BioGecko Vol 12 Issue 2 2023

ISSN NO: 2230-5807

Systemic validation of *Anna Pavazha Chendhuram*

[1]Dr.T. Sasi Priya, [2]Dr. K. Rajeswari,
[*] Lecturer, Department of Gunapadam, Sri Sai Ram Siddha Medical College and Research Center, Chennai - 44.
[2]Emergency Medical Officer, National Institute of Siddha, Tambaram sanatorium, Chennai-45
Email: siddhasasi@gmail.com, Contact Number : 9488608110
Submitted date: 23-12-2022 revised date : 16-1-2023 accepted date: 4-2-2023

Abstract:

Siddha system is the ancient Dravidian system of medicine predominantly practiced in South India. In general Siddha system includes usage of plants, together metals, minerals and animal products were also used. Standardization of Siddha drug is the most necessary step to be done for all drugs today to attain global acceptance. In general, standardization of Siddha formulary is quite difficult because of presence of many ingredients in a single formulation and the active principle is also not exactly identified. This research article focuses on elemental analysis of the test drug *Anna Pavazha Chendhuram*.

Key words: Siddha system, Standardization procedure, Elemental analysis, *Anna Pavazha Chendhuram.*

Introduction:

The science of medicine is one of the fundamental requirements to well being of humans and their survival. Generally Siddha system not only gives curative procedure of disease and also gives preventive aspects to diseases stating the proverb, 'Prevention is better than cure'. Siddhars, after achieving their goal, had contributed their meansand acknowlegements through their writings. This collection of writings formed the basis of Siddha system of medicine - a glorious ancient medicine. It restores the normal functioning of organs and maintains the ratio of the *mukkutram- vadham*, *pitham*and*kapham*, there providing a healthy state of equilibrium to the body. This research article focuses on standardization of a drug called Anna Pavazha Chendhuram mentioned in the text 'Siddha Formulary of India; Part I' which is indicated for kaasam, swasa kaasam, kshayam, raktha ushnam, pitha ushnam, mega ushnam and atthi suram.(1)

The ingredients of this drug are green vitriol (*Annabedi* or ferrous sulphate), coral reef (*Corallium rubrum or Pavzhlam*), leaves of *Acalypha indica* (*Kuppaimeni*), *Lippia nodiflora* (*Poduthalai*), *Vinca rosea* (*Nityakalyani*), *Lawsonia inermis* (*maruthondri*) and *Cynodon dactylon* (*Arugampul*) and the flowers of *Hibiscus rosasinensis* (*Chemparathampoo*) and the ripe fruits of *Phyllanthus emblica* (*nellikkai*).(2,3) *Sindhooram* is the chief therapeutic form of herbo-mineral preparations used in the Siddha system of Indian medicine.This trial drug was subjected to elemental analysis procedures such as Fourier Transform Infra Red (FT-IR), Scanning Electron Microscope (SEM-EDAX) and X-Ray Fluorescence (XRF).(4)

Materials and Methods:

Collection and Authentication of drug:

The test drug was a market sample and authenticated by Faculty members of Department of Gunapadam, National Institute of Siddha.

Systemic validation through FT-IR analysis:

FT-IR spectral studies:

Fourier Transform Infra Red Spectroscopy is a technique used to obtain an infra red spectrum of absorption or emission of a solid, liquid or gas. An FTIR spectrometer simultaneously collects high-

spectral-resolution data over a wide spectral range. This confers a significant advantage over a dispersive spectrometer, which measures intensity over a narrow range of wavelengths at a time.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 wave number and the peaks seen in the spectrum indicates the amount of material present. Procedure The Perkine Elmer Spectrum One Fourier Transform Infrared (FTIR) Spectrometer was used to derive the FTIR Spectra of Sample-APC placed in Potassium Bromide (KBr) discuss with scan rate of 5 scan per minute at the resolution 4cm-1 in the wave number range 4000-500 were recorded the FT- IR Spectrum under Standard condition. FTIR Spectra were used to determine the presence of the functional groups and bands in the drug.(5)

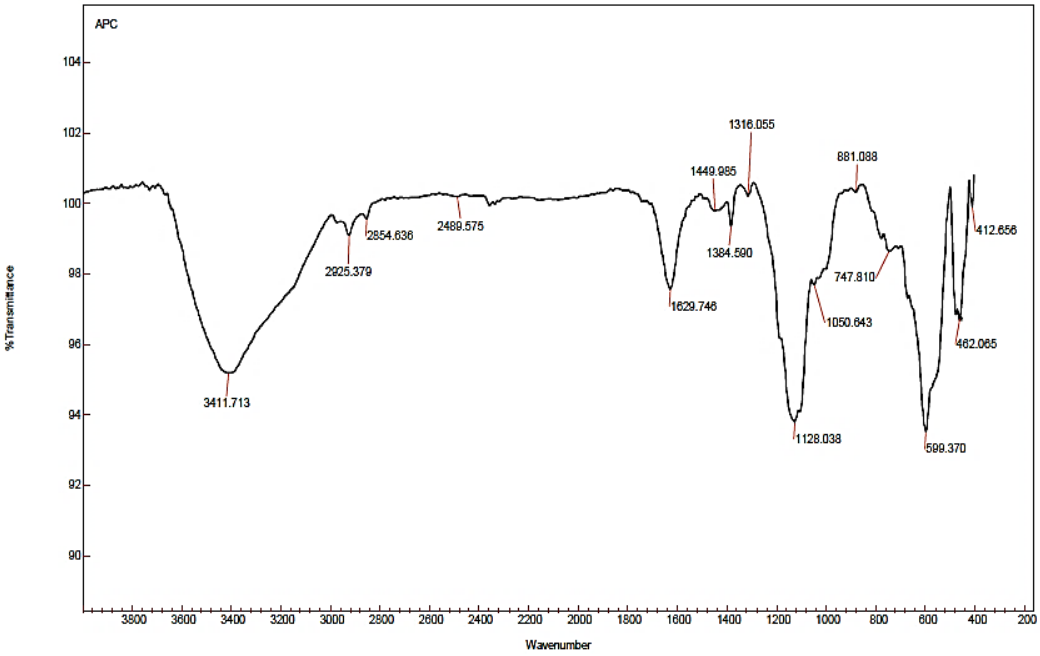


Fig – 1. FTIR analysis report of *Anna Pavazha Chendhuram*(APC)

Result:

- Strong intense peak at 412.65 cm-1 may be due to Fe- S stretching indicates the presence of Fe-S group. Medium peaks at 599.37 cm-1 may be due to presence of –COOH group.
- Sharp intense peak at 3411.73 cm-1is due to the presence of free O-H group.
- Absorption peak at 1316.05 cm-1 may be O-H stretching and band at 1128.03 cm-1 due to the presence of C-O group.
- Absorption peak at 881.08 cm-1 due to C-H out of plane bending and absorption peak at 1629.74 cm-1 due to the presence of C=C stretching vibration.
- Peaks at 2925.37 cm-1 due to CH3-stretching vibration and absorption bands at 462.06 cm-1 may due to presence of primary aliphatic amides.

S.No	Wave numbers in cm^{-1} APC	Possible molecular fragments	Functional groups
1.	412.65	Fe-S	Ferrous sulphide

2.	599.37	-COOH	Carboxylic acid
3.	3411.73	O-H	Hydroxyl
4.	1316.05	O-H	Hydroxyl
5.	1128.03	C-O	Carbonyl
6.	881.08	C-H	Alkane
7.	1629.74	C=C	Terminal alkyne
8.	2925.37	CH_3Stretch	Alkane
9.	462.06	CH_3-NH_2	Primary aliphatic amine

Table. 2. Wave numbers in cm^{-1} in APC, molecular fragments and their functional groups

Discussion:

The FTIR results shows the observed Fe-S,-COOH,O-H,O-H,C-O,C-H,C=C,CH_3 stretch,CH_3-NH_2 molecular fragments which indicates that the presence of following functional groups ferrous sulphide, carboxylic acid, hydroxyl, carbonyl, alkane, terminal alkyne and primary aliphatic amine. The instrumental analysis FTIR showed the presence of functional groups through their stretch and bends which responsible for its functional activity.

Systemic validation through SEM-EDAX analysis:

Scanning Electron Microscopy (SEM), also known as SEM analysis or SEM microscopy, is used very effectively in microanalysis and failure analysis of solid in organic materials. The electrons interact with atoms in the sample, producing varioussignals that contain information about the samples surface topography and composition. The electron beam is scanned inarasters can pattern, and the beams position is combined with the detected signal to produce an image. Itiaapowerful and mature technique in the examination of materials, widely in metallurgy, geology, biology and medicine.

Scanning electron microscopy is performed at high magnifications, generates high-resolution images and precisely measures very small features and objects.[5]

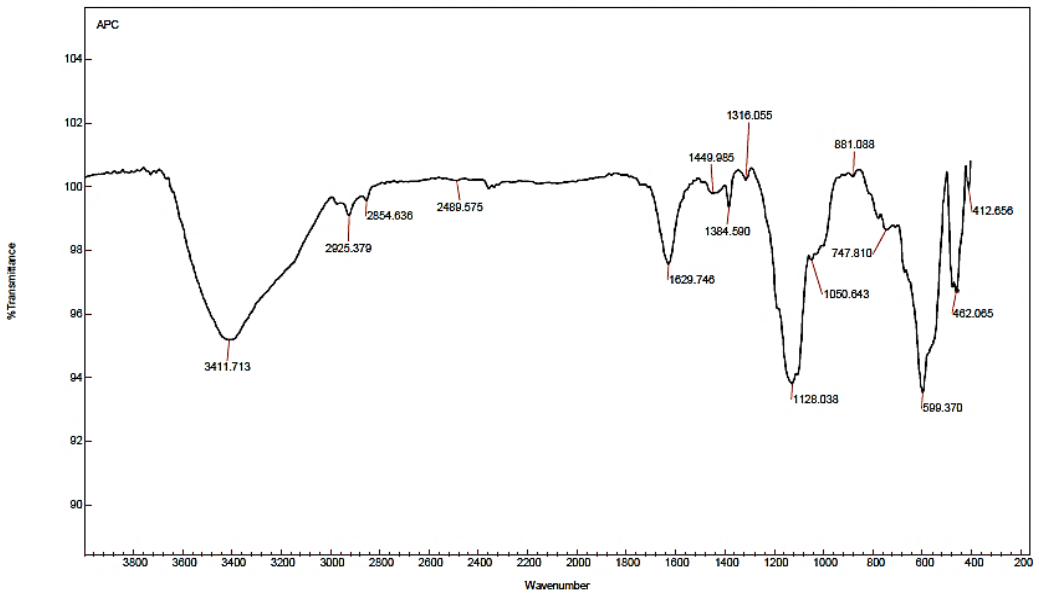


Fig No : 2 SEM analysis report of *Anna Pavazha Chendhuram*(APC)

Result :

- Strong intense peak at 412.65 cm-1 may be due to Fe- S stretching indicates the presence of Fe-S group. Medium peaks at 599.37 cm-1 may be due to presence of –COOH group.
- Sharp intense peak at 3411.73 cm-1is due to the presence of free O-H group.
- Absorption peak at 1316.05 cm-1 may be O-H stretching and band at 1128.03 cm-1 due to the presence of C-O group.
- Absorption peak at 881.08 cm-1 due to C-H out of plane bending and absorption peak at 1629.74 cm-1 due to the presence of C=C stretching vibration.
- Peaks at 2925.37 cm-1 due to CH3-stretching vibration and absorption bands at 462.06 cm-1 may due to presence of primary aliphatic amides.

Discussion:

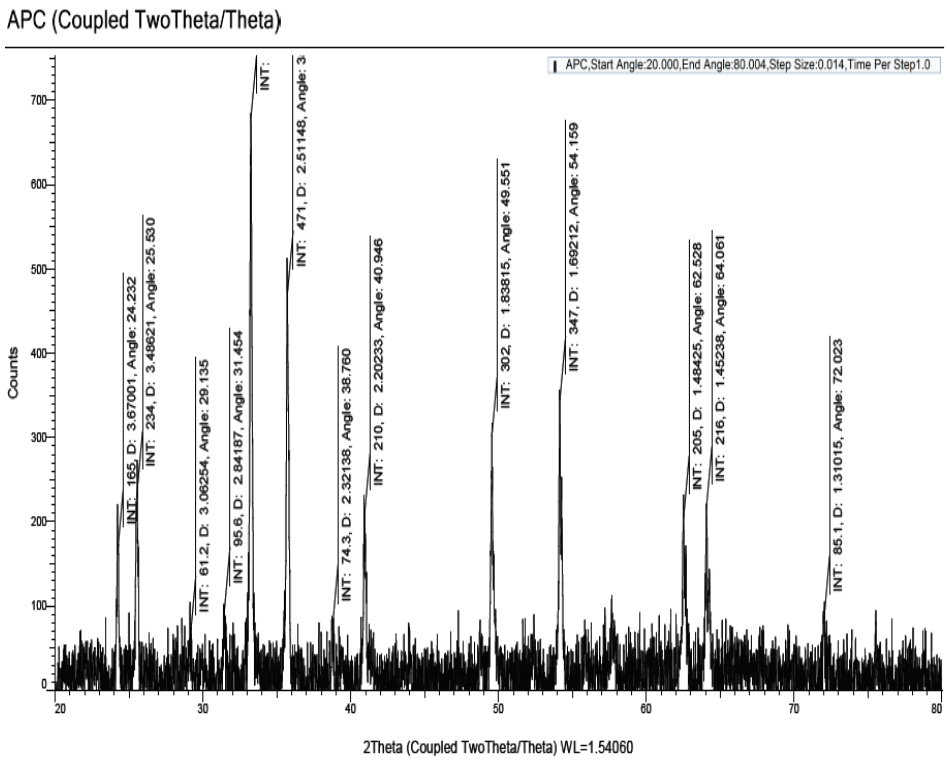
Energy dispersive x-ray analysis (EDAX) of KVKC was carried out and the elements present like Iron, Oxygen, Carbon, Carbonmonoxide, Flourine, Aluminium and Silicon were estimated. From the spectra atom percentage of the elements are found to beas follows. Iron = 39.14%, Oxygen= 30.22%, Carbon = 20.54%,Carbon monoxide =5.43%, Flourine = 3.77%, Aluminium= 0.55% and Silicon = 0.36%. SEM and EDAX provide good estimate of the concentration of main elements in the drug. Furthermore, it provides useful information in the distribution of the elements forming the drug and their sample chemical form.

Systemic validation through XRF analysis:

X-Ray Fluorescence is a lab-based technique used for bulk chemical analysis of rock, mineral, sediment,andfluidsamplesandtheemissionofcharacteristic"secondary"(or fluorescent) X-rays from a material that has been excited by being bombarded with high-energy X-raysorgammarays.. The technique depends on the fundamental principles of x-ray interactions with solid materials, similar to XRD analysis. XRF analysis is one of the most commonly used techniques for major and trace element analysis, and chemical analysis, particularly in the investigation of metals, glass, ceramics and building materials, and for research in geochemistry, forensic science due to the relative ease and low cost of sample preparation.

As the d value of the diffracting crystal is known, the detector and diffracting crystal can be

moved (using thegoniometer) through an angle q so that only X-rays with a specific wavelength arrive at the detectors. Therefore, the X-ray detector canbe"tuned"to measure only the X-rays produced by fluorescence of atoms of one element; the intensity of this radiation is proportional to the abundance of that element within the sample.(5)



Result :

The X-ray diffraction pattern of the prepared sample APC reveals the presence of major peak with 2- Theta value of 35.722 with the intensity of 471 corresponds to Iron.

Discussion:

From this analysis it was concluded that Iron is the key ingredient present in the sample APC.

Conclusion:

From the provided literature evidence, the sample drug *Annapavala Chendhuram* which was subjected to instrumental analysis which provided the key ingredients , thus it accounts the necessary justification to prove the efficacy of the drug. FTIR studies showed that there is no harmful chemicals and minerals present.

Thus this herbo-mineral formulation, *Annapavala Chendhuram*is validated and proved to be the safest and efficient drug of choice.

References:

1. Siddha Formulary of India; Part I, First Edition 1984; Ministry of Health and Family Welfare; Government of India.
2. Thiyagarajan R, Gunapadam Thathu-Jeeva vaguppu (Part 2&3); Indian medicine and Homeopathy;2009;18-20.

3. K.S. Murugesa Mudaliyar Gunapadam first part - mooligai vaguppu; published byIndianmedicine& Homeopathy; first edition -1936, IX edition-2013.
4. General Guidelines for drug development of ayurvedic formulations; Volume I, First edition 2018; Central Council for Research in Ayurvedic Sciences, Ministry of AYUSH, Government of India, New Delhi.
5. Pharmacopoeial Laboratory for Indian Medicine (PLIM) Guideline for standardization and evaluation of Indian medicine which include drugs of Ayurveda, Unani and Siddha systems, Department AYUSH, Ministry of Health & Family Welfare, Govt. of India.