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ASSESSMENT OF FUNCTIONAL GROUP IN HERBO MINERAL FORMULATION *GANDHAGA CHENDHOORAM* THROUGH FOURIER TRANSFORM INFRARED SPECTROSCOPY ANALYSIS

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ABSTRACT
Siddha system of medicine is not a single man's discovery but a gradual evolution during successive periods of history from stone period and *sangam* period sequel. This system of medicine have 32 types of internal medicine, *Chendhooram* is a one among them. But scientific validation of this internal medicine is very less in documentation. Aim of the present study is validate the *Gandhaga chendhooram* through the FT IR analysis to find out the functional group in the drug. *Gandhaga chendhooram* is taken from the *Siddha* book *Anuboga Vaithiya Navaneetham*. Result of the FTIR analysis shows presence of functional group like O-H stretch (Alcohol),=C-H stretch (Alkane), C=N stretch (Nitriles), N-H stretch (Amines), C-C stretch (Arometics), N-O stretch (Nitro compounds), O-H bend (Carboxylic acid) and C- Cl (Alkyl halides) which ensure the efficacy and therapeutic effect of the GC.

KEYWORDS: *Siddha, Gandhaga chendhooram,* FTIR, *Gandhagam, Lingam, Chendhooram.*

INTRODUCTION
Siddha science is a traditional system of medicine generated from Tamil culture.[1] C*hendhooram* is one of the medicine form in *Siddha* system, which is manufactured by the use of various chemical substances along with medicinal plants. After that it was incinerated with the cow dung cakes. It is one of the higher order medicine in the system to treat the chronic ailment diseases.

Gandhagam Chendhooram is taken form the *Siddha* literature from *Anuboga Vaithiya Navaneetham*. Ingredients of the medicine were *Gandhagam* and *lingam*, *Ganadhagam* is otherwise known as *Sentooraththathi*.[2] Which treat the condition like PCOS (*Soodhaga vayu*). In this article to analyses the presence of functional group in the *Gandhagam Chendhooram* with the help of FTIR instrument.

MATERIALS AND METHODS
Ingredients of the *Gandhaga Chendhooram*

1. *Gandhagam* (Sulphur),
2. *Lingam* (Red sulphide of mercury)
3. *Erukkam poo* (*Calotropis gigantea*)

Gandhagam and *Lingam* were purified as per the procedure of *Gunapadam Thathu Seeva Vagupu*. After that these ingredients were processed with the help of *Calotropis* extract as *Chendhooram* by the Standard Operative procedure in *Anuboga Vaithiya Navaneetham*. Then the *Chendhooram* was obtained and kept in the air tight container and labeled as GC. As per the *Siddha* Classical literature *Chendhooram* has 75 years shelf life.[3]

FTIR analysis[4]
Functional groups are structural units within the organic compound that are defined by specific bonding arrangements between specific atoms and it means a group of atoms the shape of which determines the characteristic chemical properties of the molecule. The wave numbers from 4000cm-1 to 1500cm-1 gives details for identification of functional group. The wave number from 1500cm -1 to 400 cm-1 provides particulars about molecular fingerprint.

Principle
Spectrophotometric tests are commonly used in the Identification of chemical substances and quantification of polymorphic forms. The test procedures are applicable to substance that absorbs IR radiation. The IR absorption spectrum of a substance compared with that obtained concomitantly for the corresponding reference standard /

reference substance provide conclusive evidence of the identity of the substance being tested.

Recording Infrared spectrum of a solid as a disc (as per USP ‹197K›)

- Triturate about 1 to 2 mg of the substance to be examined with 300 to 400 mg, unless otherwise specified, of finely powdered and dried potassium bromide. If the substance is a hydrochloride it is preferable to use potassium chloride.
- Carefully grind the mixture and spread it uniformly in a suitable die.
- Submit it to the pressure of about 800 mPa (8 tons/cm2).
- Examine the disc visually and if any lack of uniform transparency is observed, reject the disc and prepare again.
- Record the spectrum between 4000 to 650 cm-1 unless otherwise specified in individual standard test procedure.
- When sample and standard are measured for concordance, the transmittance obtained at the start of the scan range, should not deviate by more than 10% between them (For ex. If the standard shows a transmittance of 75%, the sample transmittance can be between 65% and 85%).

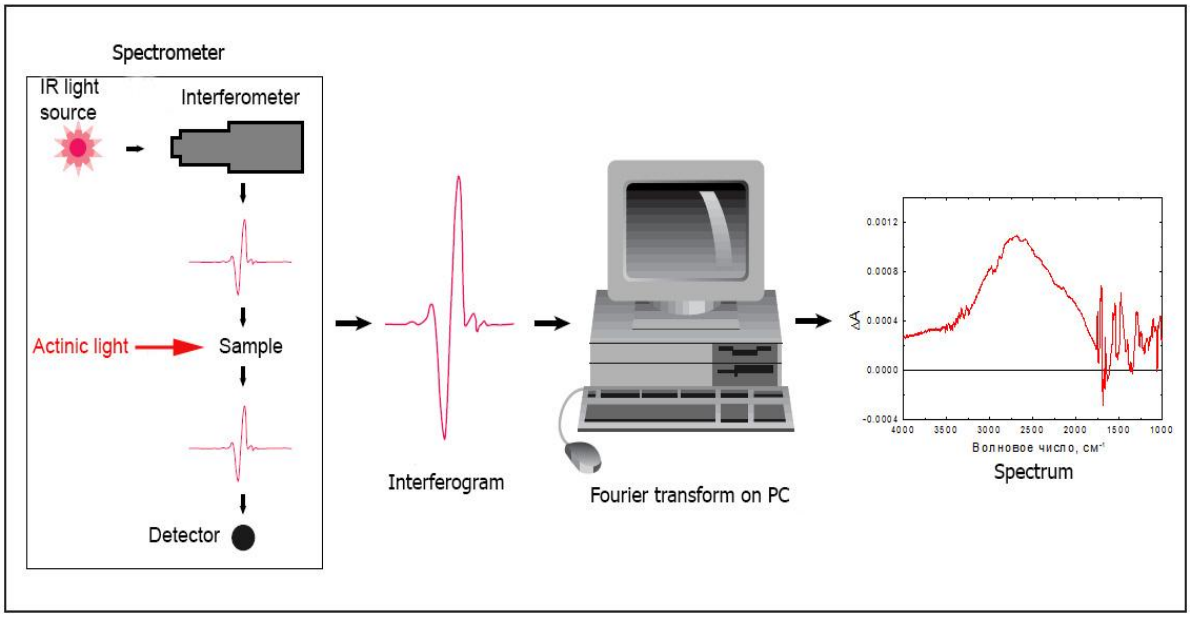
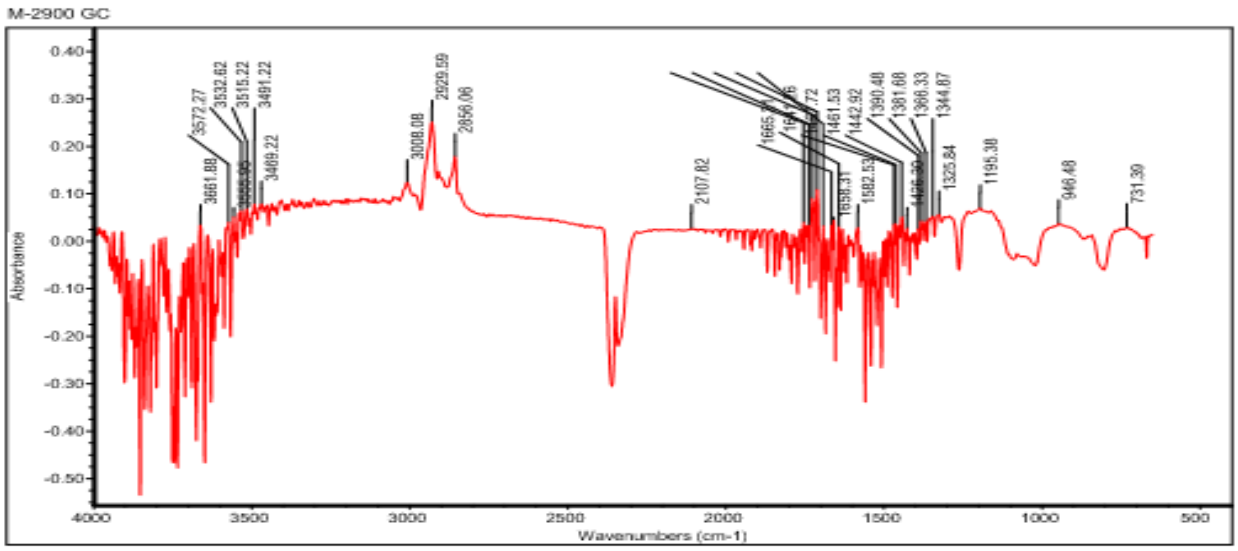


Fig. No. 1: Mechanism of FT IR.

RESULT AND DISCUSSION

FTIR -Fourier Transform Infrared Spectroscopy.



Graph. No.1: Peak values by FTIR.

Table.No. 1: Functional group presence in the of FT IR Analysis.

Absorption peak cm-1	Stretch	Functional Group
3661	O-H stretch, Free hydroxyl	Alcohols and phenols
3008	=C-H stretch	Alkanes
2107	C=N stretch	Nitriles
1658	N-H bend	1^0Amines
1582	C-C Stretch	Arometics
1344	N-O symmetric stretch	Nitro compounds
1325	C-N stretch	Arometic amines
1195	C-N stretch	Aliphatic amines
946	O-H bend	Carboxylic acid
731	C-Cl stretch	Alkyl halides

The FT IR spectra analysis which exhibits the peak value 3661, 3008, 2107,1658,1582, 1344, 1325, 1195, 946, 731cm1 having O-H stretch,=C-H stretch, C=N stretch, N-H stretch, C-C stretch, N-O stretch, C-N stretch, O-H stretch, C-Cl stretch.

This peak indicates the presence of functional groups such as Alcohol, Phenols, Alkanes, Nitrils, 1^0 Amines, Alkyl halide, Alkyne, Amine, Aromatic, Nitro compounds, Aliphatic amines and Carboxylic acid.

Amines

Amines are inorganic derivatives of ammonia; they play a very significant role in the creating amino acids.[5] Amine groups act on the neurotransmitters; and also it is involved in the protein synthesis. Proteins are helpful in creation of hormone and enzyme.

Aromatic amines

Aromatic amines act against the free radical scavenging activity; it is helpful in the polycystic ovarian syndrome.[6]

OH

OH group has higher potential towards inhibitory activity against microorganisms.

Phenols

Phenolic compounds are also present in a number of biological systems and natural products such as neurotransmitters, flavoring agents, and vitamins to name a few. The effect of phenols is currently of great awareness due to their anti-oxidative. Phenols and flavonoids possess diverse biological activities, for example antioxidant and antidepressant activities.[7] The abnormal oxidative stress in polycystic ovary syndrome (PCOS) could cause genetic instability and raise the risk of cancers. Antioxidants have positive effects on PCOS.

Alkanes

Alkanes are said to be saturated hydrocarbons, because the carbons are bonded to the maximum possible number of hydrogen's - in other words, they are saturated with hydrogen atoms.[8] Alkanes have little biological activity, protective against Microorganism.

Carboxylic acid

Carboxylic acids make up a series of fatty acids that are extremely good for health. The omega-6 and omega-3 fatty acids are considered to be "essential" because they are required for good health yet cannot be produced by the body. Another name for omega-6 is linoleic acid. It helps to maintain cell membranes and to control nutrient use and metabolism and also regulating the hormone level. Omega 3 fatty acids increase insulin sensitivity, reduce hyperinsulinemia, lower plasma triglyceride and liver fat, decrease inflammation and obesity.[9]

Nitro compounds

Nitro compounds act against the infectious disease.[10]

CONCLUSION

From the above results of FTIR analyses shows the presence of functional group like O-H stretch (Alcohol), =C-H stretch (Alkane), C=N stretch (Nitriles), N-H stretch (Amines), C-C stretch (Arometics), N-O stretch (Nitro compounds), O-H bend (Carboxylic acid), C- Cl (Alkyl halides) which ensure the efficacy and therapeutic effect of the GC. Presence of these functional groups Aromatic amines, Alcohol, Phenlos, Alkanes, Carboxylic Acid, Nitro compounds increase the efficacy of the *Gandhaga Chendhooram*. It is used to treat the various illness conditions in human beings.

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