



Physicochemical And Biochemical Evaluation Of Siddha Polyherbal Formulation-Soothagavaayukku Kiyazham

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Abstract

Soothagavaayukku kiyazham is one of the polyherbal formulation mentioned in *siddha* system of medicine. The main objective of the study was quality evaluation of formulation Soothagavaayukku kiyazham by conducting Physicochemical and Biochemical evaluation through advanced analytical techniques. The purity and quality of the formulation is provided by the organoleptic nature of the drug. The results obtained from physicochemical evaluation shows that the total ash value of Soothagavaayukku kiyazham was $4.267 \pm 0.42\%$, in which the acid insoluble ash was $0.091 \pm 0.091\%$, loss on drying at 105°C of the formulation Soothagavaayukku kiyazham was noted to be 2.333 ± 0.47 in which water soluble extract value and alcohol soluble extract value was 33.37 ± 1.95 and $14.867 \pm 0.61\%$ respectively. Biochemical analysis of *Soothagavaayukku kiyazham* exhibit the appearance of carbonates and nitrates. In conclusion, the polyherbal formulation of *Soothagavaayukku kiyazham* possess significant phytocomponents and have beneficial effects towards treating various disorders.

Key words: Standardization, Physicochemical, Soothagavaayukku kiyazham, Biochemical analysis, Soothagavaayu(pcos).

1.Introduction

Siddha system of medicine is the system that clearly explains the complete integrated relation of body, sense, mind, and soul with the universe to attain immortality⁽¹⁾. There are 32 internal medicines available in *Siddha* system of medicine. In that decoction is one of the most effective dosage forms in *Siddha* literature. The effectiveness of the decoction is about 3 hours, so it has to be used within 3 hours to get the full effect of its medicinal action⁽²⁾. Decoctions are made by pouring water to dry herbal or fresh ones and then dehydrated so that the water content is greatly reduced to 1/8th or 1/4th or 1/2th of its initial volume. The extracts of herbal drugs which are easily absorbed into the body and enter into the blood stream quickly which gives faster action than other forms of medications. In order to prepare decoctions without difficulty in sourcing raw material premixed coarse powder of the kudineer formulations are available as kudineer chooranam⁽³⁾. *Soothagavaayukku kiyazham*, a polyherbal Siddha medication, has shown great potential in treating Pcos (*soothagavaayu*) and its related symptoms, lower backache and chest pain. But scientific evidences for Pcos (*Soothagavaayu*) have not been reported. So standardization technique need to be developed by using preliminary guidelines. Therefore, physicochemical screening – organoleptic nature, loss on drying, Total ash, Acid insoluble Ash, Alcohol soluble extractive, water soluble extractive, was detected through investigation. Biochemical analysis of *siddha* formulation SVK according to PLIM guidelines.

2. Materials and methods

Selection of the drug :

The trial drug *Soothagavaayukku kiyazham* was taken from *Urvasi rasavatha chitka vaithiya chitka pancharathinam* for the treatment and management of *Soothagavaayu(pcos)* and its related symptoms⁽⁴⁾. publisher: R.C.Mohan, publication; Thamarai noolagam, page no;180 *Soothagavaayukku kiyazham* comprises of the following ingredients.

Table 1: Ingredients of *Soothagavaayukku kiyazham*

	Tamil name	Botanical name
1	Kollukavelai ver	<i>Tephrosia purpurea</i>
2	Sukku	<i>Zingiber officinale</i>
3	Athimadhuram	<i>Glycyrrhiza glabra</i>

Collection of the Raw Materials:

The raw drugs sukku [*Zingiber officinale*], Athimadhuram [*Glycyrrhiza glabra*], were bought from Authenticated country drug store in Chennai, Tamilnadu. Kollukavelai ver [*Tephrosia purpurea*], was collected from Tirunelveli district, Tamilnadu.

Identification and Authentication of The Drug:

All drugs were recognized and authenticated by Botanist in Government Siddha Medical College, Arumbakkam, Chennai. The identified product samples were maintained in the PG Gunapadam laboratory for future references.

Purification of the Drug:

Purification process were made according to the procedures mentioned in the classical *Siddha* literature

Preparation of *Soothagavaayukku kiyazham*:

The above given ingredients were taken pounded in iron mortar a coarse powder. The coarse powder was then stored in clean air-tight container and The prepared kudineer chooranam added with 650ml of water and heated with low flame till the water condensed to 168ml named as SVK

Fig:1



Fig:2



All the above investigations were performed at Noble Research Solution, Perambur at Chennai

Physicochemical analysis^(5,6)

Percentage Loss on Drying

The test drug was accurately weighed in the evaporating dish. The sample was dried at 105°C for 5 hours and then weighed.

Determination of Total Ash

The test drug was accurately weighed into a silica dish and burned in a furnace at 400 °C until it turned white, indicating the absence of carbon. The Percentage of total ash is calculated based on the weight of the air-dried drug.

Determination of Acid Insoluble Ash

The ash obtained in the total ash test is boiled with 25 ml of dilute hydrochloric acid for 6 minutes. The insoluble material is then collected in a crucible and washed with hot water and ignited to a constant mass. The Percentage of acid insoluble ash is calculated from the weight of air-dried ash.

Determination of Alcohol Soluble Extractive

The test sample is soaked in 100 ml of alcohol in a closed bottle for 24 hours, shaken frequently for six hours and left to stand for 18 hours. Filter rapidly, taking care to avoid loss of solvent, evaporate 25 ml of the filtrate to dryness in a tar-based flat bottomed shallow dish, and dry at 105°C, to constant weight. Calculate the percentage of alcohol-soluble extract of the air-dried drug.

Determination of Water Soluble Extractive

Soak the test specimen in 100 ml of chloroform water in a closed flask for 24 hours, shaking frequently for 6 hours and allowing it to stand for 18 hours. Filter rapidly, taking care to avoid loss of solvent, evaporate 25 ml of the filtrate to dryness in a tar-based shallow dish, and dry at 105°C, to constant weight. Calculate the percentage of water-soluble extract with reference to the air-dried drug.

PH determination

The required amount of the test sample was mixed with distilled water and examined with a PH meter.

Biochemical analysis of acidic and basic radicals⁽⁷⁾

1. Test for Carbonates:

To 1 ml of the test solution was taken and about 1 ml of concentration (conc.) HCL was added, Formation of brisk effervescence indicates the presence of carbonate.

2. Test for chlorides:

To 2 ml of test solution was taken; about 1 ml of silver nitrate solution was added. Appearance of White precipitate indicates the presence of chlorides.

3. Test for sulfates:

To 1 ml of the test sample was taken and 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 sulfates.

4. Test for sulfides:

To 1 ml of the test sample was taken and 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 sulfides.

5. Test for phosphates:

To 2 ml of test solution was taken and 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

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.

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 denotes the presence of Borates

8. Test for Nitrates:

0.5ml of test solution heated with copper turning followed by addition of sulphuric acid, Appearance of reddish brown gas Indicates the presence of Nitrates

ANALYTICAL INVESTIGATION ON TEST FOR BASIC RADICALS**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.

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

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.

4. Test for Copper:

1 ml of the test solution added with 1 ml of Ammonium hydroxide (NH₄OH) solution, formation of blue precipitate indicates the presence of copper.

5. Test for Ferric:

To 1 ml of test solution, about 2 ml of potassium ferrocyanide was added, formation of blue precipitate indicates the presence of ferric.

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.

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.

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.

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.

3. Result**Physicochemical evaluation of svk****Organoleptic characters:**

The drug svk was coarsely powdered and the results were mentioned in Table:2

Table :2 Organoleptic characters

State	Solid	Liquid
Nature	Coarse Fibrous	Non Viscous
Odour	Characteristic	Aromatic
Touch	Hard Texture	Non greasy
Flow Property	Non free flowing	Free flowing
Appearance	Pale Brownish	Dark Brownish

Solubility profile:

The drug SVK for solubility profile was given in Table 3

Table 3: Solubility profile of SVK

S.No	Solvent Used	Solubility / Dispersibility
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble
4	Ethyl acetate	Insoluble
5	DMSO	Soluble

The results for physicochemical analysis were tabulated in Table 4

Table 4: Results of physicochemical evaluation of SVK

S.No	Parameter	Mean (n=3) SD
1.	<i>Loss on Drying at 105 °C (%)</i>	2.333 ± 0.47
2.	<i>Total Ash (%)</i>	4.267 ± 0.42
3.	<i>Acid insoluble Ash (%)</i>	0.091 ± 0.091
4.	<i>Water soluble Extractive (%)</i>	33.37 ± 1.95
5.	<i>Alcohol Soluble Extractive (%)</i>	14.867 ± 0.61
6.	<i>pH</i>	7.2

Results of biochemical analysis of svk

Test for acid radicals and Basic Radicals was done and the results for Biochemical analysis of the sample were tabulated in table 5&6

Table 5: Test for acid radicals

Specific Radical	Test Report
Test for carbonates	Positive
Test for sulfates	Positive
Test for Phosphates	Positive

Table 6: Test for Basic Radicals Table

Specific Radical	Test Report
Test for Lead	Negative
Test for Mercury	Negative
Test for copper	Negative
Test for Ferric	Negative
Test for Ferrous	Negative
Test for Zinc	Negative
Test for silver	Negative
Test for Magnesium	Negative
Test for Arsenic	Negative

4. Discussion

The drug SVK was coarsely powdered with hard texture and pale brownish colour. Fresh preparation of its extract shows non greasy, Dark brownish with aromatic odour. Oral bio-availability depends on several factors including Aqueous solubility, drug permeability etc., The drug SVK soluble in specific solvent like Ethanol, Water and Dimethyl sulfoxide thereby it proves its efficiency of solubility increasing in bio-availability in the stomach indirectly. The loss on drying was found to be $2.333\pm 0.47\%$ which indicates the moisture content of the drug. Total ash value was found to be $4.267\pm 0.42\%$ which notes the presence of inorganic components. Acid insoluble ash was 0.091 ± 0.091 which indicates that the drug contains minimum amount of siliceous matter. The water and alcohol soluble extractive values were found to be $33.37\pm 1.95\%$ and $14.867\pm 0.61\%$. The biochemical analysis for Basic radicals of SVK reveals the presence of Carbonates, Phosphates and sulfates. Carbonates is needed for the generation of muscle nerve conduction, muscle contraction and release of hormones⁽⁸⁾. presence of carbonates in the test sample, it may be given for the treatment hormonal and metabolic disorders and also used for the management of low carbonates levels such as Hypoparathyroidism, Osteoporosis, Osteomalacia/Rickets and certain muscle disease⁽⁹⁾. Due to the presence of phosphates, it performs physiological functions in various systematic activities and possess beneficial activity towards healthy lifestyle.

5. Conclusion

Results obtained from the above discussion; Finally concluded that the Siddha polyherbal formulation SVK possess potent biologically active components which may helps in treating various disorders. Investigation of those specifications with the help of modern analytical tools helps in standardization of SVK. Hence this present investigation had generated an evidence-based data with respect to purity, standards, physicochemical, and biochemical nature of the formulation SVK.

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