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Research Article

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Physico-chemical characterization of siddha formulation *Sangu Parpam*

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Abstract

Sangu parpam is a one of the traditional Siddha drug indicated to treat various acute and chronic diseases. *Sangu parpam* was prepared along with the major ingredient of *Keezhanelli* (*Phyllanthus amarus*) juice. Physico chemical paramaters were studied using sophisticated analytical modern equipments.The finished form of prepared *Sangu Parpam*statisfies the nature of *Parpam* as per AYUSH protocol ie. It showed the property of Smokeless, Tasteless, Lustreless, Floats on water etc., The pH was observed as alkaline-8.7 in nature. FTIR characterization clearly indicates the presence of functional groups in this trial drug *Sangu Parpam*. These characterization findings will help to identify the molecular structure elucidation and therapeutic nature of the Siddha drug *Sangu Parpam*. Further research study if continues based on these findings it will be benefit to our medical field to cure the diseases effectively as indicated in Sastric Siddha text.

Keywords: *Parpam*, Siddha, *Sangu*, *Keezhanelli*, FTIR, Characterization

1. Introduction

Sangu parpam (SP) is a wonderful drug indicated for Heart Diseasesin Siddha book named *Gunapadam Thathu Jeeva Vaguppu*[1]. Cardiovascular diseases are the highly prevalenced serious health issue globally with huge mortality rate.An estimated 17.9 million people died from CVDs in 2016, representing 31% of all global deaths[2]. Of these deaths, 85% are due to heart attack and stroke[2]. Herbomineral Siddha formulations are always having significant effect in treating acute and chronic diseases. *Parpam* like formulations in Siddha system of medicine are mostly possess its property as nano medicine. Because due to itsspecialized medicine preparatory process the particles present in *Parpam* kind of medicines are considered as Nano medicines.Chemical characterization of this drug need to be studied to create the fingerprints Inorder to Standardize this formulation. Structure elucidation is also essential to identify the therapeutic value of the drug. Characterization of the drug was identified using sophisticated analytical modern equipments. The identification of presence of functional groups was achieved using the analytical instrument FTIR (Fourier Transform Infrared Spectroscopy).

2. Materials and Methods

2. A. Preparation of the Siddha formulation *Sangu parpam*

Purified *Sangu* (*Turbinella pyrum*) - 100 g
Juice of *Keezhanelli* (*Phyllanthus amarus*) - Qs

The *Sangu* (*Turbinella pyrum*) was identified and authenticated by Zoologist. The plant *Keezhanelli* (*Phyllanthus amarus*) was identified and authenticated by the botanist, National Institute of Siddha. The above mentioned quantity of ***Sangu*** (*Turbinella Pyrum*) was purified and immersed in the juice of *Keezhanelli*. (*Phyllanthus amarus*) for three days. Then it was grounded with the same juice. And those was kept into earthern saucer and it closed by suitable earthern saucer, junction of earthern saucer was sealed by clay smeared cloth. Then it was subjected into *Putam* process using 50 cow dung cakes. Finally the obtained material was grounded into fine powder by using stone mortar and pestle**.**

Dosage: 244 mg with Lemon juice

Indications: (*Maaradaippu*) Heart attack, (*Maarbu Erichal)* Burning sensation in chest, (*Naenju Vazhi)* Chest pain, (*Neersurukku)* Dysuria, (*Vellai*) Leucorrhea.

2. B. Physiochemical analysis of *Sangu parpam*

1. Loss on Drying

An accurately weighed 2g of *Sangu parpam* formulation was taken in a tarred glass bottle. The crude drug was heated at 105^0C for 6 hours in an oven till a constant weight. Percentage moisture content of the sample was calculated with reference to the shade dried material.

2. Determination of total ash

Weighed accurately 2g of *Sangu parpam* formulation was added in crucible at a temperature 600^0C in a muffle furnace till carbon free ash was obtained. It was calculated with reference to the air dried drug.

3. Determination of acid insoluble ash

Ash above obtained, was boiled for 5min with 25ml of 1M Hydrochloric acid and filtered using an ash less filter paper. Insoluble matter retained on filter paper was washed with hot water and filter paper was burnt to a constant weight in a muffler furnace. The percentage of acid insoluble as was calculated with reference to the air dried drug.

4. Determination of water soluble ash

Total ash 1g was boiled for 5min with 25ml water and insoluble matter collected on an ash less filter paper was washed with hot water and ignited for 15min at a temperature not exceeding 450^0C in a muffle furnace. The amount of soluble ash is determined by drying the filtrate.

5. Details regarding the FT-IR analysis

The Perkine Elmer Spectrum One Fourier Transform Infrared (FTIR) Spectrometer was used to derive the FTIR Spectra of *Sangu Parpam* in Potassium Bromide (KBr) matrix with scan rate of 5 scan per minute at the resolution 4cm-1 in the wave number region 450-4000cm-1. The samples were grounded to fine powder using agate motor and pestle and the mixed with KBr. They were then Pelletized by applying pressure to prepare the specimen (the size of specimen about 13 mm diameter and 0.3 mm in thickness) to recorded the FT- IR Spectra under Standard conditions. FT- IR Spectra were used to determine the presence of the functional groups and bands in the *Sangu Parpam*. The recorded spectrum shows in figure 1.

3. Results and Discussion

The Figure 1 shows the finished product of the drug *Sangu parpam* which was prepared as per the Siddha literature.

Figure 1: *Sangu parpam*

It possesses the Siddha specifications of *Parpam* such as Lustreless, fine enough to enter the crevices of finger.

Figure 2 *Sangu parpam* fine enough to enter the crevices of finger

Figure 3: *Sangu parpam* floats on water

Table 1: Results of Physiochemical Analysis of *Sangu Parpam*

Sl.no	Tests	Results
1	Description	solid
2	Colour	Off white powder
3	Loss on drying at 105 degree Celsius	0.32 % (W/W)
4	Total ash	60.73% (W/W)
5	Acid Insoluble ash	1.99% (W/W)
6	Water soluble ash	58.74% W/W)
7	pH(105% aqueous suspension)	8.70

The drug *Sangu parpam* possess off white in colour. The pH of the drug is 8.70 which indicate the drug is alkaline in nature.

Figure 4: IR analysis of *Sangu parpam* (Aqueous extract)

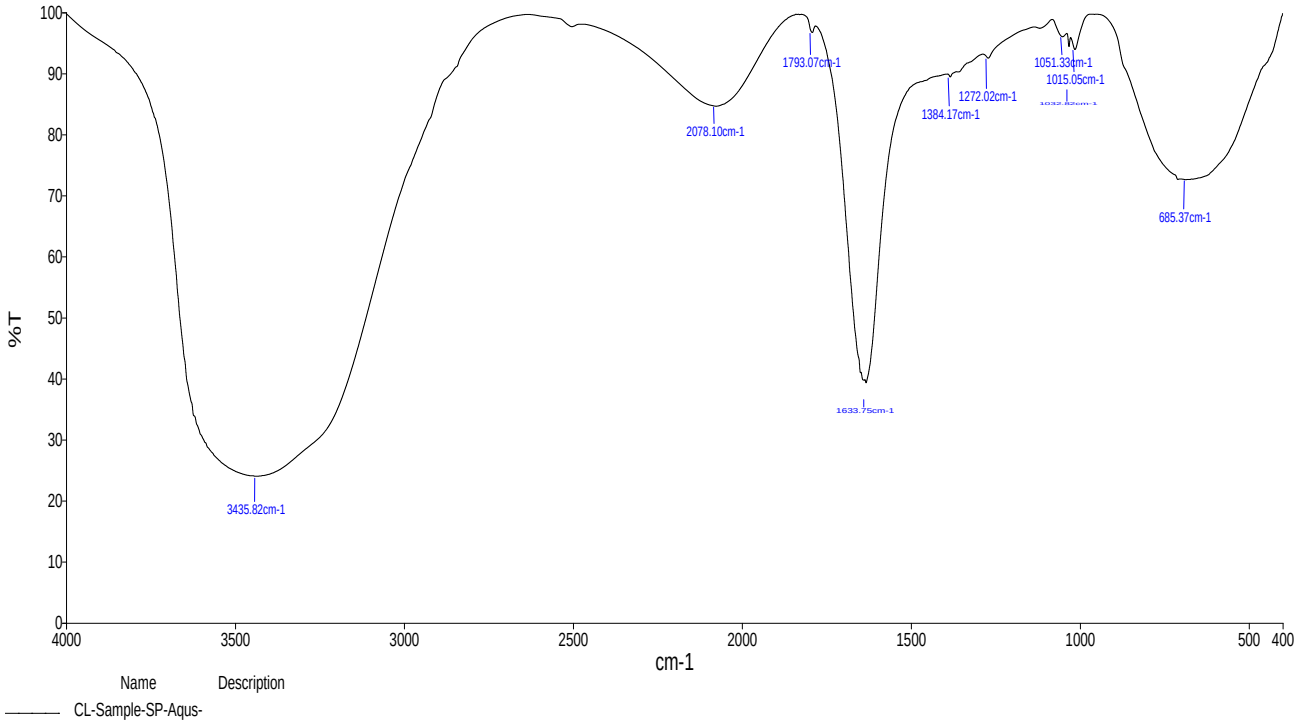

Table 2: FTIR interpretation of *Sangu parpam* (Aqueous extract)

Sl.No	Wave number (cm^{-1})	Vibrational modes of *Sangu Parpam* in IR region	Functional group
1	3435.82	N-H stretch	Secondary amine
2	2078.10	CΞC Stretching	Alkyne
3	1793.07	C=O Stretching	Esters
4	1633.75	C=C Stretching	Cyclic alkene
5	1384.17	O-H Bending	Alcohols
6	1272.02	C-O Stretching	Alkyl aryl ether
7	1051.33	C-N Stretching	Amine
8	1015.05	C-F Stretching	Fluoro compound
9	1032.82	C-N Stretching	Amine
10	685.37	C=C bending	Alkane

Figure 5: IR analysis of *Sangu parpam* (Methanol extract)

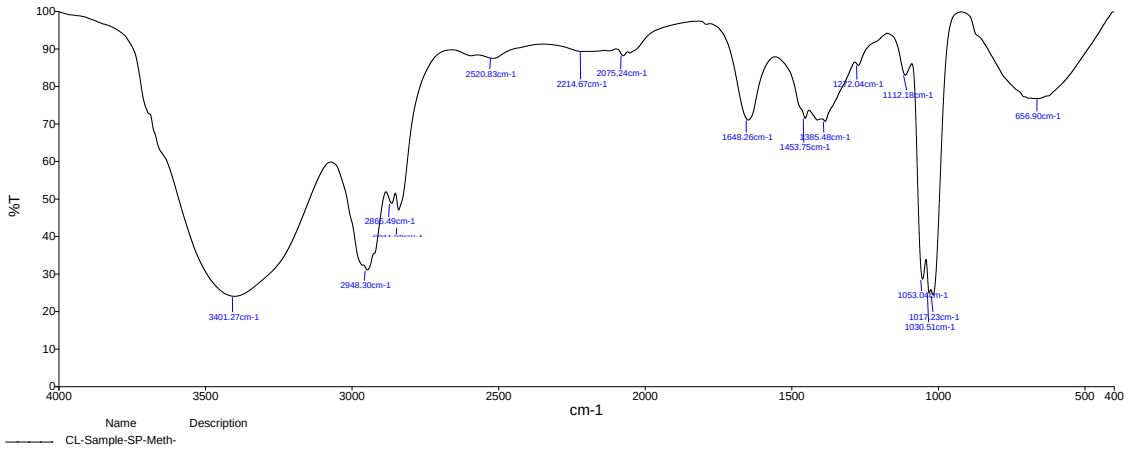

Table 3: FTIR interpretation of *Sangu parpam* (Methanol extract)

Sl.No	Wave number (cm^{-1})	Vibrational modes of *SanguParpam* in IR region	Functional group
1	3401.27	C-H Stretching	Alkane
2	2948.30	N-H Stretching	Amine salt
3	2865.49	C-H Stretching	Alkane
4	2841.56	N-H Stretching	Amine salt
5	2520.83	O-H stretching	Carboxylic acid
6	2214.67	C≡CStretching	Alkyne
7	2075.24	C-H bending	Aromatic compound
8	1648.26	C=C stretching	Alkene
9	1453.75	C-H Bending	Alkane
10	1385.48	C-H Bending	Alkane
11	1272.04	C-O Stretching	Alkyl aryl ether
12	1112.18	C-O stretching	Secondary alcohol
13	1053.04	S=O stretching	Sulfoxide
14	1017.23	S=O stretching	Sulfoxide
15	1030.51	S=O stretching	Sulfoxide
16	656.90	C-Br stretching	Halo compound

FTIR Peak interpretation was done based on Standard reference chart[4].

In the FT-IR Spectra analysis, the aqueous extract of *Sangu Parpam* sample exhibits the peak value shows in Table 2 at the wave number of 3435.82, 2078.10, 1193.07, 1633.75, 1384.17, 1272.02, 1051.33, 1015.33, 1015.33, 1015.05, 1032.82, 685 having N-H stretch, CΞC Stretching , C=O Stretching, C=C Stretching, O-H Bending, C-O Stretching, C-N Stretching, C-F Stretching, C-N Stretching, C=C bending respectively. This indicates the presence of some organic functional groups such as Secondary amine, Alkyne, Esters, Cyclic alkene, Alcohols, Alkyl aryl ether, Amine, Fluoro compound, Alkane.

In the FT-IR Spectra analysis, the methanol extract of *Sangu Parpam* sample exhibits the peak value shows in Table 3 at the wave number of 3401.27, 2948.30, 2865.49, 2841.56, 2520.83, 2214.67, 2075.24, 1648.26, 1453.75, 1385.48, 1272.04, 1112.18, 1053.04, 1017.23, 1030.51, 656.90 having C-H Stretching, N-H Stretching, C-H Stretching, N-H Stretching, O-H stretching, CΞCStretching, C-H bending, C=C stretching, C-H Bending, C=C stretching, C-H Bending, C-H Bending, C-O Stretching, C-O stretching, S=O stretching, S=O stretching, S=O stretching, C-Br stretching respectively. This indicates the presence of some organic functional groups such as Alkane, Amine salt, Carboxylic acid, Alkyne, Aromatic compound, Alkene, Alkyl aryl ether, Secondary alcohol, Sulfoxide, Halo compound.

4. Conclusion

The Siddha formulation *Sangu parpam* was identified for the presence of various functional groups such as Secondary amine, Alkyne, Esters, Cyclic alkene, Fluoro compound, Carboxylic acid, Alkene, Alkane, Sulfoxide through FTIR Characterization. It was confirmed that the pH of the drug *Sangu parpam* is alkaline in nature. This Chemical Characterization findings creates the fingerprints of this specific formulation inorder to elucidate its molecular structure. These findings helps in analysing and understanding the therapeutic efficacy of the drug.

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