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UNVEILING THE ANALYTICAL PROFILE OF SOOTHAGAVAYUVUKU CHOORANAM (SVVC) FOR PCOS THROUGH PHYSICO-CHEMICAL, PHYTOCHEMICAL AND BIOCHEMICAL PARAMETERS.

Dharshini megha B [1*], Nalina Saraswathi K[2], Monisha.J[3]

1&3 PG Scholar, Department of Pg Gunapadam, Government Siddha medical college, Chennai - Tamilnadu.

2 Guide - Lecturer, Department of Pg Gunapadam, Government Siddha Medical College, Chennai - Tamilnadu.

*Corresponding author's address

Dharshini megha. B

PG Scholar,

Department of Pg Gunapadam,

Government Siddha Medical College,

(Affiliated to The Tamil Nadu Dr. M.G.R. Medical University)

Chennai, Tamil Nadu, India.

Abstract

Siddha medicine, a holistic healthcare system, that uses natural remedies to treat various ailments. *Soothagavayuvuku Chooranam* (SVVC), a multi-component herbal *Siddha* formulation comprising 14 ingredients, is traditionally employed to manage Polycystic Ovary Syndrome (PCOS). **AIM ANDOBJECTIVE**: This study aimed to evaluate the quality, purity, and bioactive compounds of SVVC through physico - chemical, phytochemical, and biochemical analysis. **MATERIALS&METHODS**: SVVC was made following the traditional *siddha* guidebook" *Anubhava Vaithiya Muraigal*" by Dr C.N. Kuppusamy. This formulation was

subjected to physico - chemical, phytochemical, and biochemical analysis to identify its active components and healing qualities. **RESULTS:** The analysis revealed the presence of phytochemicals such as alkaloids, saponin, cardiac glycosides, flavonoids, tannins, phenols as well as various physical, chemical, and biochemical properties. These findings provide valuable insights into the composition and potential therapeutic effects of SVVC in managing PCOS. **CONCLUSION**: This study demonstrates that SVVC could be useful for the PCOS management. Further quantitative analysis test methods like HPTLC and FTIR be explored further to elucidate the therapeutic values of SVVC and understand its benefits better.

KEYWORDS: *Soothagavayuvuku chooranam* (SVVC), *Siddha* system, Standardization.

INTRODUCTION:

The *Siddha* system of medicine has its foundation in 96 components known as "Thathuvam" encompassing physical, physiological, and spiritual aspects within each part of a person. They are linked to five classical elements found in our body, governing the seven physical body parts, three biological humors, and dietary elements, mirroring their presence in the wider universe. The *Siddha* system offers various remedies to enhance a women reproductive system. Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age. PCOS has a significant impact on quality of life of affected women, causing symptoms such as: Irregular menstrual cycles, weight gain and obesity, acne, skin problems, excess hair growth, fertility issues. PCOS prevalence as of mid-2025: WHO (Feb 2025): Estimates PCOS affects between 6–13% of reproductive-aged women, with up to 70% undiagnosed. Meta-analysis (to Feb 2021): Overall global prevalence ~9.2%, varying between 5.5% (NIH criteria) to 11.5% (Rotterdam criteria).Star Pearls (May 2025): Reports a broad range of 5– 26%, depending on diagnostic definitions.The drug , *Soothagavayuvuku chooranam* (SVVC) is a multi - component herbal formulation, mentioned in [1]Dr. C.N. Kuppusamy "*Anubhava vaithiya muraigal*" has a greater potential in treating PCOS so therefore preliminary screening and standardization of this drug according to PLIM guidelines is essential to ensure the purity and efficacy .

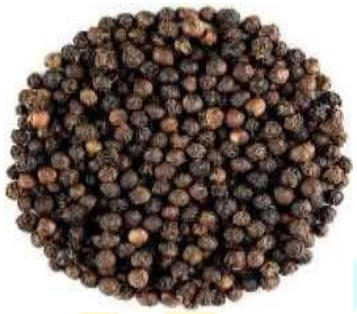
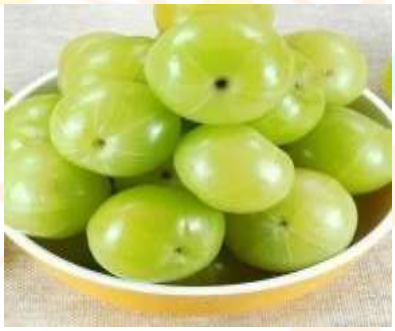
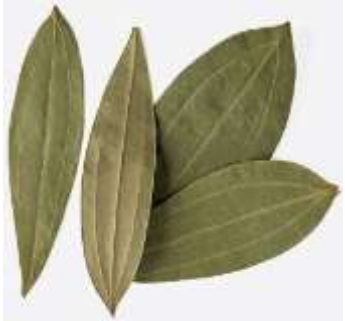
MATERIALS AND METHODS:

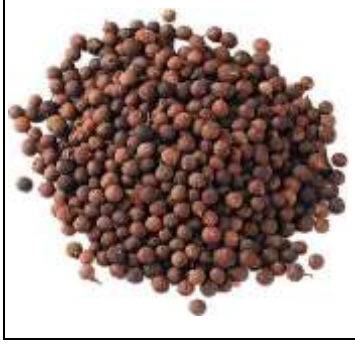
The study was initiated by obtaining the standard siddha drug *Soothagavayuvuku Chooranam* (SVVC) a multi-component *Siddha* herbal formulation used in managing PCOS. Ingredients are:

S.NO	TAMIL NAME	BOTANICAL NAME	QUANTITY	PARTS USED
1.	Chukku	*Zingiber officinale*	3varagan(12.6gm)	Dried Rhizome
2.	Milagu	*Piper nigrum*	1varagan (4.2gm)	Dried Fruit
3.	Thippili	*Piper longum*	4varagan(16.8gm)	Fruit
4.	Thippili Moolam	*Piper longum root*	5 varagan(21gm)	Dried Fruit
5.	Thalisapathiri	*Abies webbiana*	4varagan(16.8gm)	Leaves
6.	Kirambu	*Syzygium aromaticum*	5 varagan(21gm)	Flower bud(clove)
7.	Vaividangam	*Embelia ribes*	1 varagan(4.2gm)	Dried Fruit
8.	Elam	*Eletaria cardamomum*	1 varagan(4.2gm)	Dried Fruit(seed)
9.	Kadukkai	*Terminalia chebula*	1 varagan (4.2gm)	Mature Fruit
10.	Nellikai	*Phyllanthus emblica*	1 varagan(4.2gm)	Dried Fruit
11.	Thandrikai	*Terminalia bellerica*	1 varagan(4.2gm)	Fruit
12.	Muthakasu	*Cyprus rotundus*	1varagan(4.2gm)	Rhizome(tuber)
13.	Lavangapathiri	*Cinnamomum tamala*	1varagan (4.2gm	Leaves
14.	Sivathai ver	*Operculina turpethum*	10varagan(42gm)	Roots

COLLECTION OF RAW DRUGS:

All the above ingredients were bought from an authentic country drug store at Chennai.

CHUKKU 	MILAGU 	THIPPILI 
KADUKKAI 	NELLIKAI 	THANDRIKAI 
ELAM 	THALISAPATHIRI 	KIRAMBU 
LAVANGAPATHIRI 	SIVATHAI VER 	THIPPILI MOOLAM 

VAIVIDANGAM	MUTHAKAASU
	

IDENTIFICATION AND AUTHENTICATION:

All the drugs were collected and authenticated by Botanist and Gunapadam experts of Government *Siddha* Medical College, Arumbakkam, chennai. Each sample has been labelled as voucher specimen ID GSMC/GD/259 -272/2025-2026.The identified product Samples were maintained in the PG Gunapadam laboratory for future references.

Purification of the Drug: Purification process was made according to the procedures mentioned in the classical *Siddha* literature [2](*Sarakkugalin Suthi Sei Muraigal)*.

Method of Preparation of *Soothagavaayuvuku Chooranam* (SVVC):

- All the ingredients with above mentioned quantity is dried and pounded into a powder.
- Then it was sieved through white cloth to get a fine powder form.
- Then the powdered formulation was sieved through a muslin cloth to ensure uniform particle size.
- Then it was dried in the sunlight and kept in an air tight glass container and labelled as *soothagavayuvuku chooranam* (SVVC).

DRUG PROFILE:

Route of administration: Oral

Dosage : 5varagan (21 gram), twice a day

Adjuvant : Warm water

Indication : PCOS, PILES.

Fig shows *Soothagavayuvukku Chooranam* (SVVC) appearance.

STANDARDIZATION[8] of drugs is crucial for ensuring that drugs have consistent quality, purity, and potency. It is more reliable in terms of their efficacy. It also helps to minimize the risk of adverse effects by ensuring that drugs meet specific safety standards.

❖ ORGANOLEPTIC PROPERTIES:

The appearance, state, nature, odor, feel, flow property and taste were noted from the prepared drug [3]SVVC.

State	Solid
Nature	Moderately fine
Odor	Characteristic
Touch / Consistency	Soft
Flow Property	Non - Free flowing
Appearance	Brownish

❖ SOLUBILITY PROFILE:

S. No	Solvent Used	Solubility / Dispensability
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble

4	Ethyl acetate	Insoluble
5	DMSO	Soluble

❖ PHYSICO-CHEMICAL ANALYSIS:

1. PERCENTAGE LOSS ON DRYING

[3&4]Test drug was accurately weighed in evaporating dish. The sample was dried at 105°C for 5 hours and then weighed.

2. 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.

3. 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.

4. 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.

5. DETERMINATION OF WATERSOLUBLE 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 watersoluble extractive with reference to the air-dried drug.

6. PH DETERMINATION

About 5gm of test sample was dissolved in 25ml of distilled water and filtered the resultant solution is allowed to Stand for 30 minutes and then subjected to pH evaluation.

❖ PHYTOCHEMICAL ANALYSIS:

The preliminary [5&6]**phytochemical** screening test was carried out for SVVC as per the standard procedure.

1. Detection of alkaloids

Extracts were dissolved individually in diluted hydrochloric acid and filtered.

Mayer's test: 2 ml of extract was taken and alkaloids were screened using Mayer's reagent where a yellow precipitate confirmed their presence.

2. Detection of carbohydrate

The extract was dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

Benedict's test: The filtrate was treated with Benedict's reagent and heated gently.

Orange-red precipitate indicates the presence of reducing sugars.

3. Detection of cardiac Glycosides

Keller - Killani test: 1mL filtrate (SVVC drug) was taken and treated with1.5mL glacial acetic acid &1 drop of 5% ferric chloride and conc. H2SO4 (along the side of test tube) is added to it. A blue colour (in acetic acid layer) appearance shows the presence of cardiac glycosides.

4. Detection of Saponins

Foam test: 0.5-gram extract was shaken with 2 ml of water. If foam produced persists for 10 minutes, it indicates the presence of saponin.

5. **Detection of phenols**

Ferric Chloride test: 2 ml of extracts was treated with 3-4 drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

6. **Detection of tannins**

Gelatin test: To the extracts, 1% of gelatin solution containing sodium chloride was added. Formation of White precipitate indicates the presence of tannins.

7. **Detection of flavonoids**

Alkaline reagent test: The extract was treated with few drops of 10% sodium hydroxide, the formation of intense Yellow colour then on the addition of diluted hydrochloric acid it becomes colourless, and it indicates the presence of flavonoids.

8. **Detection of proteins and amino acids**

Xanthoproteic test: The extracts were treated with few drops of conc. Nitric acid formation of yellow colour indicates the presence of proteins.

9. **Test for gum and mucilage**

Alcohol test: The extract was dissolved in 10 ml of distilled water and to this 2ml of absolute alcohol with the constant stirring white cloudy precipitate indicates the presence of gum and mucilage.

10. **Detection of fixed oils and fat**

Spot test/ Stain test: Little quantity of plant extract is pressed in between to filter papers. Oil stain on the paper 11. **Detection of Quinones**

The extract was treated with sodium hydroxide blue or red precipitate indicates the presence of Quinones.

❖ BIOCHEMICAL ANALYTICAL INVESTIGATION ON TEST FOR ACID RADICALS:

S. No	Test for Specific Acid Radical	Indication / Observation	Inference
1.	**Test for Carbonates** To 1 ml of the test solution about 1 ml of concentration (conc.) HCL was added.	Carbonated were identified by effervescence upon treatment with HCL.	Presence of brisk effervescence
2.	**Test for chlorides** To 2 ml of test solution, about 1 ml of silver nitrate solution was added.	Appearance of White precipitate indicates the presence of chlorides.	Absence of White precipitate
3.	**Test for sulphate** To 1 ml of the test sample add diluted H2SO4 till effervescence ceases followed by this about 1 ml of barium chloride solution was added.	Appearance of white precipitate indicates the presence of sulphate	Presence e of white precipitate
4.	**Test for sulphide** To 1 ml of the test sample about 2 ml of HCL was added with slight warming the mixture.	Formation of colourless gas with the smell of rotten egg indicates the presence of sulphide.	Absence of rotten egg smell
5.	**Test for phosphates** To 2 ml of test solution treated with 2 ml of ammonium molybdate solution followed by addition of 2ml of concentrated nitric acid	Formation of yellow precipitate Indicates the presence of phosphates	Presence of yellow precipitate

6.	**Test for Fluoride and Oxalate** To 2 ml of the test solution about 2 ml of dilute acetic acid and 2ml of calcium chloride solution was added	Formation of white precipitate Indicates the presence of Fluoride/ Oxalate	Absence of white precipitate
7.	**Test for Borates** 2ml of the test solution was added with sulphuric acid and 95% alcohol followed by exposure to flame.	Appearance of green flame Indicates the presence of Borates	Absence of green flame
8.	**Test for Nitrates** 0.5 ml of test solution heated with copper turning followed by addition of sulphuric acid	Appearance of reddish -brown gas Indicates the presence of Nitrates	Absence of reddish brown colour.

❖ **BIOCHEMICAL ANALYTICAL INVESTIGATION ON TEST FOR BASICRADICALS**

S. No	Test for Specific Basic Radical	Indication / Observation	Inference
1.	**Test for Lead** 1 ml of the test solution added with 2 ml of potassium chromate solution.	Formation of yellow precipitate indicates the presence of lead.	Presence of yellow precipitate
2.	**Test for Arsenic** 1 ml of the test solution added with 2 ml of 10% (2N) sodium hydroxide (NaOH) solution.	Formation of brownish red precipitate indicates the presence of Arsenic	Absence of brownish red precipitate
3.	**Test for Mercury** 1 ml of the test solution added with 2 ml of 10% (2N) sodium hydroxide (NaOH) solution.	Formation of yellow precipitate indicates the presence of mercury.	Absence of yellow precipitate
4.	**Test for Copper** 1 ml of the test solution added with 1 ml of Ammonium hydroxide	Formation of blue precipitate indicates the presence of	Absence of blue precipitate
	(NH4OH) solution	copper.	

5.	**Test for Ferric** To 1 ml of test solution, about 2 ml of potassium Ferro cyanide was added.	Formation of blue precipitate indicates the presence of ferric.	Absence of blue precipitate
6.	**Test for Ferrous** To 1 ml of test solution, about 1 ml of potassium ferric cyanide solution was added.	Formation of blue precipitate indicates the presence of ferrous.	Absence of blue precipitate
7.	**Test for Zinc** 1 ml of the test solution added with 2 ml of sodium hydroxide (NaOH) drop wise until indication appears.	Formation of white precipitate indicates the presence of Zinc.	Absence of white precipitate
8.	**Test for Silver** 1 ml of the test solution was added with 1 ml of conc. HCL followed by appearance of curdy white precipitate. Boil the precipitate with water. It does not dissolve. Add NH4OH solution in it and add 1 ml dilute HNO3.	Formation of curdy white precipitate indicates the presence of silver.	Absence of curdy white precipitate
9.	**Test for Magnesium** 1 ml of the test solution added with 2 ml of sodium hydroxide (NaOH) drop wise until indication appears.	Formation of white precipitate indicates the presence of Magnesium.	Absence of white precipitate

❖ RESULTS:

PHYSICO- CHEMICAL ANALYSIS:

S. No	Parameter	Mean (n=3) SD
1.	LOSS ON DRYING AT 105 °C (%)	7.767 ± 2.055
2.	TOTAL ASH (%)	0.7367 ± 0.1401
3.	ACID INSOLUBLE ASH (%)	0.1233 ± 0.03215
4.	WATER SOLUBLE EXTRACTIVE (%)	12.87 ± 0.9019
5.	ALCOHOL SOLUBLE EXTRACTIVE (%)	11.23 ± 0.6658
6.	PH	6.51

❖ PHYTOCHEMICALS:

S.NO	PHYTOCHEMICALS	TEST REPORT
1.	DETECTION OF ALKALOIDS	PRESENT
2.	DETECTION OF CARBOHYDRATE	PRESENT
3.	DETECTION OF CARDIAC GLYCOSIDES	PRESENT
4.	DETECTION OF SAPONINS	PRESENT
5.	DETECTION OF PHENOLS	PRESENT
6.	DETECTION OF FLAVONOIDS	PRESENT
7.	DETECTION OF TANNINS	PRESENT
8.	TEST FOR GUM AND MUCILAGE	PRESENT
9.	DETECTION OF FIXED OILS AND FAT	PRESENT
10.	DETECTION OF QUINONES	PRESENT
11.	DETECTION OF PROTEINS AND AMINO ACIDS	PRESENT

❖ **TEST FOR ACID RADICALS:**

SPECIFIC RADICAL	TEST REPORT
1.TEST FOR CARBONATES	Positive
2.TEST FOR CHLORIDES	Negative
3.TEST FOR SULFATES	Positive
4.TEST FOR SULPHIDES	Negative
5.TEST FOR PHOSPHATES	Positive
6.TEST FOR FLUORIDE AND OXALATE	Negative
7.TEST FOR BORATES	Negative
8.TEST FOR NITRATES	Negative

❖ **TEST FOR BASIC RADICALS:**

SPECIFIC RADICAL	TEST REPORT
1.TEST FOR LEAD	Positive
2. FOR ARSENIC	Negative
3.TEST FOR MERCURY	Negative
4.TEST FOR COPPER	Negative
5.TEST FOR FERRIC	Negative
6.TEST FOR FERROUS	Negative
7.TEST FOR ZINC	Negative
8.TEST FOR SILVER	Negative
9.TEST FOR MAGNESIUM	Negative

❖ **DISCUSSION:**

In Siddha herbal formulations like *Soothagavayuvuku Chooranam* (SVVC), initial standardization is essential to ensure quality, consistency, efficacy and therapeutic properties prior to employing advanced analytical methods. The organoleptic evaluation helps us to match with traditional description in siddha Materia Medica. SVVC shows brownish powder with soft texture and moderately fine consistency. Then the physico - chemical parameters further support the quality of formulation. The moisture content of SVVC measured as loss on drying is 7.767 ± 2.055% is within the acceptable range, indicating microbial contamination or degradation of the herbal medicine. For herbal drug the moisture content

should to be less than 14%. Total Ash value is 0.7367 ± 0.1401%reflecting the minimal inorganic impurities. Acid insoluble ash value is 0.1233 ± 0.03215% suggested negligible contamination from siliceous matter such as soil or sand. The PH value 6.51indicates that the drug is slightly acidic determining stability and compatibility with gastrointestinal absorption. The Solubility property impacts bioavailability and pharmacological efficacy of a drug. SVVC solubility profile indicates that, SVVC dissolves well in water, ethanol and DMSO but remains insoluble in chloroform and ethyl acetate. The phytochemical screening confirmed the presence of a wide range of bioactive compounds, including alkaloids, carbohydrates, cardiac glycosides, saponins, phenols, flavonoids, tannins, gums and mucilage, fixed oils and fats, Quinones, as well as proteins and amino acids. The detection of these metabolites indicates significant therapeutic potential. Alkaloids and flavonoids are well known for their antioxidant, antimicrobial, and anti-inflammatory activities. Cardiac glycosides may support cardiovascular health, while saponins and tannins contribute to antimicrobial and astringent effects. The presence of phenols and Quinones suggests strong antioxidant properties, and proteins with amino acids highlight nutritional value. Additionally, gums, mucilage, and fixed oils can aid in formulation stability and drug delivery. Overall, the diverse phytochemical profile suggests a broad spectrum of pharmacological actions that may substantiate the traditional medicinal use of the formulation. The analysis of acid radicals revealed positive results for carbonates, sulphates, and phosphates, while tests for chlorides, sulphides, fluorides, oxalates, borates, and nitrates were negative. The presence of carbonates indicates a potential role in maintaining acid–base balance within the body. Sulphates contribute to various physiological processes, including detoxification and metabolic functions. Phosphates are essential for numerous biological activities, such as energy metabolism, bone mineralization, and regulation of biochemical pathways. The absence of harmful radicals such as nitrates and fluorides further supports the safety profile of the formulation. The basic radical analysis indicated a positive result for lead, while all other tested radicals, including arsenic, mercury, copper, ferric, ferrous, zinc, silver, and magnesium, were absent. The presence of lead is noteworthy, as it is generally considered toxic and may pose potential health risks if present above permissible limits. The absence of other heavy metals and essential mineral radicals suggests that the formulation does not carry a broad spectrum of toxic metal contaminants. However, the detection of lead warrants further quantitative analysis to determine its concentration and ensure safety for therapeutic use.

❖ CONCLUSION:

The present study on *Soothagavayuvuku Chooranam* (SVVC) provide a comprehensive evaluation through physicochemical, phytochemical, and biochemical analysis. The present study provides a comprehensive preliminary evaluation of *Soothagavayuvuku Chooranam* (SVVC) through physicochemical, phytochemical, and biochemical analyses. The results confirm that SVVC possesses acceptable quality parameters, including controlled moisture content, low inorganic impurities, and good solubility, which support its stability for remedial use. The presence of diverse phyto constituents such as alkaloids, flavonoids, tannins, phenols, and saponins highlights its potential pharmacological relevance, particularly in addressing the multifactorial challenges of Polycystic Ovary Syndrome (PCOS). In addition, the detection of beneficial acid radicals like carbonates, sulphates, and phosphates underscores its potential contribution to metabolic and physiological functions. However, the identification of lead, even in trace amounts, reinforces the necessity for stringent purification and quality control during preparation. Overall, the findings provide scientific support for the traditional use of SVVC in PCOS management. Further investigations employing advanced analytical methods and well-designed pharmacological and clinical studies are warranted to validate its therapeutic efficacy, establish dosage guidelines.

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