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Standardization of Sangu Parpam a Herbo Marine Siddha Drug

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Abstract

Standardization of traditional drug is a burning topic globally. As, the usage of traditional medicine increases day by day. Now a days manufacturing of Siddha medicine done in a large scale level. So, it is mandatory to standardize the traditional medicine not only to mention its quality but also to maintain the standard of the finished product. Sangu parpam is a well known Siddha medicine which is used very frequently in day to day practice for management of peptic Ulcer disease. This study is planned to analyze the Physico chemical characters of Sangu parpam and sophisticated instrumental analysis on Sangu parpam.

Keywords: Sangu, Herbo marine, Standardization, Siddha.

Introduction

Traditional medicine has a long history. It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses.

Traditional Medicine has played an important role in meeting the demands of primary health care in many developing countries and its use has expanded widely in many developed countries.¹ Siddha system of medicine is one among them, which is flourished in the southern India especially Tamilnadu.²

Siddha system is unique among the Indian system of medicine. It is believed to have been developed by the Siddhar's the ancient supernatural spiritual saints of

India. In Siddha system of medicine the drug sources are obtained from plant, mineral, metal and animals.³

The unique formulations in Siddha include Parpam (mineral/metallic oxides), Chendhooram (mineral/metallic sulphides), Chunnam (caustic or major oxides) and Pathangam (sublimation)⁴ Parpam and Chendooram type of medicines are highly used by the traditional medicine practitioners for its smaller dosage with higher therapeutic values.

Most of the medicines are mixture of compounds and because of its synergistic action, toxicity is being diminished, thereby increasing bioavailability through the cells of the body. Treating the minerals with herbal juices may lead to reduction (trituration) in particulate size even up to nano levels (less than 100 nm) enabling increased potency. These drugs are known to be effective even in low concentration.⁵

Standardization of herbal drugs is a burning topic in herbal drug industry today. Standardization is difficult because they are usually mixtures of many constituents and the active principle in most cases is unknown.⁵

Proper standardization techniques, Toxicological and Pharmacological evaluation on these medicines to meet the criteria to support its use worldwide. Therefore, in this study an attempt has been made to evaluate the Physico chemical characters, Pharmacological actions and toxicological analysis and Standardization of a Herbo-marine Siddha drug **Sangu Parpam**. Sangu (Conch) is a Marine origin drug. Loads of research has been conducted in drugs of plant origin but very little amount research work done in the marine origin drugs.

In this work **Sangu Parpam** a herbo-mineral Siddha drug is taken which is highly used by the traditional medicine practitioners. It has high therapeutic value by treating the diseases Peptic Ulcer, Gastro intestinal disorders, Cough, Piles etc.⁶

Prevalence of peptic ulcer is higher in third world countries where it is estimated at about 70% of the population, whereas developed countries show a maximum of 40% ratio. It is the lifetime risk for developing a peptic ulcer is approximately 10%.⁷

Overall, *H. pylori* infections show a worldwide decrease, more so in developed countries. Transmission is by food, contaminated groundwater, and through human saliva such as from kissing or sharing food utensils⁸

The reason that the rates of peptic ulcer disease decreased is thought to be the development of new effective medication and acid suppressants and the discovery of the cause of the condition, *H. pylori*. Though in Siddha system literatures highly recommended Sangu Parpam for Peptic Ulcer disease. But worldwide usage of this medicine will be on hand if the Safety and Efficacy and actions of the Medicine will prove by the standard scientific methods. Aim of our present study is to scientifically analyze the purification and preparation process of Sangu parpam and validate its safety and therapeutic efficacy.

Materials and Methods

Preparation process of Sangu Parpam: Purification of Sangu⁹

a) Process I: (Spu I)

35 gm of Sangu (1 palam) should be soaked in 175 gms of Juice of Ilaikkalli (Common Milk Hedge –*Euphorbia ligularia*) and let to dry in sunlight from morning to evening. This process is to be repeated for another 3 times with fresh juice.

b) Process II: (Spu II)

Sangu is to be processed in thaalithal method (Heating process) by covering it with Karchunnam (limestone).

c) Process III: (Spu III)

Equal parts of Karchunnam (limestone) and Uvarmann (Alkaline earth) should be mixed up with 8 parts of water and the clarified water to be collected. Sangu should be processed by heating with this clarified water. After heating Sangu shall be collected after washing with water.

Preparation of Sangu Parpam:¹⁰

100 gms of purified Sangu (Spu I, Spu II, Spu III) from each purification process is covered up by ground paste of Uthamani (*Pergularia damea*) and kept separately in the mud lid and closed by another mud lid. Cotton ribbon soaked in wet clay is winded over the rims of both mud lids and let to dry in sun light for 8 hours. Then this set up is subjected to Gana pudam. After cooling the set up is taken out and the calcinated. Sangu is collected and named as SP I, SP II, SP III respectively.

Route of administration: Oral

Dose: 260mg

Adjuvant : ghee

Indication: Cough, Piles, Stomach diseases, Enlarged tonsils, Chest pain, Vayu, Gunmam (Peptic Ulcer).

Physicochemical Analysis:

Organoleptic characters:¹¹

Loss on drying@105°C

Five grams of **Sangu Parpam** is heated in a hot oven at 105°C to till it reaches its constant weight.

Determination of ash value

Weighed accurately 2 grams of **Sangu Parpam** in tarred platinum or silica dish and incinerate at a temperature not exceeding 500 – 5500 C until free from carbon, cooled, and weighed.

Acid in soluble ash

Boiled the ash 5 minutes with 25 ml of 1:1 dil HCl. Collected the insoluble matter in Gooch crucible on an ash less filter paper (Whatman No. 41) wash with hot water and ignite. Cooled in a dessicator and weighed.

pH

The pH of **Sangu Parpam** was estimated as per the method prescribed in Indian Standard (IS) – 6940 (1982). One gram of the **Sangu Parpam** was taken into a 100ml graduated cylinder containing about 50ml of

water and filled up to the mark with water. The cylinder was stopped and shaken vigorously for two minutes and the suspension was allowed to settle for an hour at 25 to 27°. About 25ml of the clear aqueous solution was transferred into a 50ml beaker and tested for pH using DIGISUN digital pH meter (DIGISUN Electronics, Hyderabad, India.)

Inductively coupled plasma optical emission spectrometry (ICP-OES) Analysis¹²

Analysis was performed using Optima 5300 DV ICP-OES equipped with a Sea Spray concentric nebulizer (Glass Expansion, Pocasset, MA) and cyclonic spray chamber. Following parameters were introduced: nebulizer flow, 0.8 l min⁻¹; radiofrequency power, 1450 W; sample introduction, 1.5 ml min⁻¹; flush time, 20 s; delay time, 10 s; read time, 10 s; wash time, 30 s; and replicates, three. Standards were prepared by dilution of 1000 mg l⁻¹ stock solutions and the

calibration curve was obtained using five to ten points including the blank.

X ray diffraction study (XRD) Analysis¹³

The powder XRD patterns of the solid samples were recorded on X'pert pro analytical X-ray diffractometer using CuK radiation filtered by a nickel foil over the range of diffraction angle 10-70°. The wave length of the radiation used was 1.5405Å.⁵

Scanning electron Microscope – Energy dispersive X ray spectrometry (SEM-EDAX) Analysis¹²

Powder property of the samples was determined by JEOL ASM 3500 SEM with EDAX. A representative portion of each sample was sprinkled onto a double side carbon tape and mounted on aluminium stubs, in order to get a higher quality secondary electron image for SEM and EDAX examination.

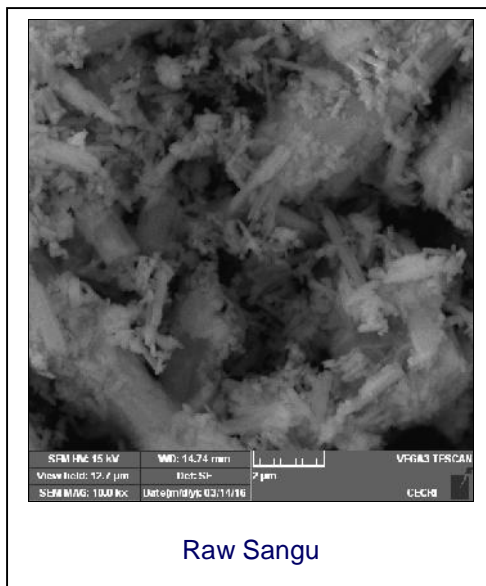
Results

Physico Chemical Analysis:

Table 1: Organoleptic Characters

S.No	Parameters	Raw Sangu	Spu I	Spu II	Spu III	SP I	SP II	SP III
1	pH at 25 °C(1:10ratio)	8.06	9.31	8.05	8.83	9.33	9.32	9.12
2	Total ash value	82.77%	72.36%	65.49%	74.54%	76.25%	68.40%	79.86%
3	Acid insoluble ash	2.37%	2.28%	0.75%	3.56%	10.40%	7.48%	10.33%
4	Loss of drying at 105° C	0.25%	0.10%	0.28%	0.12%	0.11%	0.10%	0.15%

Table 2: SEM Analysis



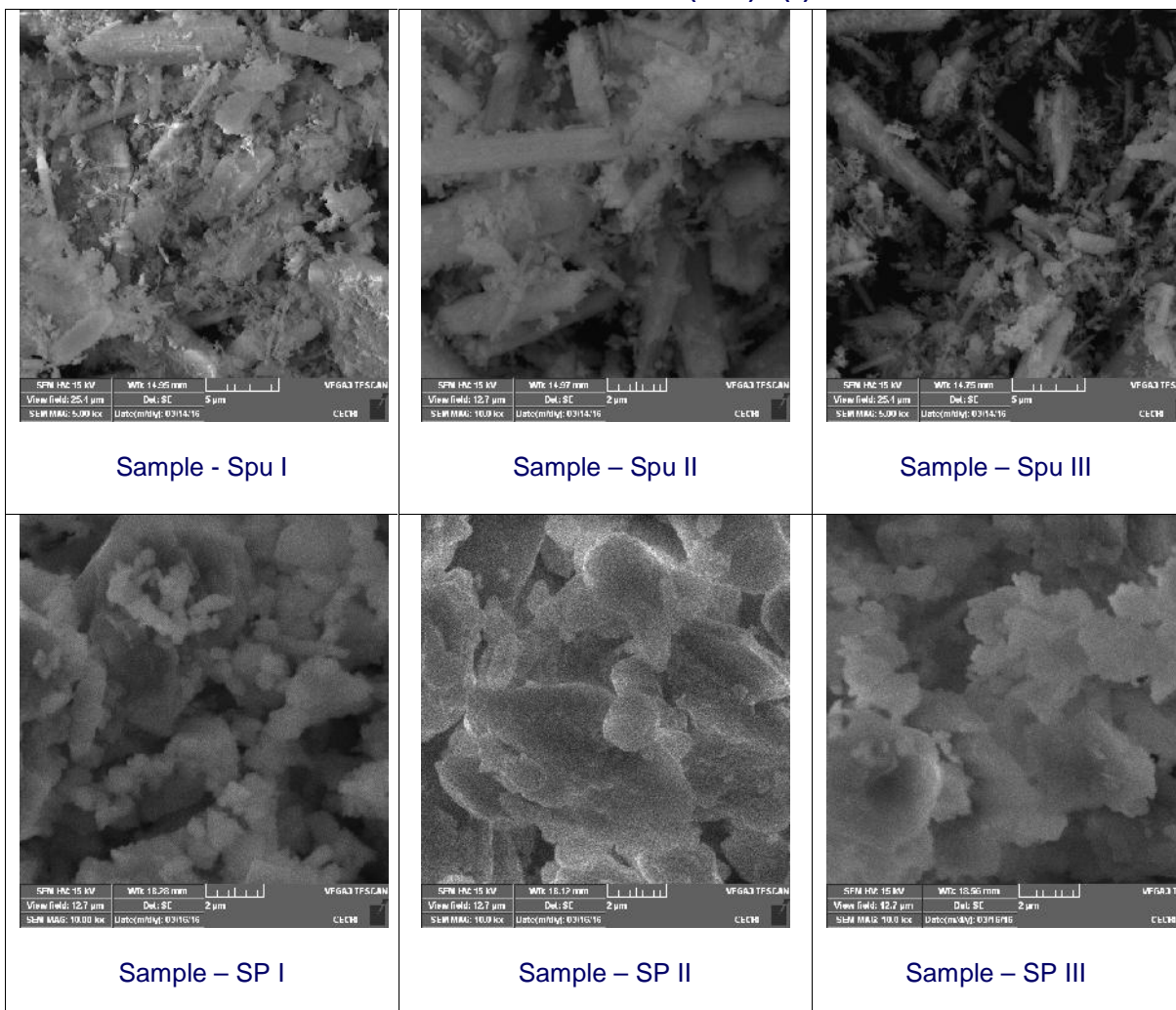


Table 2: SEM Images Of Samples

Table 3: ICPOES Analysis of samples

S. No	Elements in ppm level	Raw Sangu	Spu I	Spu II	Spu III	SP I	SP II	SP III
1	Lead	2.6	0.2	BLQ	0.1	BLQ	BLQ	BLQ
2	Cadmium	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
3	Arsenic	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
4	Mercury	1.0	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
5	Potassium	75	80	420	94	86.5	590	94
6	Magnesium	301	348	301	354	367	317	354
7	Sodium	3584	3338	3512	3831	3800	3766	3831
8	Silica	112	BLQ	BLQ	252	BLQ	BLQ	252
9	Zinc	2.6	0.9	4.8	2.9	1.8	3.2	3.0
10	Copper	1.3	BLQ	BLQ	BLQ	BLQ	BLQ	BLQ
11	Calcium	33.34	34.21	37	37.26	37.96	38.29	38.13
12	Chloride	0.10	0.15	0.2	0.18	0.17	0.21	0.24

BLQ – Below the Level of Quantification

S. No	Elements present	Raw Sangu		Spu I		Spu II		Spu III		SP I		SP II		SP III	
		Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%	Wt%	At%
1	Ca	30.21	13.35	35.26	15.78	39.79	24.65	23.48	12.39	39.10	19.46	42.76	21.70	28.48	14.48
2	O	45.49	57.68	43.36	57.24	42.63	51.68	47.24	55.27	49.12	61.24	48.65	61.96	47.48	60.36
3	C	5.00	8.09	13.47	15.65	6.58	7.43	9.82	15.43	11.46	19.03	4.06	6.88	10.50	17.77
4	Na	0.96	0.54	0.30	0.24	10.67	9.80	0.03	0.05	0.31	0.27	11.80	10.46	0.07	0.06
5	Cl	0.03	0.02	-	-	3.05	2.20	-	-	-	-	7.31	4.20	-	-
6	Mg	-	-	-	-	8.90	3.97	-	-	-	-	6.97	1.48	-	-
7	K	-	-	-	-	1.00	0.40	-	-	-	-	1.02	0.53	-	-
8	Si	-	-	-	-	-	-	2.10	0.18	-	-	-	-	0.15	0.11

Discussion

Organoleptic characters:

In analytical specifications (Table 1) the total ash value of every samples found to be within the range of 65% to 80% this indicating a less amount of organic matter¹⁴ and a high amount of minerals present in the Sangu parpam samples. This indicates purification and preparation process is the key to addition of concentration of minerals and some organic compounds. The drug possesses a low value in samples SP I (10.40 %) SP II (7.48%) SP III (10.33%) of acid insoluble ash indicating that the preparation did not contain any siliceous matter¹⁴ and the medicine was prepared in a hygienic condition signifying a better quality of drugs. The loss on drying test of every sample at 105°C indicates that only of less than 0.25 %. This moisture content prevents reduction of efficacy and degeneration. So the shelf life has been dated up to 100 years for parpam type of medicines which is mentioned in Siddha literature. The pH value of every samples at 25°C was found to be within the range of 8.00 to 9.50 which indicates the alkalinity of the drug.¹⁴ The pH of every Sangu parpam samples were above 9 is a good indication that the drug is alkaline and recommended for the treatment of Gunmam.

SEM analysis

SEM images (Table 2) of Raw Sangu indicates the size of particle is 5µm to 10 µm and the particles are crystal in shape. Surface of the particle is rough in Raw sangu. After purification the samples surfaces were slightly smooth and particles moderately get

agglomerated and particle size was reduced to 3µm to 5 µm. After preparation of Sangu parpam sample's are highly agglomerated due to repeated incineration (Pudam Process) process.¹⁵

And the surface of every sample is smooth and particle size ranging from 1µm to 2 µm in samples SP I, II and SP III. Of these samples SP II is better because of it's smooth surface and the particle size is 1µm to 2 µm and the shape of the sample is Oval, this is because the flow ability of the drug is possible and absorption is easy. Shape of the samples SP I, III are changed and mostly agglomerated and oval in shape. As the preparation involves crunching of raw materials with herbal juices, heat processes and subsequent cooling of product, it tends to agglomerate the drug particles, which causes the particle size variation.

ICP-OES analysis

ICPOES analysis (Table 3) indicates the presence of Heavy metals like Lead, Mercury, Copper, Silica and Zinc in Raw Sangu sample. After purification concentration of the heavy metals are highly reduced in Spu I, II, III. And in the final purification process the presence of heavy metals in SP I, II, III are in Below the limit of quantification as per WHO guidelines. Other minerals Calcium, Sodium, Chloride, Zinc and Magnesium which are identified in the Raw sangu. After Purification and preparation the concentration was increased. This may responsible for therapeutic value of the medicine and also indicates the quality of the purification and preparation processes of Sangu. Overall analysis indicates the purification process II that is Spu II and prepared sangu parpam SP II shows better quality than other samples.

Figure 1. XRD Analysis

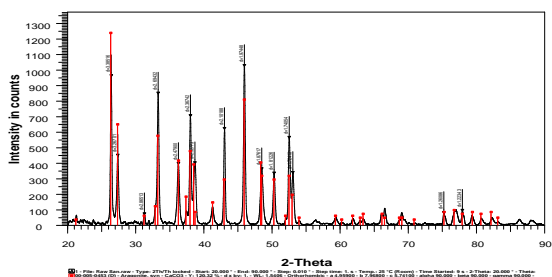


Image 1 : XRD Analysis of Raw Sangu

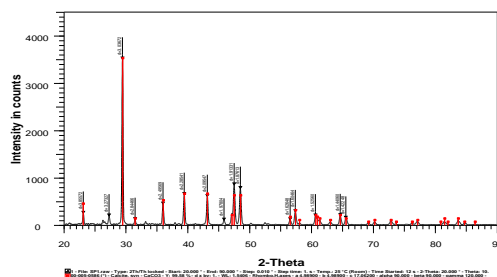


Image 2 : XRD Analysis of SP I

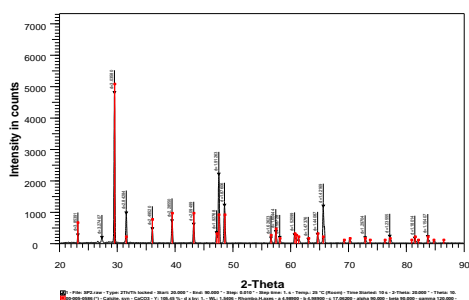


Image 3 :XRD Analysis of SP II

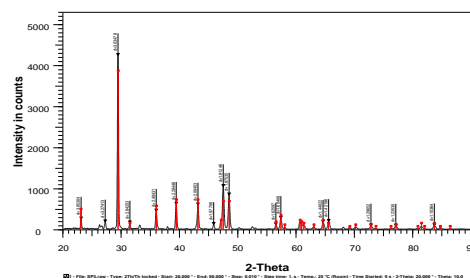


Image 4 :XRD Analysis of SP III

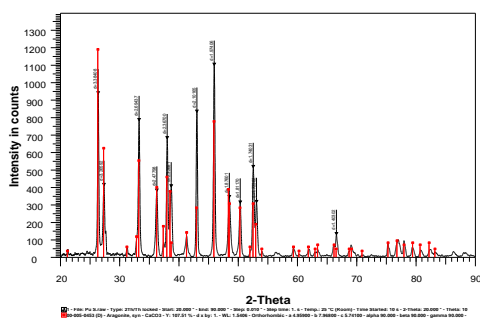


Image 5 :XRD Analysis of Spu I

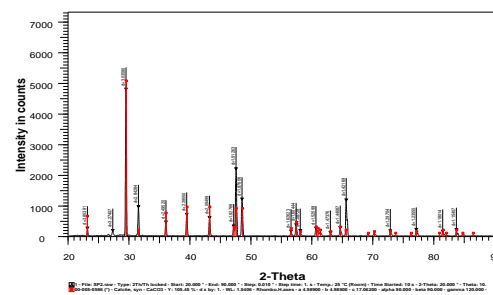


Image 6 :XRD Analysis of Spu II

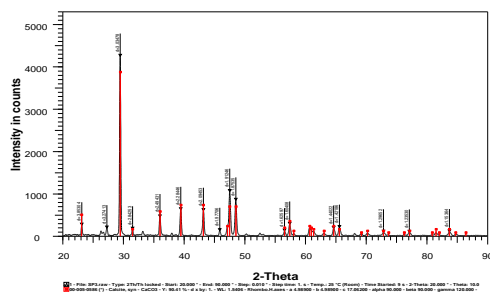


Image 7 :XRD Analysis of Spu III

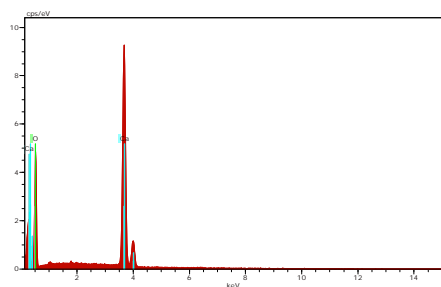


Image 1 :EDAX Analysis of Raw Sangu

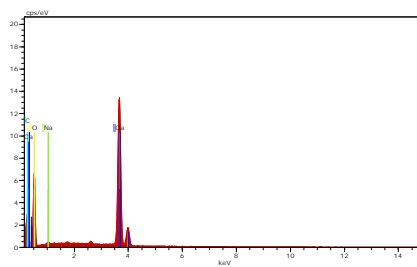


Image 2:EDAX Analysis of SP I

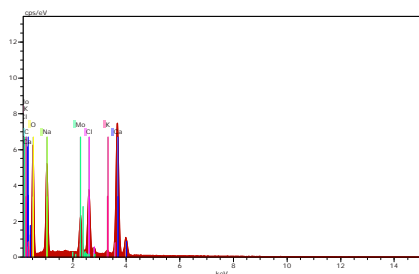


Image 3 :EDAX Analysis of SP II

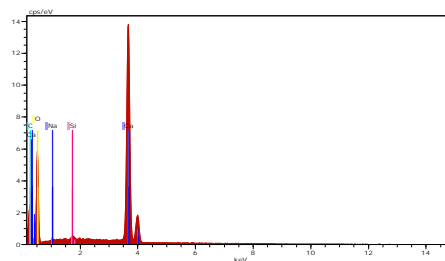


Image 4 :EDAX Analysis of SP III

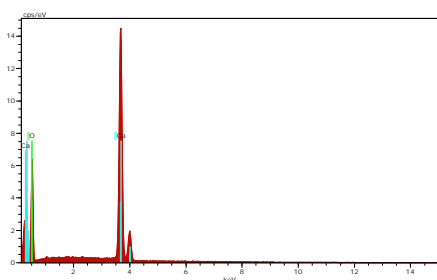


Image 5 :EDAX Analysis of Spu I

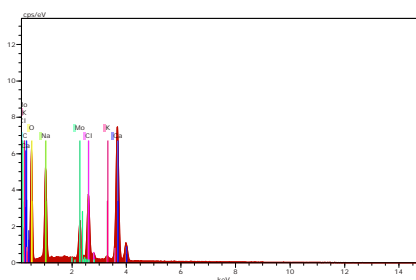


Image 6 :EDAX Analysis of Spu II

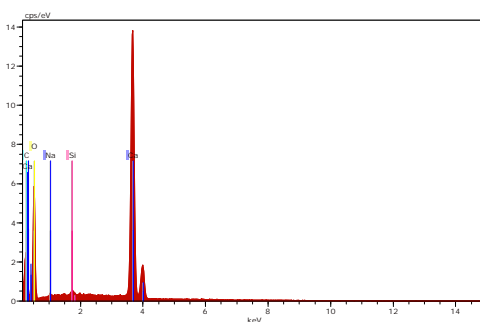


Image 7:EDAX Analysis of Spu III

XRD analysis

X-ray diffraction study of the Sangu sample showed a sharp peak indicating its crystalline nature. Whereas the Sangu Parpam did not give sharp peaks indicating the reduction of crystalline nature, thus the sharp crystalline structure of the Sangu parpam reflects light rays whereas reduction of crystalline nature in the

Sangu parpam prevents it from doing so. The XRD high intensity peaks confirm the presence of Calcium oxide as the major crystalline phase in the samples. Other low intensity peaks were observed which may be due to presence of trace element. After the process of purification strongest peaks of samples corresponded to Calcium oxide and few weak peaks corresponds to Na, Si and C peak of very low intensity was observed (Figure 1).

EDAX Analysis:

The EDAX spectra (Table 4, Figure 1) showed the presence of Calcium, Sodium, Carbon and Oxygen in higher percentage compared with other nutrients. The nutrients are responsible for the therapeutic action of the drug. This analysis confirmed the presence of various elements viz. Ca, Na in their oxide form. The major percentage of spectra was Calcium oxide. The source of the other elements can be attributed to the fact that various processes involving different herbal drugs were used in the purification process and preparation processes of Sangu parpam. The puta process (calcination) may also have contributed to the addition of these elements.

Conclusion

In this study, Sangu Parpam was prepared and analyzed according to the standard procedures. This report could be used as a finger print for future references in standardization of Sangu Parpam. Heavy metals like Mercury, Copper, Lead were reduced after purification and preparation processes and powder property of the samples were good for absorption and flowability. Organoleptic characters reveals the purification and preparation processes were done in a hygienic condition and samples were alkaline in nature. XRD analysis confirms the Calcium oxide as the major crystalline phase in samples. Findings revealed that samples were need more studies to standardize the drug and to evaluate the importance of Siddha drug preparation technique, which may reveal the scope for chemical modulation by traditional methods.

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