To 2ml of extract dil. sodium hydroxide solution was added in 5 drops to excess.	White precipitate is obtained	Presence of magnesium
8.	Test For Ammonium: To 2ml of extract 1 ml of Nessler's reagent and excess of dil.sodium hydroxide solution were added.	Brown colour appeared	presence of ammonium
9.	Test For Potassium: A pinch (25mg) of extract was treated with 2ml of dil. sodium nitrite solution and then treated with 2ml of dil. cobalt nitrate in 30% dil. glacial acetic acid.	No Yellow precipitate was obtained	Absence of potassium
10.	Test For Sodium: 2 pinches (50mg) of the extract was made into paste by using HCl and introduced into the blue flame of Bunsenburner.	No yellow colour flame evolved.	Absence of sodium
11.	Test For Mercury: 2ml of the extract was treated with 2ml of dil. sodium hydroxide solution.	No Yellow precipitate was obtained	Absence of Mercury
12.	Test For Arsenic: 2ml of the extract was treated with 2ml of dil. sodium hydroxide solution.	No Brownish red precipitate was obtained	Absence of arsenic

III. Miscellaneous			
1.	Test For Starch: 2ml of extract was treated with weak dil. Iodine solution	No Blue colour developed	Absence of starch
2.	Test For Reducing Sugar: 5ml of Benedict's qualitative solution was taken in a test tube and allowed to boil for 2 minutes and added 8 to 10 drops of the extract and again boil it for 2 minutes. The colour changes were noted.	Brick red colour is developed	presence of reducing sugar
3.	Test For The Alkaloids: a) 2ml of the extract was treated with 2ml of dil. potassium iodide solution. b) 2ml of the extract was treated with 2ml of dil. picric acid. c) 2ml of the extract was treated with 2ml of dil. phosphotungstic acid.	Yellow colour developed	Presence of Alkaloid
4	Test For Tannic Acid: 2ml of extract was treated with 2ml of dil. ferric chloride solution	No Blue-black precipitate was obtained	Absence of Tannic acid
5	Test For Unsaturated Compound: To the 2ml of extract, 2ml of dil. Potassium permanganate solution was added.	Potassium permanganate was not decolourised	Absence of unsaturated compound
6	Test For Amino Acid: 2 drops of the extract was placed on a filter paper and dried well. 20ml of Burette reagent was added.	Violet colour appeared	presence of amino acid
7	Test For Type of Compound: 2ml of the extract was treated with 2 ml of dil. ferric chloride solution.	red colour developed	Presence of quinolepinephrine pyrocatechol antipyrine

		Aliphatic amino acid and meconic acid.
	No Violet colour developed	Apomorphinesalicylate and Resorcinol were absent
	No Blue colour developed.	Morphine, Phenol cresol and hydrouinone were Absent.

The results were tabulated in Table –04

Organoleptic character

Table: 5. Organoleptic characters of Thanga Uram

Colour	Mosaic gold
Odour	Odour less
Taste	Characteristic taste
Texture	Solid

Physico-chemical analysis

Table: 6. Physico-chemical properties of thanga uram

S.No.	Parameters	Results
1	LOD	0.15%
2	Ash value	
	a. Total ash (w/w)	99.84%
	b. Acid insoluble ash (w/w)	19.08%
	c. Water Soluble ash (w/w)	0.16%
3	Extractive values	
	a. Alcohol successive soluble (w/v)	15.47%
4	pH	4.65

Interpretation

Ash:

Ash constitutes the inorganic residues obtained after complete combustion of a drug. Thus Ash value is a validity parameter describe and to assess the degree of purity of a givendrug

Total ash:

Total ash value of plant material indicated the amount of minerals and earthy materials present in the plant material. The total inorganic content (ammonium, potassium, calcium, chloride, iron, etc.) present in the drug is measured through the Total ash value and it is of 99.89% for thangauram

Acid insoluble ash:

The acid insoluble ash value of the drug denotes the amount of siliceous matter present in the plant. The quality of the drug is better if the acid insoluble value is medium. It is 19.08% of total ash for thanga uram

Water soluble ash:

Water-soluble ash is the part of the total ash content, which is soluble in water. It is 0.16% of total ash for thanga uram

Extractive values

- These are indicating the approximate measure of chemical constituents of crudedrug.
- The percentage of soluble matters present in the drug is determined by the values of water extractive and ethanolextractive.
- Based on the extractive value suitable solvent can be selected. It also gives the percentage of drug which will correlate with the metabolismreactions.
- Water-soluble extractive value plays an important role in evaluation of crudedrugs
- The alcohol-soluble extractive value

was also indicative for the same purpose as the water-soluble extractive value.

Loss on drying

- The total of volatile content and moisture present in the drug was established in loss on drying.
- Moisture content of the drug reveals the stability and its shelf-life.
- High moisture content can adversely affect the active ingredient of the drug.
- Thus low moisture content could get maximum stability and better shelflife.

pH:

- It is a measure of hydrogen ion concentration; it is the measure of the acidic or alkaline nature. 7.0 is neutral, above 7.0 is alkaline and below is acidic.
- The pH of the drug *thanga uram* is 4.65 which is slightly alkaline in nature and it is essential for its bioavailability and effectiveness.

Chemical analysis

The Chemical analysis shows the presence of Phosphate, sulphate, carbonate and sulphide, Iron, Zinc, Calcium, Magnesium, Potassium, Starch, Reducing sugar, Alkaloids in Thanga uram

Table: 7. Chemical Analysis of Thanga uram-Acid Radicals

S.NO	Parameters	Results
1.	Silicate	Absent
2.	Sulphate	Present
3.	Chloride	Present
4.	Phosphate	Present
5.	Carbonate	Absent
6.	Nitrate	Absent
7.	Sulphide	Present
8.	Oxalate	Absent
9.	Nitrite	Absent
10.	Borate	Absent
11.	Lead	Absent
12.	Copper	Absent
13.	Aluminium	Absent

Interpretation

The acidic radicals test shows the presence of **Phosphate, sulphate, and sulphide.**

Table: 8 Chemical Analysis of Thanga uram –Basic Radicals and Miscellaneous

S.NO	Parameters	Results
14.	Iron	Present
15.	Zinc	Present
16.	Calcium	Present
17.	Magnesium	Present
18.	Ammonium	Present
19.	Potassium	Absent
20.	Sodium	Absent
21.	Mercury	Absent
22.	Arsenic	Absent
23.	Starch	Absent
24.	Reducing sugar	Present
25.	Alkaloids	Present
26.	Tannic acid	Absent

Interpretation

The basic radical test shows the presence of Iron, Zinc, Calcium, Magnesium, Reducing sugar, Alkaloids and absence of heavy metals such as lead, arsenic, mercury.

Discussion

❖ In physico chemical analysis, The pH of the drug *Thanga Uram* is 4.56 which is alkaline in nature and it is essential for its bioavailability and effectiveness.

❖ The loss on drying value at 105°C of *Thanga Uram* was found to be 1.68% w/w, hence the drug will not lose much of its volume on exposure to the atmospheric air at room temperature. It shows that the drug has more stability.

❖ Ash value 96.69 % it is the residue remaining after incineration that determines the inorganic substances present in the drug. Similarly it can also detect the nature of the material, whether it is adulterate or not. Hence, determination of the ash value provides an idea for judging the identity and purity of the drug.

❖ Decreased water soluble ash value (5.455%) indicates easy facilitation of diffusion and osmosis mechanisms.

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