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COMPREHENSIVE PHYTO-PHYSICOCHEMICAL PROFILING OF SIDDHA POLY HERBAL FORMULATION "*SEVIYA VADAGAM* (SV)" FOR QUALITY ASSURANCE

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ABSTRACT

SeviyaVadagam (SV) is a traditional Siddha polyherbal formulation that has long been used for managing jaundice and various hepatic disorders. Despite its extensive traditional usage, scientific validation and standardization are essential to ensure the quality, safety, and consistency of the formulation. This study was designed to investigate the phytochemical and physicochemical properties of SV using standard analytical methods prescribed for Siddha formulations.The formulation was prepared according to classical Siddha text **"**Aathmarakshamirtham Vaithiya Saara Sangiragam**"** and subjected to organoleptic, phytochemical, and physicochemical analyses. Preliminary phytochemical screening revealed the presence of biologically active constituents including alkaloids, flavonoids, tannins, glycosides, phenolic compounds, saponins, and triterpenoids. Physicochemical evaluation showed that moisture content, ash values, extractive values, pH, hardness, and friability were within permissible limits, indicating the stability and purity of the formulation. The findings generated from the present investigation may serve as preliminary standardization parameters for SV and also support its traditional use in hepatic disorders. However, further detailed pharmacological and clinical studies are necessary to confirm its therapeutic efficacy and safety profile

Keywords: *Siddha medicine, Seviya Vadagam, hepatoprotective activity, phytochemical analysis, physicochemical evaluation, jaundice.*

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INTRODUCTION

The liver is an essential metabolic organ involved in detoxification, nutrient metabolism, protein synthesis, and maintenance of physiological homeostasis. Hepatic disorders, particularly jaundice, continue to represent a major public health concern worldwide. In traditional systems of medicine such as Siddha, several herbal formulations have been documented for the management of liver-related diseases.According to *Siddha* principles, disturbances in *Azhal* humour are primarily associated with hepatic dysfunction. Traditional Siddha formulations are widely employed to restore normal liver function, improve digestion, and maintain systemic balance. Herbal medicines remain an important component of traditional healthcare due to their natural origin, accessibility, cost-effectiveness, and comparatively lower incidence of adverse effects. *Seviya Vadagam* is a classical Siddha formulation indicated for jaundice and associated hepatic abnormalities. Although the formulation has long been utilized in clinical practice, limited scientific data are available regarding its standardization and quality assessment. Establishing physicochemical and phytochemical standards is therefore essential to ensure the identity, purity, safety, and consistency of the formulation. The present investigation was undertaken to evaluate *Seviya Vadagam* using standard analytical methods. The study is intended to generate baseline quality control parameters that may contribute to future pharmacological and clinical validation studies.

AIM

To standardize and scientifically evaluate *SeviyaVadagam* (SV), a traditional Siddha formulation, through phytochemical and physicochemical analyses for establishing quality control parameters.

OBJECTIVES

1. To prepare *SeviyaVadagam* according to classical Siddha literature.
2. To evaluate the physicochemical properties of the formulation.
3. To identify major phytochemical constituents present in the formulation.
4. To establish preliminary analytical standards for future pharmacological and clinical investigations.

MATERIALS AND METHODS

Drug Profile [1]

Drug Name: SeviyaVadagam (SV)

Dosage: Paakkalavu (Approximately 5 g)

Route of Administration: Oral

Indications: Kaamalai, Sogai, Veekkam, Vaayu, Vikkal, Vaanthi, AkkiniMantham, Nenjerivu, Kirani, and Irumal.

INGREDIENTS OF SEVIYA VADAGAM

Table 01: Ingredients and Botanical name of SeviyaVadagam (SV) [1].

S.NO	TAMIL NAME	BOTANICAL NAME	QUANTITY
1	Seviyam (Milaguver)	Piper nigrum	1 Palam (35g)
2	Iluppai poo	Madhucalongifolia	1 Palam (35g)
3	Thippilimoolam	Piper longum	1 Palam (35g)
4	Vilamichamver	Plectranthusvettiveroides	1 Palam (35g)
5	Sukku	Zingiberofficinale	1 Palam (35g)
6	Nilavembu	Andrographispaniculata	1 Palam (35g)
7	Adhimadhuram	Glycyrrhizaglabra	1 Palam (35g)
8	Neitharkizhangu	Nymphaea nouchali	1 Palam (35g)
9	Vettiveru	Vetiveriazizanioides	1 Palam (35g)
10	Santhanam	Santalum album	1 Palam (35g)
11	Elavangam	Syzygiumaromaticum	1 Palam (35g)
12	Elavangapattai	Cinnamomumverum	1 Palam (35g)
13	Nagesaram	Mesuaferrea	1 Palam (35g)
14	Ealam	Elettariacardamomum	1 Palam (35g)
15	Milagu	Piper nigrum	1 Palam (35g)
16	Thalisapathiri	Abiesspectabilis	1 Palam (35g)

COLLECTION AND AUTHENTICATION OF RAW DRUGS

The raw herbal ingredients required for the preparation of SeviyaVadagam were procured from a reputed country drug store in Chennai, Tamil Nadu. The collected materials were authenticated by experts from the Department of Gunapadam (Siddha Pharmacology) and by a qualified botanist at Government Siddha Medical College, Chennai.

PURIFICATION AND PREPARATION OF *SEVIYAVADAGAM* (SV) [1&2]

Purification procedures for the individual ingredients were carried out according to the methods described in Siddha literature- **Sigicha Rathna Deepam Ennum Vaithiya Nool**. Following purification, the ingredients were shade-dried and pulverized separately into fine powder. All powdered ingredients were mixed thoroughly to obtain a homogeneous blend. An equal quantity of jaggery was subsequently added and triturated until a uniform mass was formed. The prepared formulation was rolled into *Paakkalavu* (approximately 5g) units and stored in airtight containers for further analytical studies.

Figure 01: Homogeneous powder mixture of ingredients.

Figure 02: Final prepared Seviya Vadagam (SV) after incorporation of jaggery.

PHYTOCHEMICAL SCREENING PROCEDURES [3, 6 & 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 colour.

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 colour showed the presence of tannins.

Test for glycosides

To the sample extract, hydrolyze with dilute acid and then add fehling's or Benedict's reagent. The appearance of red precipitate indicating that glycosides were present.

Test for flavonoids

Shinoda test:

To the 2ml of sample extract, Mg ribbon and few drops of conc. HCl was added. Appearance of pink/ red colour indicated the presence of flavonoids.

Test for phenols

To the test sample, 2-3 drops of FeCl3 was added. Blue-black/ green or white precipitate indicated the presence of phenolic compounds.

Test for steroids

Liebermann–Burchard test:

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 turned into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

Test for Triterpenoids

Salkowski 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 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 coloured precipitate indicates the presence of sugar.

Test for Proteins

Biuret Test

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

Test for Quinones

The test sample extract was treated with sodium hydroxide. Appearance of blue or red precipitate indicates the presence of quinines.

Test for Anthraquinones

Borntrager's test:

The test sample extract was treated with benzene and shake it well and then add ammonia solution. Appearance of pink or red colour indicates the presence of Anthraquinones.

Test for cardiac glycoside

Keller-Killiani test:

To the test sample, add glacial acetic acidand Fecl3 and then mixed well. sulphuric acid was added from the sides of the test tube, appearance of brown ring indicates the presence ofcardiac glycoside.

Test for acids

Dip blue litmus paper into the sample. It turns red colour indicating the presence of acidic compounds**.**

Physicochemical Analytical and evaluating methods [4, 5].

Percentage Loss on Drying

Test drug was accurately weighed in evaporating dish. The sample was dried at 105°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 400oC until it turns white in colour 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. 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 105oC, 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 105oC, 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.

Friability Test

Test sample was evaluated using a friabilator. A pre-weighed sample was placed in the friabilator drum, which was operated at a speed of 25 revolutions per minute for 4 minutes. The apparatus was designed with internal baffles to allow free movement and falling of tablets during rotation. After completion of the test, the sample was reweighed, and the percentage weight loss was calculated to assess mechanical strength.

Hardness Test

Test sample was determined using a tablet hardness tester. Each tablet was placed between a fixed anvil and a movable piston connected to a force gauge. Pressure was gradually applied until the sample fractured. The force required to break the sample was recorded in kilograms, providing an estimate of the mechanical strength and resistance to handling.

Disintegration Time

The test sample was evaluated using a standard disintegration apparatus. Individual tablets were placed in separate tubes, each fitted with a disc. The assembly was immersed in a beaker containing water maintained at a temperature between 35°C and 39°C. The apparatus was operated, and the time required for complete disintegration was recorded. The assembly was removed once no residue remained, indicating complete disintegration.

RESULTS

Organoleptic characters

Table 02: Organoleptic characters

S. NO	PARAMETER	OBSERVATION
1	State	Solid
2	Nature	Moderately fine
3	Odour	Aromatic
4	Touch	Hard Texture
5	Flow property	Non-free-flowing
6	Appearance	Black colour

Physico-chemical analysis

Table 03: Results of physicochemical evaluation of SV

Sl.No.	Name of the Experiment	I	II	Mean
1.	Loss on drying (at 105°C)	12.08%	11.24%	11.66%
2.	Total ash	5.35%	5.73%	5.54%
3.	Water insoluble ash	1.93%	1.92%	1.92%
4.	Acid insoluble ash	1.18%	1.48%	1.33%
5.	Water soluble extractive	66.73%	67.16%	66.94%
6.	Alcohol soluble extractive	61.73%	61.84%	61.78%
7.	pH value (10%)	7.14	7.14	7.14
8.	Reducing sugar	7.26%	7.43%	7.34%
9.	Total sugar	12.75%	12.75%	12.75%
10.	Friability	0.32%	0.32%	0.32%
11.	Disintegration Time	>20min		
12.	Weight variation Test	Averageweightoftablet5.439g Deviationfrom6.10%to10.29%		
13.	Hardness	40.4N		

Phytochemical analysis

Table 04: Results of phytochemical evaluation of SV

S.No	Phytochemical Test	Result
1.	Test for Phenol	Present
2.	Test for Tannin	Present
3.	Test for Flavonoids	Present
4.	Test for Triterpenoids	Present
5.	Test for Proteins	Absent
6.	Test for Glycosides	Present
7.	Test for Reducing Sugar	Present
8.	Test for Anthraquinones	Absent
9.	Test for Quinones	Present
10.	Test for Alkaloids	Present
11.	Test for Saponins	Present
12.	Test for Cardiac glycoside	Absent
13.	Test for Steroids	Absent
14.	Test for Coumarin	Absent
15.	Test for Acids	Absent

DISCUSSION

The present study was conducted to establish preliminary analytical standards for *SeviyaVadagam*, a classical Siddha formulation traditionally indicated for jaundice and hepatic disorders [1]. Organoleptic evaluation demonstrated that the formulation possessed a characteristic aromatic odour, hard texture, black appearance, and non-free-flowing nature, which may be considered as primary identification parameters.

Phytochemical analysis confirmed the presence of several biologically active secondary metabolites, including alkaloids, flavonoids, tannins, phenolic compounds, glycosides, quinones, saponins, and triterpenoids. These phytoconstituents are widely recognized for their antioxidant, anti-inflammatory, and hepatoprotective properties. Flavonoids and phenolic compounds are known to reduce oxidative stress through free radical scavenging mechanisms, thereby protecting hepatocytes from cellular injury [3]. Tannins may contribute to membrane stabilization and tissue repair, while saponins and triterpenoids exhibit anti-inflammatory and hepatoprotective activities.

The physicochemical parameters obtained in the present investigation indicate that the formulation possesses satisfactory quality and stability. The

moisture content (11.66%) was within permissible limits, suggesting reduced susceptibility to microbial contamination and enhanced shelf stability. The total ash (5.54%), water-insoluble ash (1.92%) and acid-insoluble ash (1.33%) indicated minimal inorganic contamination and absence of excessive extraneous matter. Furthermore, the Water-soluble (66.94%) and alcohol-soluble (61.78%) extractive values observed in both aqueous and alcoholic solvents suggest the presence of appreciable quantities of active phytoconstituents. The formulation exhibited a nearly neutral pH (7.14), indicating suitability for oral administration with minimal possibility of gastric irritation. Mechanical parameters such as hardness and friability also confirmed adequate physical stability and handling properties of the prepared formulation.

Overall, the present findings provide scientific evidence supporting the traditional use of *SeviyaVadagam* in hepatic disorders. The analytical data generated through this study may serve as reference standards for quality control and future research on Siddha formulations.

CONCLUSION

The present investigation successfully evaluated the phytochemical and physicochemical characteristics of *SeviyaVadagam*, a traditional Siddha formulation used in the management of jaundice and liver-related disorders. The formulation was found to contain several important bioactive constituents, including alkaloids, flavonoids, tannins, phenols, glycosides, saponins, and triterpenoids, which are associated with hepatoprotective, antioxidant and anti-inflammatory properties. The Physicochemical parameters, including ash values, extractive values, moisture content and pH, were found to be within acceptable limits, indicating the formulation's stability, purity, and reproducibility. These findings collectively establish baseline quality control standards for SV and scientifically substantiate its traditional claims. The results demonstrate that the formulation possesses desirable chemical and physical characteristics, confirming its safety and therapeutic potential as a hepatoprotective agent. Further pharmacological and clinical studies are warranted to validate its efficacy and to promote its integration into evidence based Siddha practice.

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CONFLICT OF INTEREST

No conflict of interest.

INFORMED CONSENT

Not Applicable.

ETHICAL STATEMENT

The study was carried out according to standard laboratory procedures for physicochemical and phytochemical evaluation of Siddha formulation and did not involve human or animal experimentation.

AUTHOR CONTRIBUTION

Dr. S. K. SABARI SUVETHA: Conceptualization, formulation preparation, data collection, analysis, manuscript drafting. Dr. C. MEENAKSHI: Supervision, validation, manuscript review, and editing.

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