International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

FTIR Analysis of Siddha Drug Bojana Kudori Mathirai

Abirami A[*1], Kingsly A[2]

PG Scholar[1], Professor & HOD[2]
Department of Gunapadam, Government Siddha Medical College, Palayamkottai, Tirunelveli, Tamilnadu, India
Corresponding Author: Abirami A
*drabianbu16[at]gmail.com

Abstract: ***Background: The BOJANA KUDORI MATHIRAI is a herbo-mineral drug used for the treatment of akkinimantham, gunmam, vayuruvali, vayu, pithavayu, soothgavayu, kiragani. Objective: The objective of the present study is to characterize and assess the functional groups in herbo-mineral drug BOJANA KUDORI MATHIRAI. Materials and Methods: The ingredients were collected & purified and the drug was prepared as per Siddha literature "Anuboga vaithiya brama ragasiyam - part 6 ". Here, the drug was subjected into characterization through FT-IR analysis. Result: Characterization plays a major role to identify the nature of the drug. The instrumental analysis FT-IR study for "BOJANA KUDORI MATHIRAI" will show the presence of functional group through the stretch and this form the base for the further pharmaceutical analysis and clinical trial. Conclusion: This study forms the base for the pharmaceutical analysis of BOJANA KUDORI MATHIRI which will be followed by safety and efficacy studies later.***

Keywords: *FT-IR, Bojana Kudori Mathirai, Functional groups, Soothagavayu*

1.Introduction

Siddha system is one of the most conservative medical systems in the world. In the field of medicine, Siddhars enlightened the world to save the human lives from various diseases. *Siddha* system of medicine use plants, minerals and animal products as main ingredient to cure various ailments. It is more widely used for the human ailments from time immemorial. *BOJANA KUDORI MATHIRI* has been mentioned in *Siddha* texts for the management of *akkinimantham, gunmam, vayuruvali, vayu, pithavayu, soothgavayu, kiragani Siddha* Herbo-mineral formulations are gaining popularity worldwide due to the presence of nano and micro size particles which have properties like increased bioavailability, minimal side effect, and longer shelf life period and need less therapeutic dosage. Therapeutic activity of a herbo-mineral formulation depends on its phytochemical constituents. Standardization is a system that ensures a predefined amount of quantity, quality and therapeutic effect of ingredients in each dose. Standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assurance program for the manufacturing of an herbal drug.

For the development of a new drug or the standardization of the traditional Siddha formulations through characterization, usage of modern sophisticated equipments is an emergency need to strengthen the field of Pharmacology. FT-IR is one of the important analytical techniques which is used to determine the organic compounds, including chemical bond, as well as organic content (eg., protein, carbohydrate and lipid). In this article the drug TM is subjected to access the functional groups present in the drug, with the help of FT-IR instrument.

2.Materials and Methods

In the present study, Herbo-mineral preparation (*BOJANA KUDORI MATHIRI)* has been selected to establish its standardization status from the classical Siddha literature. The key ingredients used in the formulation were listed below. Purification and Preparation of the BOJANA KUDORI MATHIRI was carried out as per classical text literature mentioned.

Ingredients of Drug:

- *Chukku (*Zingiber officinale. Linn.)
- *Indhuppu (*rock salt _ sodium chloride impure)
- *Perungayam (*ferula asafoeetida)
- *Inji (*zingeber officinale)
- *Chiragam (*cumminum cyminum)
- *Milagu (*Piper nigrum. Linn.)

Preparation:

All purified raw drug are made in to fine powder individually. To this mixture add lime juice and grind it for 6 hours (2 samam) in to a paste like form and made in to small pills size of *sundaikaaialavu (*0.798 gm) and dried in sun shade and kept in air tight porcelain container.

Dosage: 1 pill (0.798 gm)

Indications:

- *Akkinimantham*
- *gunmam*
- *vayuruvali*
- *vayu*
- *pithavayu*
- *soothgavayu*
- *kiragani*

FT-IR Analysis:

FTIR (Fourier Transform Infra-red Spectroscopy) is a sensitive technique particularly for identifying organic chemicals in a whole range of applications although it can also characterize some inorganics. Examples include paints, adhesives, resins, polymers, coatings and drugs. FTIR is an effective analytical instrument for detecting functional groups. FTIR analysis was done at International Research Centre, Kalasalingam Academy of Research and Education, Krishnankoil.

The analysis was carried out using IRTRACER-100. The IRTracer-100 FTIR Spectrophotometer has an enhanced interferometer and detector design, and it offers excellent sensitivity with a 60, 000: 1 S/N ratio. When the Lab Solutions IR Contaminant Analysis Macro is combined with the sensitivity; faster, easier, and more precise analysis of small samples can be performed. The IRTracer-100 system can be customized by the user, with a range of accessories and user-friendly software options to meet the needs of a specific application.

Potassium Bromide (KBr) matrix with scan rate of 20 spectra per second at the resolution 0.25 cm-1 in the wave number region 400-4000 cm-1. The samples were ground to fine powder using agate motor and pestle and then mixed With KBr. They were 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.

3.Results

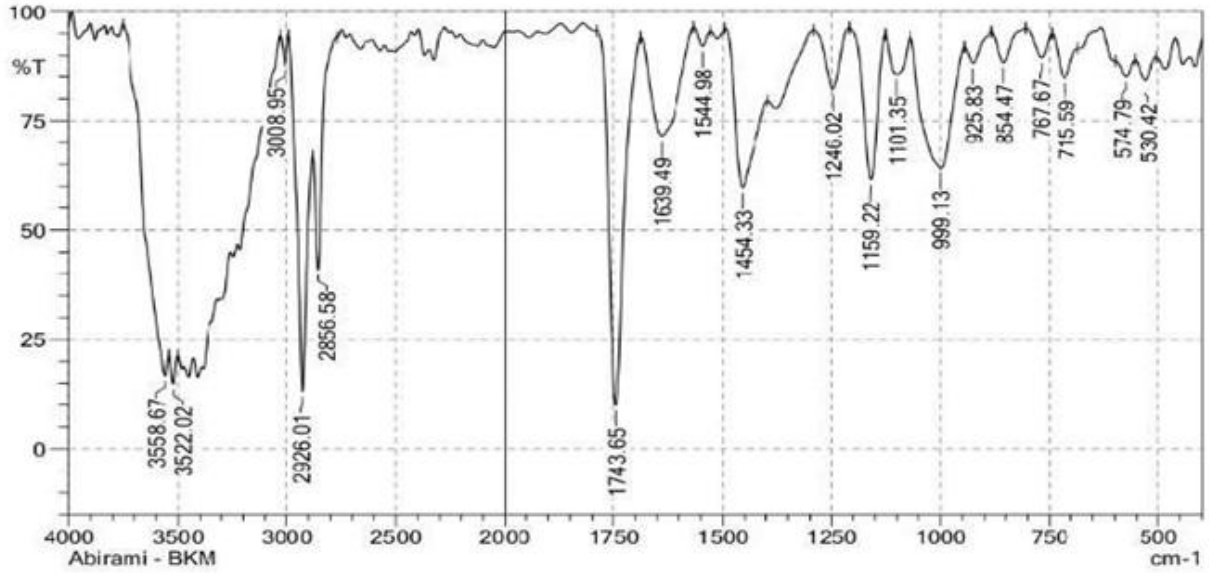

Figure 1: FTIR Spectra of BKM

Table 1: FTIR interpretation of *Bojana kudori mathirai*

S. N o	Wave Number (cm-1)	Vibrational Modes of BKM in IR Region	Functional group
1	3588.67	O-H Stretching	Alcohol, adehyde, carboxylic acid
2	3522.02	O-H Stretching,	Alcohol
3	3008.95	O-H Stretching	Carboxylic acid
4	2926.01	O-H Stretching	alcohol
5	2856.58	O-H Stretching	Alcohol
6	1743.65	C-H bending	Aromatic compounds
7	1639.49	C=-C Stretching	Conjugated Alkenes
8	1544.98	N-O stretching	Nitro compound
9	1454.33		
10	1246.02	C-N Stretching	Amines
11	1159.22	C-O streching	Tertiary alcohol
12	1101.35	C-O stretching	Aliphatic ether
13	999.13	C-H	Alkene & aromatic compound
14	925.83	-NH 2	Aliphatic amines
15	854.47	=CH2	Wagging
16	767.67	C-halogen &Aromatic rings	Halogen compounds &Aromatic compounds
17	715.59	C=C bending	Alkene
18	574.79	C-Br stretching	Halo compound
19	530.42	C-I stretching	Halo compound

4.Results and Discussion

In FT-IR spectra analysis, this sample BOJANA KUDORI MATHIRAI exhibits the peak value shows in table 1 at the wave number of 3558.67, 3522.02, 3008.95, 2926.01, 2856.58, 1743.65, 1639.49, 1544.98, 1454.33, 1246.02, 1159.22, 1101.35 999.13, 925.83, 854.47, 767.67, 715.59, 574.79, 530.42 having [-OH,-NH, =C-H], OH stretching, OH stretching, OH stretching OH stretching, CH bending, C=C stretching N-O stretching, C-N stretching, C-O stretching, C-O stretching, C-H,-NH 2,, =CH2, [C-halogenAromatic rings], C=C bending, C-Br stretching, C-I stretching respectively. This peak indicates the presence of some organic functional groups such as Alcohol, amides, amines, alkynes, carboxylic acid, aromatic compound, conjugated alkene, nitro compound, aliphatic ether, halogen compound respectively.

5.Conclusion

The instrumental analysis FTIR shows the presence of functional groups through their stretch and bends which are responsible for its functional activity. It will be subjected to further many studies to validate its efficacy and safety through proper standardization procedure. Thus this drug can be taken to the next level of isolation of the active principles which is responsible for the therapeutic effect.

Acknowledgement

I wish to express my sincere thanks to Dr. A. Kingsly, Professor & HOD, Department of Gunapadam, GSMC, Palayamkottai, for the valuable support and for giving the authentication for the raw materials of the drug used in the preparation of medicine. I wish to express my sincere thanks to International Research Centre, Kalasalingam Academy of Research and Education, Krishnankoil to provide the FTIR result of the drug.

References

[1] Kuppusamy Mudaliyar K. S. Anuboga Vaithiya Brama Ragasiyam-Part 6,. Pg. No.18, 1951.
[2] Dr. Thiyagarajan R., Gunapadam ThathuJeeva Vaguppu, Government Siddha Medical College, Palayamkottai, Tirunelveli 627002, 1981.
[3] Dr. Murugesa Muthaliyar K. C., Gunapadam MooligaiVaguppu Part-I, Indian Medicine and Homeopathy Department, Chennai 106, 2016.
[4] Somasundaram .S, Maruthuva Thavara Iyal, Vol-1, Ilangovan publishers, Tirunelveli-2, 1997 edition.
[5] Fourier Transform Infra-red Spectroscopy available at: https://www.lpdlabservices.co.uk/analytical_techniques/chemical_analysis/ftir.php
[6] Devi dattjoshi 2012, FTIR spectroscopy: herbal drugs and fingerprints pg no: 121-146 In: Herbal Drugs and Fingerprints.