

FTIR Analysis of Siddha Medicine “Kara Sooda Sathu Parpam”

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Abstract: *Background:* The Kara soda sathu parpam is a herbo-mineral drug used for the treatment of Kalladaippu (Renal calculi), Neerkattu (Anuria), Thasaiadaippu (Stricture urethra), Neeradaippu. *Objective:* The objective of the present study is to characterize and functional groups in herbo-mineral drug “Kara Sooda Sathu Parpam”. *Materials and methods:* The ingredients were collected and purified and the drug was prepared as per Siddha literature “Chikicha Rathna Deepam Vaiththiya Sinthamani part-2” by Kannusamy Pillai, page no: 218. Here, the drug was subjected into characterization through FT-IR analysis. *Result:* FT-IR characterization shows that the presence of functional groups like O-H stretch (Alcohol), OH stretch (Carboxylic acid), C=O stretch (Aromatic groups), C=C stretch (Alkene), C-O stretch (Ester), C-F stretch (Alkyl & aryl halides), C=C bending (Alkene), C=C bending (Alkene), C=C bending (Alkene) & C-Br stretch (Halo compound) which ensure the efficacy and therapeutic effect of the drug. *Conclusion:* This study forms the base for the pharmaceutical analysis of Kara Sooda Sathu Parpam which will be followed by safe and efficacy studies later.

Keywords: Kara sooda sathu parpam, FT-IR

1. Introduction

Siddha, a traditional healing science of India is an age old holistic medicine which emphasizes the maintenance of relaxed mind and body harmony and insists to keep pace with the laws of nature. In Siddha system besides herbs, metals, minerals as well as marine and animal products are used as medicine. Siddhars classify Kalladaippu noi under neerinai arukkal noigal. They define that the dietary factors play an important role in the formation of Calculi. Derangement in the pitha humour results in highly concentrated urine and accumulation of salts in the urinary tract. Urinary calculi consists of aggregates of crystals containing small amounts of protein and glycoprotein. Kara sooda sathu parpam has been mentioned in Siddha texts for the management of Kalladaippu, Neerkattu, Thasaiadaippu, Neeradaippu.

The standardization of the drugs will assess the quality control of the drugs. Standardization is a system that ensures a predefined amount of quality, quantity and therapeutic effect of ingredients in each dose. Therapeutic activity of a herbo-mineral formulation depends on its phytochemical constituents. Standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile or simply a quality assurance program for the manufacturing of an herbal drug.

For the development of a new drug or the standardization of the traditional Siddha formulations through characterization, usage of modern sophisticated equipments is an emergency need to strengthen the field of Pharmacology. FT-IR is one of the important analytical techniques which is used to determine the organic compounds, including chemical bond, as well as organic content (eg: Carbohydrate, protein and lipid).

Kara soda sathu parpam is a herbo-mineral drug used for “Kalladaippu” in Siddha Medicine. In Siddha system, “Kalladaippu” can be correlated with “Renal calculi”. In this article the drug KSSP is subjected to access the functional groups present in the drug, with the help of FT-IR instrument.

2. Materials and Methods

Collection of Raw drugs: Raw drugs were purchased from raw country drug shop at Nagarcoil, Kanniyakumari District.

Authentication of raw material:

Raw drugs were authenticated by faculties of Department of Gunapadam, Govt. Siddha Medical College, Palayamkottai.

Process of Preparation:

The ingredients given in the table 1 were purified as per the procedures given in the Gunapadam – Thathu jeevam vaguppu book.

Table 1: Ingredients of the drug

S. No	Ingredients	Quantity
1	Vengaram/ Borax (Sodium baborate)	1 pangu
2.	KarpooraSilasathu /Gypsum (Calcium sulfate dehydrate)	1 pangu
3.	Vediuppu/ Salt petre (Pottassium Nitrate)	1 pangu
4.	Padigaaram/ Alum (Potassium aluminium sulfate)	1 pangu
5.	Chitrandathol (Egg shell of Gallus Domesticus).	1 pangu
6.	Palagarai /Cowrie (Cyprea Moneta Linn. .)	1 pangu
7.	Lemon juice (Citrus aurantifolia)	Required quantity

Preparation

Grind the above 6 purified raw materials with lime juice. Then make pelletes of grind material and dry it well. Prepare

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the crucible and its lid with limestone. Then disintegrate the dried pellet collect into the crucible and sealed with mud cloth and dry it well. After that it incinerated with 8 cow dung cakes. Then collect the inside material of crucible and grind into fine powder with stone mortar and pestle. And then, store it in an air tight glass container.

Shelf life:

100 years.

Dosage:

1-1 ½ *Panavedai* (488-732 mg)-Twice a day.

Adjuvant:

Tender coconut, lemon juice, honey.

Indication:

Kalladaippu (Renal calculi), *Neerkattu* (Anuria), *Thasaiadaippu* (Stricture urethra), *Neeradaippu*.

Instrumental Analysis**Fourier transform – infrared (FT-IR)**

FT-IR spectra were recorded at International Research Centre, Kalasalingam Academy of Research and Education, Krishnankoil, Viruthunagar district. The FT-IR spectra of Kara soda sathu parpam in Potassium Bromide (KBr) matrix

recorded with scan rate of 20 scan per minute at the resolution 0.25cm⁻¹ in the wave number region 400-4000cm⁻¹. The samples were ground into fine powder using agate mortar and pestle and then with KBr. They were then pelletized by applying pressure to prepare the specimen (the size of specimen about 13mm diameter and 0.3mm in thickness) to record the FT-IR spectra under standard conditions. FT-IR spectra were used to determine the presence of the functional groups and bands in the Kara soda sathuparpm. The recorded spectrum shows in figure 1.

3. Results and Discussion

FT-IR instrumental analysis was done. The FT-IR spectrum has 12 absorption bands (more than 5). So the sample KSSP can be a complex molecule. In FT-IR spectra analysis, this sample KSSP exhibits the peak value at 3415.93, 2517.10, 1797.66, 1639.49, 1193.94, 1111.00, 991.41, 871.82, 829.39, 719.45, 613.36 having O-H stretch, O-H stretch, C=O stretch, C=C stretch, C-O stretch, C-F stretch, C=C bend, C=C bend, C-Cl stretch, C=C bend, C=C bend, C-Br stretch respectively. This peak indicates the presence of some organic functional groups such as alcohol, carboxylic acid, aromatic compounds, alkene, ester, alkyl and aryl halides, alkene, alkene & halocompound, alkene and halo compound.

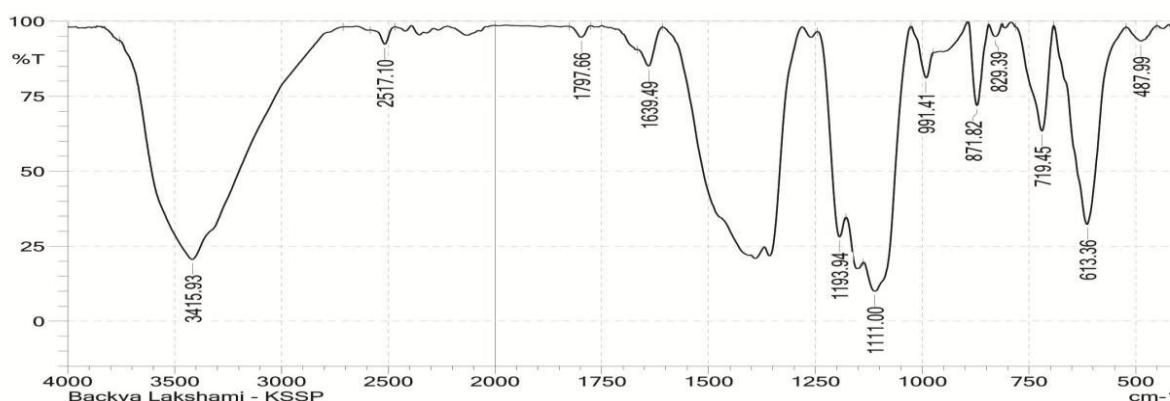


Figure 1: FTIR Spectra of KSSP

Table 2: FTIR Interpretation of KSSP

S. No	Wave Number (cm ⁻¹)	Vibrational Modes of PVC in IR region	Functional groups
1	3415.93	O-H stretching	Alcohol
2	2517.10	O-H stretching	Carboxylic acid
3	1797.66	C=O stretching	Aromatic compounds
4	1639.49	C=C stretching	Alkene
5	1193.94	C-O stretching	Ester
6	1111.00	C-F stretching	Alkyl and aryl halides
7	991.41	C=C bending	Alkene
8	871.82	C=C bending	Alkene
9	829.39	C=C bending & C-Cl stretching.	Alkene & halo compound
10	719.45	C=C bending	Alkene
11	613.36	C-Br stretching	Halo compound.

These compounds have some pharmaceutical properties and briefly discussed below.

Alcohol:

Alcohol is one of the potent diuretic agents. It inhibits the release of hormone vasopressin (ADH) which decreases water excretion by the kidneys by increasing water reabsorption in the collecting ducts.

Carboxylic acids:

Aminoacids and fatty acids are important example of carboxylic acids which are the building blocks of protein and lipids. Carboxylic acid used as antimicrobials.

Aromatic compounds:

Aromatic compounds have anti-bacterial, anti-diabetic and anti-oxidant activity.

Alkenes:

Alkenes are used as a general anaesthetic. They are also used to prepare some organic compounds such as ethyl alcohol, acetic acid and acetaldehyde.

Ester:

Ester has anti-microbial & anti-spasmodic property.

Alkyl halides:

Alkyl halides have little biological activity. They protect against bacteria and fungi.

Aryl halides:

Several aromatic chloro compounds are used as insecticides, fungicides and bactericides.

Halocompound:

Halocompounds of both chlorine and bromine. They have anti-cancer, anti-bacterial activity & disinfectants.

4. Conclusion

The instrumental analysis FT-IR shows the presence of functional groups through their stretch and bends which are responsible for its functional activity. It will be subjected to further many studies to validate its efficacy and safety through proper standardization procedure. Thus, this drug can be taken to the next level of isolation of the active principles which is responsible for the therapeutic effect.

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