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Fourier Transform Infrared Spectroscopy Analysis of Siddha Formulation "*Ayakaruppu*"

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Abstract: ***The Siddha System of medicine is one among the AYUSH system in India. The Siddha medicine is used to treat various diseases, especially inPerumpadu ["Dysfunctional uterine bleeding" (DUB)] diseases. In Siddha system, medicine are prepared from herbals, minerals, salts and metals as well as marine and animal products. The Siddha formulation "Ayakaruppu" is used to the DUB diseases. The functional groups of this formulation are analysed through FTIR Spectrocopy and the biological roles of the functional groups are discussed in this paper.***

Keywords: *Ayakaruppu*, FTIR, Siddha medicine, Functional groups

1. Introduction

Siddha medicine has profound vital role in disease, prevention and prophylaxis through it's herbal medicine and other form of medicine like *karuppu, chendooram, parpam* and other 32 types of preparation (Thiyagarajan. R-2006). The standardization of drug and clinical efficacy of study in ***Ayakaruppu*** was done through FT-IR Spectroscopy.

As per guidelines of WHO and AYUSH insisted the guidelines for quality control to better standardization of the drugs as pertain to Pharmacopeia Laboratory of Indian Medicine (PLIM). The systematic steps should be taken to standardization of traditional drugs by using modern technique like FTIR. In siddha text ***Anubavavaithiya deva ragasium* –part 2-page-298** is mentioned the indication of ***perumpadu*** (Dysfunctional Uterine Bleeding-DUB).

2. Materials and Methods

In the present study, Herbomineral preparation (*Ayakaruppu*) has been selected to establish it's standardization status from the classical Siddha literature. Purification and preparation of the ***Ayakaruppu*** was carried out as per classical text literature mentioned.

Required ingredients:
Purified *ayam* (Ferrum iron)
Karuvelam pinju (A young pod extract of acacia arabica)

DOSAGE:
Kundri edai (130mg) –twice a day

ADJUVANT:
Ghee

INDICATION:
Perumpadu

FT-IR RESULT:

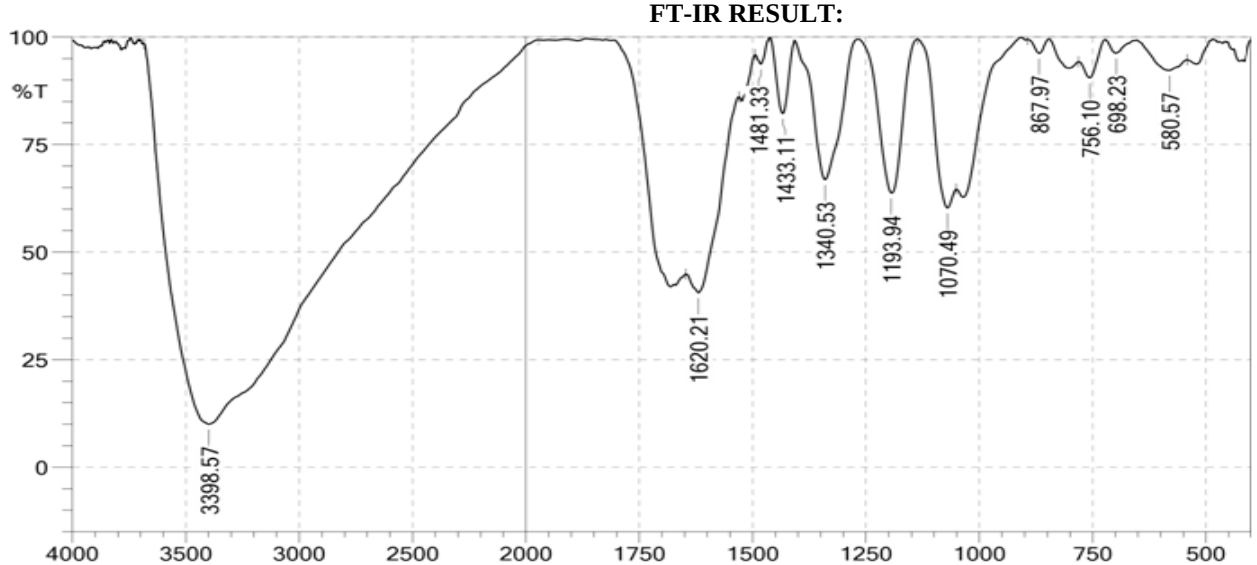

Figure 1: FTIR Spectra of AK

Table 1: FTIR Interpretation of AK

S. NO	Wave Number (cm)	Vibrational Modes of AK in IR Region	Functional groups
1	3398.57	N-H Stretching	Aliphatic primary amine
2	1620.21	C=C Stretching	Alpha, beta unsaturated ketone
3	1481.33	C=C Stretching	Aromatic compound
4	1433.11	O=H Bending	Carboxylic acid
5	1340.53	S=O Stretching	Sulfone
6	1193.94	C-O Stretching	Ester
7	1070.49	C-O Stretching	Primary alcohol
8	867.97	C-H Bending	1, 3 disubstituted
9	756.10	C-H Bending	1, 2 disubstituted
10	698.28	C=C Bending	Alkene
11	580.57	C-I Stretching	Halo compound

Interpretation

In FT-IR Spectra analysis, this sample "*Ayakaruppu"* exhibits, this peak value at 3398.57, 1620.21, 1481.33, 1433.11, 1340.53, 1193.94, 1070.49, 867.97, 756.10, 698.28, 580.57 having N-H Stretch, C=C Stretch, O-H Blend, S=O Stretch, C-O Stretch, C-H Bend, C-I Stretch respectively. This peak indicates the aliphatic primary amine, alpha, beta unsaturated ketone, carboxylic acid, aromatic compounds, sulfone, ester, primary alcohol, alkene, halocompounds.

These compounds have some pharmaceutical properties and are briefly discussed below.

Aliphatic primary amines: Aliphatic amines constitute the largest group of epoxy curing agents. They can be usedas is or adducted to modify volatility, toxicity, reactivity, and stoichiometry.

Aromatic compound: They have antibacterial, anti diabetic and antioxidant activities. The hormonal changes of menstrual cycle affect the misplaced endometrial tissue, causing the area to become inflamed and painful. This means the tissue will grow, thicken and break down. Presence of antioxidant activity of this drug, its repair the endometrial tissue damage.

Pimaryalcohol: Some examples of these primary alcohols included methanol (propanol), ethanol etc. These are used in medicine as an antiseptic, disinfectant and antidote.

Halo compound: The "halo effect" is when one trait of a person or thing used to make an overall judgement of theperson or thing. It supports rapid decisions, even if biased ones. The compound used as disinfectants, anticancer and antibacterial. Abnormal vaginal bleeding with fever may be caused by bacterial infection in the pelvic organs. Presence of antibacterial activity of drug, it's prevents the pelvic organs from bacterial infections.

Carboxylic acid: It is used as antimicrobials. Amino acids and fatty acids are important examples carboxylic acids. Which are the building block of proteins and lipids respectively. Haem protein is one of the main constituent of haemoglobin. So it's prevents and cure the blood loss anaemia in *Perumpadu (*DUB).

Sulfone: Sulfones have various biological activities primarily as antimalarial, anti-inflammatory, antimicrobial, antifungal, antibacterial and antiproliferative. Antimalarial activity of the drug, prevents the abnormal menstruation, which is an unusual manifestation of malaria.

Esters: Esters have antispasmodic properties. Naturally occurring fats and oils are fatty acid esters of glycerol**.**

Alkene: This is used as a general anaesthetic and have antioxidant activity**.** This is also used to prepare some organic compounds such as ethyl alcohol, acetic acid and acetaldehyde.

3. Conclusion

The above data showed that the spectroscopic standardization of the drug *Ayakaruppu.* It concludes that the presence of functional groups of ***Ayakaruppu*** have antiseptic, antispasmodic, antimicrobials, antibacterial, antidote and disinfectant properties. Presence of these active components ensures the quality and efficacy of the drug. So this drug is important role to cure the DUB diseases. These findings will give valuable information to future clinical trials.

Acknowledgement: None.

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