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STANDARDIZATION OF SASTHRIC SIDDHA FORMULATION DHATHU BHUSTI CHOORANAM THROUGH FT-IR, ICPOES AND SEM TECHNIQUES

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ABSTRACT

For the globalization of traditional system the medicines like Siddha, Ayurvedha & Unani, the need for standardization of the prepared medicines are significant of the hour. Nowadays, an Herbal formulation plays an important role in the healthcare management and the recent scientific forum were also looking back for developing their research and to expose the hidden treasure of Siddha system of medicine. The standardization is an essential part in whole of the medicine preparation process. Which is helpful in improve drug quality & efficacy, reduce adulteration, facilitating for global acceptance and export etc**.** Siddhars identified innumerable number of preparations in treating male infertility. One such effective siddha poly herbal formulation by name *Dhadhu Bhushti Chooranam* which is said to be cost effective, efficacious and simple formulaion when compared to other medications. In the present study and attempt has been made to standardize the Chooranam. In this way, *Dhathu Bhusti chooranam*, a Siddha traditional medicine is studied through Fourier Transform Infrared Spectroscopy to identify the functional groups present it. Primary and secondary amines, alkaline, aliphatic compounds, esters, alcohols and alkyl halides are observed in the study. Particle sizes of the drug is detected through SEM technique, which are in range from 0.5 to 1 micron. Presence of

minerals such as Calcium, Potassium, Phosphorus and Sodium are detected through ICPOES analysis.

KEYWORDS: *Dhathu Bhusti chooranam*, Male infertility, SEM technique ICPOES, Functional groups

INTRODUCTION

Knowledge of traditional medicines has been grown along with the evolution of human. But its importance was faded during recent past due to introduction of modern drugs and now it is again rejuvenating due to the former's adverse effects.[1] Herbal based traditional remedies are highly recommended by World Health Organization (WHO) because of their safety, easy availability, low cost in the treatment of various diseases. In traditional system, these medicines have a richest bio-resource such as phenols, micro and macronutrients etc. Several causes of male infertility in clinical practice oligospermia is considered one of the most prevalent cause. Literally oligospermia means insufficient no of spermatozoa, but significally, it means a medical symptom characterized by less than 20 million spermatozoa per/ml of ejaculate. Extensive clinical research is going on in oligospermia utilizing various, natural sources of plants, mineral & animal origin . As mentioned in different classical traditional texts. Siddhars identified innumerable number of preparations in treating male infertility. One such effective siddha poly herbal formulation by name *Dhadhu Bhushti Chooranam* mentioned in *Noigalukku Siddha Parigaram.*[2] Which is said to be cost effective, efficacious and simple formulation when compared to other medications.

The ingredients of the drug are *Nilapanai Kizhangu (Curculigo orchioides), BoomiSarkarai Kizhangu ((Ipomoea mauritiana), Poonai Kali vidai (Mucuna pruriens), Salamisri (Orchis latifolia), Thaneervittaan kizhangu* (*Asparagus racemosus*).[3] Salamisiri is well known for aphrodiasic action and poonaikkali is helps in spermatogenesis.[4] Hence we chose *Dhadhu Bhushti Chooranam* for treatment of oligospermia. In the present study and attempt has been made to standardize the choornam by modern methods.

METHOD OF PREPERATION

Nilapanai kizhangu	-10 tholas
Boomisarkarai kizhangu	-10 tholas
Poonaikaali vidhai	-10 tholas
Thanneervittan kizhangu	-10 tholas

Salamisiri -10 tholas

All the ingredients are purified, powdered individually. Then they are mixed and taken in an air tight container.

Dose: 2gms twice a day before food.
Adjuvant: Cow's Milk.
Indications: Development and maturation of semen, strength and general vitality, impotence and nervine tonic.

Drug collection

All the raw materials were obtained from Country drug shop, Ramaswamy chetti, Parrys, Chennai.

Identification and Authentication

All the raw drugs were identified and authenticated at Department of Botany (Assistant professor of Botany) and Gunapadam experts in National institute of siddha, Chennai. The drug was prepared in the laboratory of Gunapadam, National institute of siddha, Chennai.

Details regarding experiment

Fourier Transform-Infra Red Spectroscopy (FTIR)

FTIR analysis was done at SAIF, IIT Madras. IR data was acquired using Perkin Elmer FT- IR spectrometer. For sampling techniques, KBr method (Price, 1972) was followed. The sample was ground using an gate motor and pestle to give a very fine powder. The finely powdered sample was mixed with about 100 mg dried potassium bromide salt. The mixture was then pressed under hydraulic press using a die to yield a transparent disc (measure about 13 mm diameter and 0.3 mm in thickness) through which the beam of spectrometer passed. The analysis was carried out using BRUKER RFS 27: Standalone FT-Raman Spectrometer.

SEM Analysis

To evaluate grain size, particle size, distributions, material homogeneity and inner metallic distributions, SEM was carried out by using FEI quanta 200-highresolution instrument. The study was carried out in Sophisticated Analytical Instrumental Facility (SAIF) in IIT Madras.

RESULTS

Dhathu Bhusti Chooranam

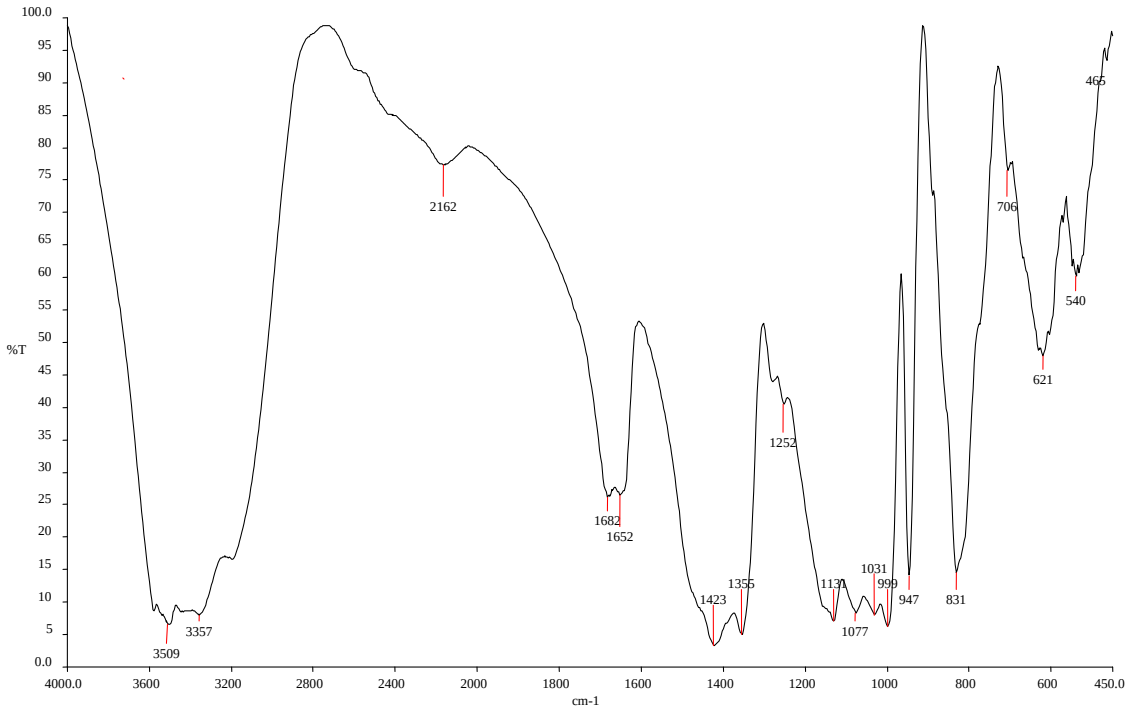

Table-1

Absorption peak(cm-1)	Vibrational modes of Dhathubustichooranam in IR region	Functional Group
3509	O–H stretch, free hydroxyl	alcohols, phenols
3357	N–H stretch, O–H stretch, H–bonded	1°, 2° amines, amides, alcohols, phenols
2162	–C≡C– stretch	Alkanes
1682	C=O stretch	α,β–unsaturated aldehydes, ketones
1652	–C=C– stretch	Alkanes
1423	C–C stretch (in–ring)	Aromatics
1355	C–H rock,	Alkanes
1252	C–H wag (–CH2X)	alkyl halides
1131	C–O stretch	aliphatic amines
1077	C–N stretch	aliphatic amines
1031	C–N stretch	aliphatic amines
999	=C–H bend	Alkenes
947	O–H bend	carboxylic acids
831	N–H wag	1°, 2° amines
706	C–Cl stretch	Aromatics
621	–C≡C–H: C–H bend	Alkynes
540	C–Br stretch	alkyl halides

SCANNING ELECTRON MICROSCOPY

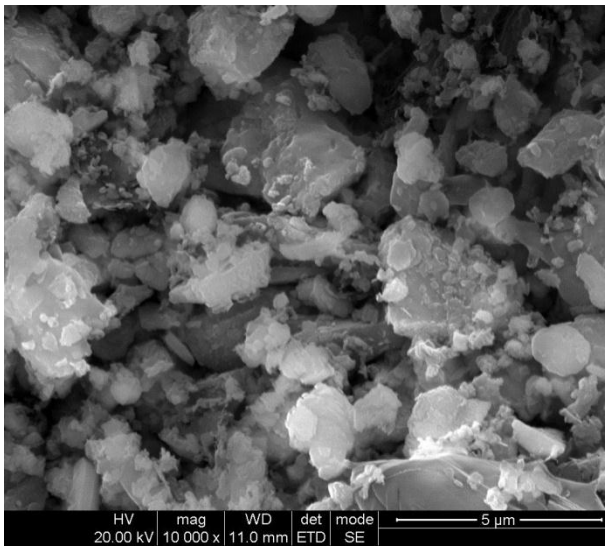

Figure 1: SEM image of DBC, Magnification 10000x

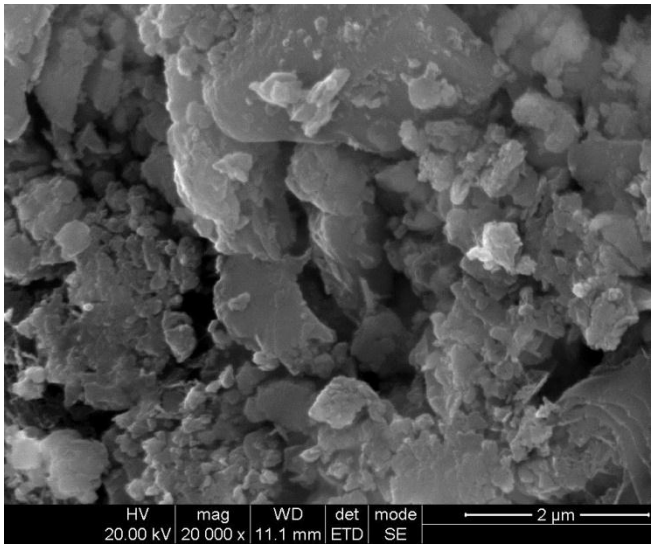

Figure 2: SEM image of DBC, Magnification 20000x

ICP-OES

S.No	Elements	Detected Levels
1.	Arsenic	BDL
2.	Calcium	74.320 mg/L
3.	Cadmium	BDL
4.	Mercury	BDL
5.	Potassium	50.821 mg/L
6.	Sodium	13.110 mg/L
7.	Nickel	BDL
8.	Lead	BDL
9.	Phosphorus	38.541 mg/L

DISCUSSION

In FTIR spectra analysis this Poly Herbal drug *Dhathu bushti Chooranam* sample exhibits the peak value as shown in table 1 at the wave number 3509,3357,2162,1682,1652,1423, 1355,1252,1131,1077,1031,999,947,831,706,621,540,465 having O–H stretch, free hydroxyl, N–H stretch, O–H stretch, H–bonded, –C≡C– stretch, C=O stretch, –C=C– stretch, C–C stretch (in–ring), C–H rock, C–H wag (–CH2X), C–O stretch, C–N stretch, C–N stretch, =C–H bend, O–H bend, N–H wag, C–Br stretch. This indicates the presence of some organic functional groups such as primary and secondary amines, alkanes, aliphatic, alcohols, phenols, Alkynes, α,β–unsaturated aldehydes, ketones, Aromatics, alkyl halides, aliphatic amines, carboxylic acids, 1°, 2° amines compounds.

The morphology of the DBC sample was determined by SEM analysis. SEM photographs shown that particles are spherical in shapes and sizes are in the range from 0.1 micron to 0.5 micron. Although the particle sizes of different batches showed similarity, it seems that these particles are aggregates of much smaller particles. When dispersed in an aqueous medium, these preparations form a negatively charged hydrophobic particle suspension. This hydrophobicity gives these particles a tendency to aggregate together to form larger particles. DBC exhibited larger sizes and agglomeration of the particles. Therefore, the comparatively larger size may be due to the agglomeration of the particles by repeated purification process involved in preparation.

ICPOES analysis shows that the drug DBC has Calcium, Potassium, Sodium and Phosphorus. Calcium is the chief constituent of bones and teeth. It is necessary for transmission of nerve impulse and release of certain hormones such as insulin, calcitonin.[5] Ionized calcium may influence sex steroid bioavailability and semen quality in infertile men.[6] In DBC, Arsenic, Calcium, Mercury, Nickel and Lead are Below Detectable Level, which indicates that drug is more safe to administer.

CONCLUSION

These observed data from this FTIR characterization helps to standardize this Siddha compound drug *Dhathu Bushti Chooranam* regarding its functional behavior. Some organic functional groups such as primary and secondary alcohols, phenols, Alkynes, α,β–unsaturated aldehydes, ketones, Aromatics, alkyl halides, aliphatic amines were identified in the drug. Besides iron and magnetic oxide of iron, presence of fluoride and chloride is identified through observed frequencies. Particles in the drug are spherical in shape and sizes are in range from 0.5 to 1 micron. Below Detectable Levels of Arsenic, Cadmium, Nickel, Mercury and Lead indicates that the drug is safe and the presence of calcium which is associated with sex steroid bio-availability and semen quality correlates with the indication of the drug as per Siddha Literature i.e oligospermia. The author hopes that this study could help future studies regarding *Dhathu Bushti Chooranam.*

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