

Physicochemical and phytochemical analysis of siddha formulation thoothuvalaiyathi chooranam

V. THIRUNAVUKKARASU *, M. Sivagamasundari and R. Antony Duraichi

Department of PG Gunapadam, Government Siddha Medical College, Palayamkottai, Tirunelveli, Tamil Nadu, South India.

World Journal of Advanced Research and Reviews, 2024, 23(03), 1699–1705

Publication history: Received on 26 July 2024; revised on 13 September 2024; accepted on 16 September 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.3.2695>

Abstract

Aim And Objective: This study aimed to investigate the physicochemical properties and phytochemical composition of siddha formulation thoothuvalaiyathi chooranam.

Materials And Methods: Thoothuvalaiyathi Chooranam is one Of the Siddha formulation chosen from Sarabenthira vaithya muraigal kasa swasa sikichai , Page No. 153 which is indicated for Eraippu ,Kasam ,swasam, kabarogangkal. The drug prepared as per the Siddha literature. The drug is subjected to physico chemical analysis such as loss on ignition, loss on drying, water soluble ash etc and phytochemical analysis as per the PLIM guidelines.

Results And Conclusion: Phytochemical analysis of this drug was done such as pH (7.10), Loss on ignition (92.10%), Acid Insoluble ash (5.10 ± 0.100), Water soluble extractive (9.30 ± 0.500), Alcohol soluble extractive (8.10 ± 0.200), Loss on drying (0.90 ± 0.500). The results revealed the presence of various bioactive compounds, including Alkaloids, Carbohydrates, Glycosides, Saponins, Phenols, Triterpenoids, Flavanoids, Proteins and amino acids, Anthocyanin , Tannins. The results indicate the standard quality ,safety and standardization for their use.

Keywords: Physico-Chemical; Phyto-chemical Analysis; Thoothuvalaiyathi chooranam; Siddha Medicine

1. Introduction

Thoothuvalaiyathi Chooranam is a traditional Siddha polyherbomineral formulation that has been used for centuries in Indian medicine to treat various ailments, including respiratory and gastrointestinal disorders. Despite its widespread use, there is a lack of comprehensive scientific data on its physicochemical and phytochemical properties. This study aims to bridge this knowledge gap by conducting a detailed physicochemical and phytochemical analysis of Thoothuvalaiyathi Chooranam. The analysis will include the determination of physical parameters such as pH, moisture content, and ash value, as well as the identification and quantification of phytochemical constituents. The results of this study will provide valuable insights into the chemical composition and quality control of Thoothuvalaiyathi Chooranam, which will help to ensure its safety and efficacy for therapeutic use.

Aim and objective

This study aimed to investigate the physicochemical properties and phytochemical composition of siddha formulation thoothuvalaiyathi chooranam.

* Corresponding author: V. THIRUNAVUKKARASU

2. Materials and methods

2.1. Collection Of The Raw Drugs

All the raw materials were bought from the indhumathi raw drug shop Tirunelveli.

2.2. Identification And Authentication of The Drug

The identification of Herbomineral drugs authenticated by the faculties of PG Gunapadam department Experts Govt. Siddha Medical College, Palayamkottai.

2.3. Preparation Of Thoothuvalaiyathi Chooranam

2.3.1. Ingredients

- Thoothuvalaiverpattai thool(*Solanum trilobatum*) - $\frac{1}{2}$ padi(0.65 mg)
- Perumarunthu chooranam(*Aristolochia indica*) -1 Uzhakku(336 mg)
- Indhuppu(Rock salt) -2Varaganedai(8.40 g)
- Milagu(Piper nigrum) -2Varaganedai(8.40 g)
- Thippili(Piper longum). -2Varaganedai(8.40 g)
- Chukku(Zingiber officinale) -2 varaganedai (8.40g)
- Chitrarathai (Alpinia Galanga) -2Varaganedai(8.40 g)
- Karunjeeragam(*Nigella sativa*) -2varaganedai(8.40 g)
- Kadukkaithol(*Terminalia chebula*) -2varaganedai(8.40g)
- Eluppaikatti(*Madhuca longifolia*) -2varaganedai(8.40g)
- Kandanthippili(Piper longum) -2varaganedai(8.40 g)
- Perungkayam (Ferula asafoetida) -2 varaganedai(8.40 g)
- Vengkaram((Sodium biborate) - $\frac{1}{4}$ varaganedai(1.05 g)

2.4. Purification Of Raw Drugs :

2.4.1. Thoothuvalaiverpattai

Wipe off the root bark with a cloth and scrape off its epidermis with a knife to get the purified form

2.4.2. Esuramooli

Dried the whole plant of aristolochia indica in heavy sunlight

2.4.3. Indhuppu

Soaked the indhuppu in vinegar (kaadi) for 3 days and insolate it.

2.4.4. Milagu

Soaked the piper nigrum in sour butter milk for 3 hours (1 saamam) and dry it.

2.4.5. Thippili

Soaked in lime juice for a period of time then allowed it to dry .

2.4.6. Chukku

Soaked in lime stone water for a period of time and dried it in sun shade then peel off the outer layer.

2.4.7. Chitrarathai

Break the alpinia officinarum into pieces and roaste it slightly.

2.4.8. Karunjeeragam

Roasted the nigella sativa.

2.4.9. Kadukkai

Soaked the terminalia chebula in rice washed filtrate ,removed its seed and dried it completely.

2.4.10. Eluppaikatti

Removed the dust particles and dried it sun light.

2.4.11. Kandathippili

Removed the nodes of the root of piper longum and dried it .

2.4.12. Perungayam

Soaked the ferula asafoetida in betel leaf juice for 3 hours and dried it.

2.4.13. Vengaram

Fried untile the water dried up.

2.4.14. Procedure

Purified raw drugs are made into fine powder separately and mixed together homogenously then it is filtered in pure white cloth.

2.5. Administration of the drug

- Route of administration : Oral
- Dosage : 1Verukadi alavu(1250-1500 mg)
- Adjuvant : Honey.

2.6. Indication

- 1. Eraippu
- 2. Kasam
- 3. Swasam
- 4. Kabarogangal

3. Physicochemical Analysis

The sample is tested for the following parameters as per the PLIM guidelines.

3.1. Organoleptic Features

3.1.1. Color

About 5 g of test drug was taken in a clean glass beaker and tested for its color by viewing against a white opaque background under direct sunlight .

3.1.2. Odour

About 5 g of the test drug was placed in a 100 ml beaker and tested for its odour by wafting the air above the beaker.

3.1.3. pH

About 5 g of test sample will be dissolved in 25ml of distilled water and filtered the resultant solution is allowed to stand for 30 mins and then subjected to pH evaluation barrier. pH of the formulation was found .

3.2. Physical Evaluation

3.2.1. Determination Of Ash Value

2 g of thoothuvalaiyathi chooranam was weighed accurately, added in silica dish and incinerated at the furnace a temperature not exceeding 450°C until free from carbon, then cooled and weighed. The percentage of ash is calculated with reference to the air dried drug .

$$\text{Acid-insoluble Ash} = \text{Weight of Ash/Wt of the Crude drug taken} \times 100$$

3.2.2. Water Soluble Ash

The ash obtained by total ash test will be boiled with 25 ml of water for 5 mins. The insoluble matter is collected in a crucible and will be washed with hot water, and ignite for 15mins at a temperature not exceeding 450°C. The weight of the insoluble matter will be subtracted from the weight of the ash; the difference in weight represents the water-soluble ash. Calculate the percentage of water-soluble ash with reference to the air-dried drug.

$$\text{Water Soluble Ash} = \text{Weight of Ash/Wt of the Crude drug taken} \times 100$$

3.2.3. 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 a 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.

$$\text{Acid-insoluble Ash} = \text{Weight of Ash/Wt of the Crude drug taken} \times 100$$

3.2.4. Loss On Drying

10 gm of drug was accurately weighed in an evaporating dish and was air dried at 105 Degree C for 5 hours and then weighed.

3.2.5. Determination Of Moisture Content

Take weight of freshly prepared drug. Then the same weight of drug was placed over it in a air cooled oven at 80 Degree Celsius for 48 hrs. Take weight of it again The difference of weight multiplied by 100 gives it percentage of moisture content.

3.2.6. Determination of Alcohol Soluble Extractive

Test sample was macerated with 100 ml of Alcohol in a closed flask for twenty-four hours, shaken frequently during six hours and allowed to stand for eighteen hours. Filtered 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 weighed. The percentage of alcohol-soluble extractive with reference to the air-dried drug was obtained. Alcohol sol extract = Weight of Extract/ Wt of the Sample taken X 100

3.2.7. Determination of Water Soluble Extractive

Test samples A and B was macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaken frequently during six hours and allowed to stand and for eighteen hours. The samples were filtered rapidly, taking precautions against loss of solvent, 25 ml of the filtrate was evaporated to dryness in a tared flat bottomed shallow dish, and dry at 105 °C, to constant weight and weighed. The percentage of water-soluble extractive with reference to the airdried drug was calculated.

$$\text{Water soluble extract} = \text{Weight of Extract/ Wt of the Sample taken} \times 100$$

4. Results and discussion

4.1. Phytochemical Analysis

Table 1 Organoleptic characters of TVC

Colour	Pale Brown
Odour	Typical
Taste	Bitter
Texture	Fine Powder

Table 2 Result Of Physicochemical Parameters

S No	Parameters	Values
1	Loss on drying at 105°C	0.90±0.500
2	Loss on ignition	92.10%
3	Water soluble ash	9.10±0.100
4	Acid insoluble ash	5.10±0.100
5	Water soluble extractive	9.30±0.500
6	Alcohol soluble extractive	8.10±0.200
7	pH	7.10
8	moisture content	9.10±0.100%

4.2. Interpretation

The physicochemical analysis of thoothuvalaiyathi chooranam revealed several notable characteristics. The low loss on drying at 105°C (0.90±0.500) indicates a minimal moisture content, suggesting a low risk of microbial growth and spoilage.

Loss on ignition (92.10%) reveals high organic matter.

The moderate water-soluble ash content (9.10±0.100) and water-soluble extractive value (9.30±0.500) suggest the presence of polar compounds, potentially including bioactive molecules. In contrast, the relatively low alcohol-soluble extractive value (8.10±0.200) indicates a lower content of non-polar compounds.

The acid-insoluble ash content (5.10±0.100) is relatively low, suggesting a minimal presence of silicates or other acid-insoluble minerals. The neutral pH (7.10) indicates a balanced acidity, which may be beneficial for certain applications.

The moisture content (9.10±0.100%) is relatively low, consistent with the loss on drying result. This suggests that Thoothuvalaiyathi chooranam is a dry material with minimal water content.

4.3. Phytochemical Analysis

Table 3 Phytochemicals Analysis Test

S.No	Phytochemicals	Result
1	Alkaloids	present
2	Carbohydrates	Present
3	Glycosides	present
4	Saponins	Present
5	Phenols	present
6	Triterpenoids	present
7	Flavanoids	Present
8	Proteins and Amino Acids	present
9	Anthocyanin	present
10	Tannins	present

4.4. Interpretation

The presence of these phytochemicals suggests potential biological activities, including antioxidant, anti-inflammatory, antimicrobial, and nutritional properties. The sample's high content of phenols, flavanoids, and triterpenoids indicates significant antioxidant capacity. The presence of glycosides, saponins, and tannins suggests antimicrobial and anti-inflammatory activities. The nutritional value is supported by the presence of carbohydrates, proteins, and amino acids.

5. Conclusion

In the present study of thoothuvalaiyathi chooranam were thoroughly investigated for their physicochemical and phytochemical characters to analyse their safety, quality and standardization for their use.

Compliance with ethical standards

Acknowledgments

The author is grateful to Noble research solutions and IIT madras chennai and I thankful to Asst Prof Dr.R.Antony Duraichi ,MD(S), Government Siddha Medical College for his guidance.

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Sarabenthira vaithiya muraigal kaasaswasa sikitchai (Pg No. 153),
- [2] Dr.Thiyagarajan.R, 2009, Gunapadam MooligaiVaguppu, Department of Indian Medicine and Homeopathy, Chennai 600106.
- [3] Dr.Thiyagarajan.R, 2009, Gunapadam – Thathu JeevaVaguppupart 2&3, Department of Indian Medicine and Homeopathy, Chennai 600106.
- [4] Sambasivampillai T.V., *Siddha Medical Dictionary* (Tamil –English) Volume II – Part I, Department of Indian Medicine and Homeopathy Chennai 600106.
- [5] Sarakku Suththi Muraigal.

- [6] Pharmacopoeial Laboratory for Indian Medicine (PLIM) Guideline for standardization and evaluation of Indian medicine which include drugs of Ayurveda, Unani and Siddha systems. Department AYUSH Ministry of Health & Family Welfare, Govt of India
- [7] Brain KR. Turner TD. The Practical Evaluation of Phytopharmaceuticals. Bristol: Wright Sciencetechnica; 1975:36-45
- [8] Snehal s.patel et al, systematic review of plant steroid as potential anti-inflammatory agents: current status and future perspectives, The Journal of Phytopharmacology, 2015.