IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Assessment Of Physicochemical And Phytochemical Attributes In Siddha Polyherbal Formulation Thalisapathri Vadagam: A Qualitative Study

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Abstract

Siddha medicine is one of the traditional Indian System of Medicine (AYUSH). Siddha System has many herbal preparations. One such preparation is ***Thalisapathri Vadagam*** which is indicated in classical siddha literature to treat Menorrhagia (*Perumbadu)*. The organoleptic Characters, physico-chemical characters like ash values, pH value and phytochemicals were also analysed as per PLIM guidelines. The total Ash value was found to be 15.1%, acid insoluble ash value is 1.533%, water soluble ash value is 12.2%, and loss of drying at 105 ° c is 7.2%. The pH value is 6.6. Phytochemical analysis reveals the presence of Alkaloids, steroids, Triterpenoids, Coumarin, Phenol, Tannin, Sugar and Betacyanin. This study highlights the suitable application of modern Standardizing techniques for bringing the herbal formulation into focus and analysing the safety profile of the drug.

Keywords: *Perumbadu, Physicochemical Analysis*, *Plim Guidelines, Siddha, Thalisapathri Vadagam.*

Introduction

Siddha is one of the traditional systems of Indian medicine which uses plant & animal products as medicine. Herbal medicines are at great demand globally for primary healthcare due to their higher safety margins and cost effectiveness. Quality control of herbal medicines generates a lot of problems. So first and fore most task is the selection of the right kind of plant material which has therapeutically efficacious compounds. Standardising herbal remedies is therefore essential to ensuring their efficacy, potency, safety, and purity[1].*Thalisapathri vadagam* is one such polyherbal formulation indicated in Siddha literature *Sarabendira vaithya muraigal* for the treatment of Menorrhagia (Perumbadu)[2]. Menorrhagia is the most common type of abnormal uterine bleeding characterised by heavy and prolonged menstrual bleeding. A normal menstrual cycle is 21-35 days duration with bleeding, lasting an average of 5-7 days and total blood flow between 25 to 80 ml. Blood loss of greater than 80 ml or lasting longer than 7 days constitutes menorrhagia[3]. 9-14% of reproductive age women have blood loss that exceeds 80 ml. Prolonged and excessive bleeding may provoke serious medical consequences or aggravate anaemia and in a certain percentage of cases may eventually be life threatening if left untreated. As per *Siddha* literature *Perumbadu* is a disorder of dysfunctional uterine bleeding. *Thalisapathri vadagam* is a polyherbal formulation. The Aim of this study is to analyse the physicochemical and phytochemical parameters of the drug.

Materials and methods

The raw materials of the study were procured from drug store of Chennai. The authentication of raw drugs was done by Botanists and experts of *Gunapadam* Department. The study drug was prepared at Government Siddha medical college, Chennai and the qualitative analysis was conducted at Noble research solutions, Chennai.

Ingredients of *Thalisapathri Vadagam*

1. Thalisapathri *(Abies spectabilis)* - 1 *palam (35g)*
2. Chukku *(Zingiber officinalis)* - 3 *palam (105g)*
3. Koogaineeru *(Maranta arundinacea)* - 1 *palam (35g)*
4. Sirunagappu *(Mesua nagassarium)* -1 *palam (35g)*
5. Chithiramoolam *(Plumbago zeylanica)* - 1 *palam (35g)*
6. Kirambu *(Syzygium aromaticum)* - 1 *palam (35g)*
7. Milagu *(Piper nigrum)* - 2 *palam (70g)*
8. Thippili moolam*(Piper longum)* - 2 *palam (70g)*
9. Sugar - 3 *ser (840g)*

Preparation of *Thalisapathri Vadagam*

All the ingredients were dried and purified according to the classical *Siddha* literature[4]. All the ingredients were finely powdered and subjected to *vasthira kayam*. Ghee and sugar were added to it and mixed. Then the mixture was purified by *pittaviyal* (steam cooking) *method.* Then the mixture in the muslin cloth was cooled. Honey was added and rolled into pills of the size of *kazharchi* (2.7g).

Drug profile

Drug Name : *Thalisapathri Vadagam*

Dose : Oru urundai (Kazharchi kai alavu – 2.7g|)

Indications : ***Perumbadu*** (Menorrhagia), *Suram* (Fever), *Adhisaram* (Diarrhoea), *Paandu*(Anaemia), *Ajeeranam*(Indigestion),*Irumal* (Cough) and etc

Qualitative analysis of *Thalisapathri vadagam*

A. Macroscopic evaluation

The test drug was subjected to evaluate the organoleptic characters such as state, appearance, color, nature, odor, touch and flow property

B. Solubility profile

The solubility profile of the drug was evaluated.

C. Physicochemical analysis, [5,6]

Percentage Loss on Drying

Test drug was accurately weighed in evaporating dish. The sample was dried at 105^{o}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.

D. Phytochemical analysis[7]

- **Test for alkaloids:**

Mayer's Test: To the test sample, 2ml of Mayer's reagent was added, a dull white precipitate revealed the presence of alkaloids.

- **Test for coumarins:**

To the test sample,1 ml of 10% sodium hydroxide was added. The presence of coumarins is indicated by the formation of yellow color.

- **Test for saponins:**

To the test sample,5 ml of water was added and the tube was shaken vigorously. Copious lather formation indicates the presence of Saponins.

- **Test for tannins:**

To the test sample, ferric chloride was added, formation of a dark blue or greenish black color showed the presence of tannins.

- **Test for glycosides- Borntrager's Test**

Test drug is hydrolyzed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests. To 2 ml of filtered hydrolysate, 3 ml of chloroform is added and shaken, chloroform layer is separated and 10% ammonia solution is added to it. Pink color indicates presence of glycosides.

- **Test for flavonoids:**

Alkaline reagent test.

Two to three drops of sodium hydroxide were added to 2 mL of extract. Initially, a deep yellow color appeared but it gradually became colorless by adding few drops of dilute HCL, indicating that flavonoids were present.

- **Test for phenols:**

Lead acetate test:

To the test sample; 3 ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

- **Test for steroids:**

To the test sample, 2ml of chloroform was added with few drops of conc. Sulphuric acid (3ml), and shaken well. The upper layer in the test tube was turns into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

❖ **Triterpenoids**

Liebermann–Burchard test: To the chloroform solution, few drops of acetic anhydride was added then mixed well. 1 ml concentrated sulphuric acid was added from the sides of the test tube, appearance of red ring indicates the presence of triterpenoids.

❖ **Test for Cyanins**

A. Anthocyanin:

To the test sample, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100°C. Formation of bluish green color indicates the presence of anthocyanin.

❖ **Test for Carbohydrates - Benedict's test**

To the test sample about 0.5 ml of Benedict's reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic-colored precipitate indicates the presence of sugar.

❖ **Proteins (Biuret Test)**

To extracts 1% solution of copper sulphate was added followed by 5%solution of sodium hydroxide, formation of violet purple color indicates the presence of proteins.

Results

Figure 01. ***Thalisapathri vadagam***

Table 1. Organoleptic characters of *Thalisapathri vadagam*

State	Solid
Nature	Fine
Odour	Strongly Aromatic
Touch	Soft
Taste	Flavorful & Tangent
Flow Property	Non-Free Flowing
Appearance	Dark Brownish

Table 02. Solubility Profile of *Thalisapathri Vadagam*

S.no	Solvent Used	Solubility / Dispersibility
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble
4	Ethyl Acetate	Insoluble
5	Dmso	Soluble

Table 03. Physicochemical Analysis of *Thalisapathri Vadagam*

S.no	Parameter	Mean (n=3) sd
1.	Loss on Drying at 105 °C (%)	7.2 ± 0.65
2.	Total Ash (%)	15.1 ± 0.264
3.	Acid insoluble Ash (%)	1.533 ± 0.351
4.	Water soluble Extractive (%)	12.2 ± 0.458
5.	Alcohol Soluble Extractive (%)	8.433 ± 0.404
6.	Ph	*6.6*

Figure 02. Qualitative phytochemical investigation of *Thalisapathri Vadagam*

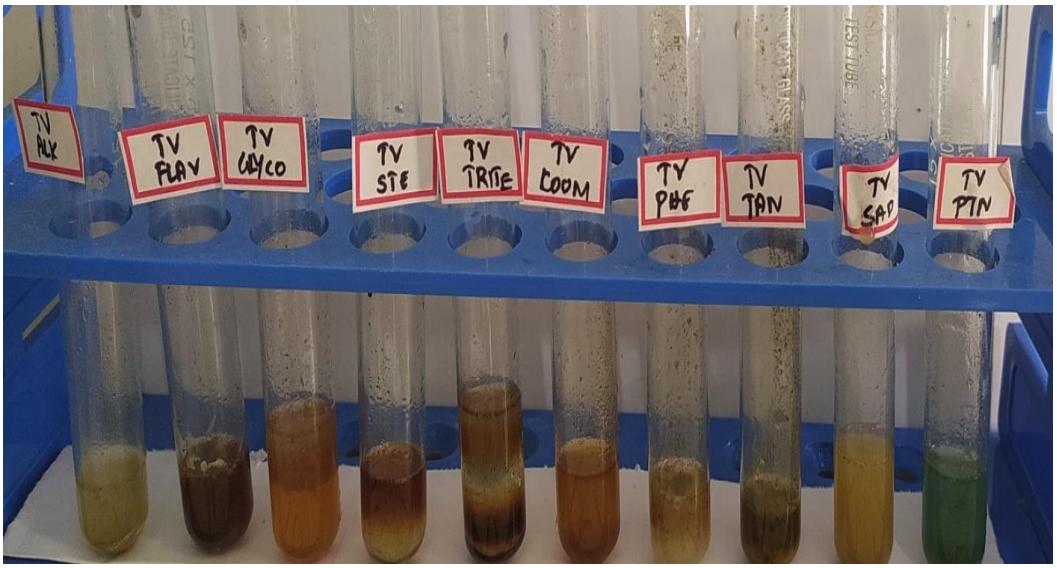

Table 03. Phytochemical evaluation of *Thalisapathri Vadagam*

S.no	Test	Observation
1	Alkaloids	+
2	Flavonoids	-
3	Glycosides	-
4	Steroids	+
5	Triterpenoids	+
6	Coumarin	+
7	Phenol	+
8	Tannin	+
9	Protein	-
10	Saponin	-
11	Sugar	+
12	Anthocyanin	-
13	Betacyanin	+

(+) indicates positive and (-) indicates negative

DISCUSSION

Thalisapathri vadagam is an polyherbal siddha formulation indicated for Menorrhagia in the classical *siddha* literature *Sarabendira vaithiya muraigal.* The physicochemical parameters such as total ash, LOD etc., were analysed in this study. The loss of drying of drug at 105°c was 7.2% indicates the low moisture content. Hence Stability and longer shelf life of drug was ensured. The ash content of the drug was 15 % revealing that it contains organic matter and absence of inorganic matter. Acid insoluble ash was 3.42% revealing that the drug contains negligible amount of acid insoluble silica and salts of tin. Low acid-insoluble ash indicates the quality of the drug. Water/Alcohol Soluble extractive value indicates the nature of chemical constituents present in the drug. The pH of the drug is found to be 6.6 which is weakly acidic. Hence on oral intake it will not cause any irritation to the gastrointestinal tract like a strong alkali or acid. On Phytochemical analysis, the drug shows the presence of Alkaloids, Steroids, Triterpenoids, coumarin, Phenol, Tannin, Sugar and Betacyanin.

CONCLUSION

Through this study the *Siddha* drug *Thalisapathri Vadagam* has been traditionally prepared and the preliminary Physicochemical and phytochemical properties of the herbal formulation has been evaluated as per PLIM Guidelines.

The present study shows the preliminary screening of physico-chemical and phytochemical analysis shows the presence of Alkaloids, Steroids, Triterpenoids, coumarin, Phenol, Tannin, Sugar and Betacyanin

This study has been carried out as an earnest attempt to scientifically validate its qualitative analysis and phytochemical composition as per PLIM guidelines. Further preclinical and clinical studies may be essential to confirm its bioavailability, particle size and mineral composition and its therapeutic efficacy in humans for the treatment of *Perumbadu* (Menorrhagia).

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my lecturers of *Gunapadam* department, Government Siddha medical, college, Chennai for their valuable assistance and feedback throughout the course of this research project. Additionally, I extend my thanks to Dr, K. Kanakavalli, Principal, Govt. Siddha medical college, Chennai, The *TamilNādu* Dr. M.G.R. medical university, my colleagues and friends for their guidance and support.

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