International Journal of Advanced Multidisciplinary Research
ISSN: 2393-8870
www.ijarm.com
(A Peer Reviewed, Referred, Indexed and Open Access Journal)
DOI: 10.22192/ijamr Volume 9, Issue 10 -2022

Research Article

DOI: http://dx.doi.org/10.22192/ijamr.2022.09.10.006

Instrumental analysis of herbomineral formulation *Thanga uram*

Karthi S* Visweswaran S[1] Sivakkumar S[2] Mariappan A[3] Meenakumari R[4]

* Pg scholar Department of Gunapadam, National Institute of Siddha, Chennai
1,2,3, Associate Professor, Department of Gunapadam, National Institute of Siddha, Chennai
4 Director, National Institute of Siddha, Chennai
E-mail: *drkarthibsms38@gmail.com*

Keywords

thanga uram ,XRD, FTIR , Instrumental, analysis

Abstract

Siddha medicine is one of the most ancient medical systems of India. Siddha is the mother medicine of ancient Tamils/Dravidians of peninsular South India. This system has enormous pharmacopoeia containing vegetable, animal and mineral products.FTIR offers quantitative and qualitative analysis for organic and inorganic samples. Fourier Transform Infrared Spectroscopy (FTIR) identifies chemical bonds in a molecule by producing an infrared absorption spectrum. The spectra produce a profile of the sample, a distinctive molecular fingerprint that can be used to screen and scan samples for many different components. FTIR is an effective analytical instrument for detecting functional groups.X-ray powder diffraction is most widely used for the identification of unknown crystalline materials (e.g. minerals, inorganic compounds). Determination of unknown solids is important to studies in geology, environmental science, material science and biology.XRD pattern of Thanga uram shows the good crystallinity after calcinations process. The major diffraction peaks are identified after XRD analysis TU concluded that HgS in nano crystalline range(31 -56nm) is association with organic molecules probably plays an important role inmaking it biocompatible and non toxic at therapeutic doses. Other elements present in TU act as additional supplement and possibly helps in increase the efficacy of theformulation

Introduction

Siddha System of Medicine is a complete reputed medical system that has been practiced in India. Its origin dates back to BC 10,000 to BC 4,000 . The name Siddha medicine owes its origin to medicinal ideas and practices of a class of Tamil sages called the Siddhars-“Perfected” or “Holy immortals who are still believed to have superhuman powers. Siddha medicine is the only medicine which bestows longevity. The word Siddha comes from the word ‘Siddhi’ which means an object to attain perfection or heavenlybliss. Siddhars explained human life based on Trithodam principle from embryonic stage to death not only about stages of human life they were also explained disease manifestations and treatment aspect ,they have classified disease into 4448 types. Aan maladu is one among them. According to Yugi muni in Aan maladu the semen exhibits the following characters such as absence of sweetness, buoyancy on water.

Instrumental analysis

FT-IR (Fourier TransformInfra-Red)

Definition:[1]

FTIR offers quantitative and qualitative analysis for organic and inorganic samples. Fourier Transform Infrared Spectroscopy (FTIR) identifies chemical bonds in a molecule by producing an infrared absorption spectrum. The spectra produce a profile of the sample, a distinctive molecular fingerprint that can be used to screen and scan samples for many different components. FTIR is an effective analytical instrument for detecting functional groups.

Applications:[2]

Quantitative Scans, Qualitative Scans x Solids, Liquids, Gases

- Organic Samples, Inorganic Samples
- UnknownIdentification
- ImpuritiesScreening
- Formulation
- Pharmaceuticals.

Fig 1.FTIR (Fourier Transform Infrared Spectroscopy)

FTIR Instrument- instrument details

Model: Spectrum one: FT-IR Spectrometer Scan Range:MIR 450-4000 cm-1 Resolution : 1.0cm-1
Sample required : 50 mg, solid or liquid.

It is the preferred method of infrared spectroscopy. FT-IR is an important and more advanced technique. It is used to identify the functional group, to determine the quality and consistency of the sample material and can determine the amount of compounds present in the sample. It is an excellent tool for quantitative analysis.

In FT-IR infrared is passed from a source through a sample. This infrared is absorbed by the sample according to the chemical properties and some are transmitted. The spectrum that appears denotes the molecular absorption and transmission. It forms the molecular fingerprint of the sample. Like the finger print there is no two unique molecular structures producing the same infrared spectrum. It is recorded as the wavelength and the peaks seen in the spectrum indicates the amount of material present.

FT-IR is the most advanced and the major advantage is its

- Speed
- Sensitivity
- Mechanical Simplicity
- Internally Calibrated.

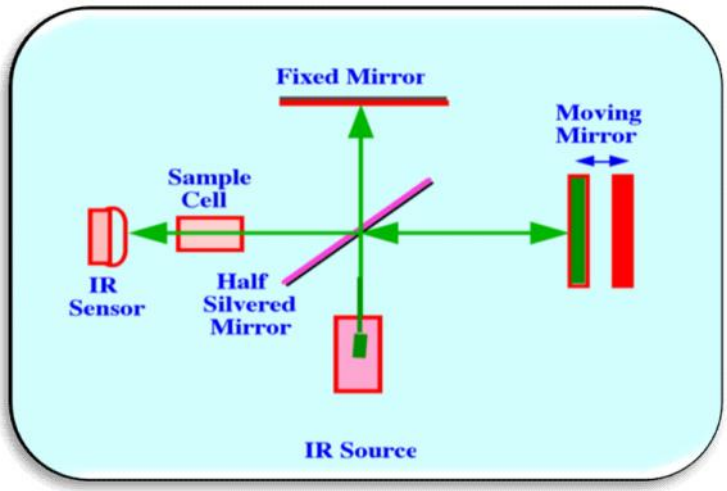


Fig 2.FTIR (**FTIR Mechanism)**

XRD (X-ray powder diffraction) DEFINITION

X-ray powder diffraction is most widely used for the identification of unknown crystalline materials (e.g. minerals, inorganic compounds). Determination of unknown solids is important to studies in geology, environmental science, material science and biology.

APPLICATIONS: [3]

Fig no: 3 XRD instrument

Characterization of crystalline materials x Identification of fine-grained minerals such as clays and mixed layer clays that are difficult to determine optically x Determination of unit cell dimensions.

With specialized techniques, XRD can be used to:

Determine crystal structures using Rietveld refinement x Determine of modal amounts of minerals (quantitative analysis) x Characterize thin films samples by: determining lattice mismatch between film and substrate and to inferring stress and strain determining dislocation density and quality of the film by rocking curve measurements measuring super lattices in multilayered epitaxial structures determining the thickness, roughness and density of the film using glancing incidence X-ray reflectivity measurements x Make textural measurements, such as the orientation of grains, in a polycrystalline sample.

Strengths and Limitations of X-ray Powder Diffraction

Strengths

Powerful and rapid (< 20 min) technique for identification of an unknown mineral x In most cases, it provides an unambiguous mineral determination x Minimal sample preparation is required x XRD units are widely available x Data interpretation is relatively straightforward.

Limitations

Homogeneous and single phase material is best for identification of unknown x Must have access to a standard reference file of inorganic compounds x Requires tenths of a gram of material which must be ground into a powder x For mixed materials, detection limit is ~ 2% of sample x For unit cell determinations, indexing of patterns for non-isometric crystal systems is complicated.

Sample Collection and Preparation

Determination of an unknown requires: the material, an instrument for grinding, and a sample holder.

Obtain a few tenths of a gram (or more) of the material, as pure as possible x Grind the sample to a fine powder, typically in a fluid to minimize inducing extra strain (surface energy) that can offset peak positions, and to randomize orientation. Powder less than ~10 ɜm(or 200-mesh) in size is preferred x Place into a sample holder or onto the sample surface.

FT-IR (Fourier Transform Infra-Red) Spectroscopy Fig no :4

FT-IR SPECTRUM OF TU

FT-IR PEAK TABLE 10

Absorption Peak No	Range (cm-1)
1.	2802
2.	2311
3.	2057
4.	1940
5.	1656
6.	1498
7.	1018
8.	872
9.	710
10.	603
11.	566
12.	459
13.	410

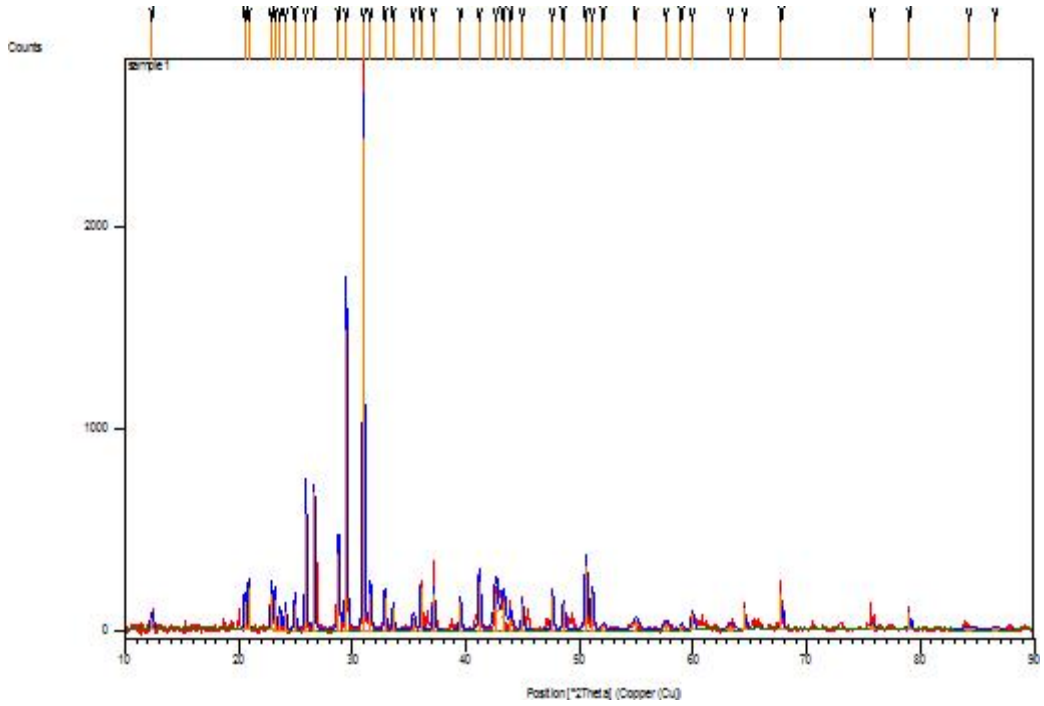
Result Analysis Interpretation

- Peak at 2802 cm-1 due to O-H stretching vibration
- Peak at 1940 cm-1 due to di sulphidebond
- Peak at 1656 cm-1 due to C=N stretching vibration
- Peak at 1498 cm-1 and 1018 cm-1 due to C-H deformationvibration
- Peak at 872 cm-1 due to C-O stretching vibration and Peak at 710 cm-1 due to N-H out-of-plane bendingvibrations
- Peak at 603 cm-1 due to acetylated group
- Peak at 566 cm-1 due to aromatic C-C skeletonvibration
- Peak at 410 cm-1 due to aromatic bending vibration

Methodology

About 20 mg of the test sample was taken on a micro spatula and grounded well with required quantity of KBr salt. Sample admixed with KBr with trituration aided by mortar and pestle until to get a uniform fine powder of sample- KBr mixture. Further mixture was loaded in pellet die and subjected to 5000-10,000 psi in pelletizer. Resulting pellet was placed in FTIR sample holder and expose to IR radiation to get the spectra.

7.6 X-RAY DIFFRACTION (XRD) Fig no :5 x-ray diffraction peak



The crystalline structure, the size and shape of the particles are highly dependent on the route of synthesis and high lights the efficacy of the drug. The nano particles may enhance bio absorption of the drug.

XRD pattern of Thanga uram shows the good crystallinity after calcinations process. The major diffraction peaks are identified after XRD analysis TU concluded that HgS in nano crystalline range(31 -56nm) is association with organic molecules probably plays an important role in making it biocompatible and non toxic at therapeutic doses. Other elements present in TU act as additional supplement and possibly helps in increase the efficacy of theformulation

Discussion

Based on the result Thanga Uram is preferably non –toxic to human in its therapeutic dose. the standardization of the drug was evaluated by chemical analysis characterization with elemental analysis determination of particle size by FTIR ,XRD respectively.

FTIR

The absorption at 3200−3500 cm^{-1}were due to the stretching of O-H groups present in the fibres where they can be found in their main chemical composition: celluloses, hemicelluloses, and lignin. OH group of has *Thanga Uram* potential towards inhibitory activity against microorganisms

XRD

The major peak observed in test sample with 2-theta values of 29.59, and their corresponding intensities 39.3% matching with the material Sulphur.

peak observed in test sample with 2-theta valuesof20.65,
peak observed in test sample with 2-theta valuesof27.10,and their corresponding intensities 47.7% matching with the material Lead.
From the result of present study XRD analysis it was concluded that the elemental composition of sample TU conforms the presence of mercury, Sulphur, lead

Bibliography

1. Fourier Transform Infrared Spectroscopy (FT-IR) Analysis and testing chemical compound, Available athttp://www..intertek.com/analysis/ftir/.
2. FT-IR sample preparation, Northern Illinios University, Department of Chemistry and Biochemistry, available athttp://www.niu.edu/analyticallab/ftir/samplepreparation.htmlSem
3. Seong H.Kim, Christopher M et al...Characterization of crystalline cellulose in biomass: Basic Principles, application and limitations of XRD, Korean J.Chemm.Eng,11814-013-0162-0.

Access this Article in Online	
Quick Response Code	Website: www.ijarm.com
	Subject: Siddha Medicine
DOI:10.22192/ijamr.2022.09.10.006	

How to cite this article:
Karthi S Visweswaran S Sivakkumar S Mariappan A Meenakumari R. (2022). Instrumental analysis of herbomineral formulation *Thanga uram*. Int. J. Adv. Multidiscip. Res. 9(10): 55-61.
DOI: http://dx.doi.org/10.22192/ijamr.2022.09.10.006