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Characterization of the Traditional Siddha medicine Vengara parpam through spectroscopic analysis

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Abstract

Traditional use of siddha medicine has received attention by the scientific community for its high therapeutic value and their standardization is essential to get wider knowledge about that drug for extensive safe use worldwide. Fourier Transform Infra-Red Spectroscopy (FTIR) characterization will help to determine the functional compounds of the drug. Siddha medicine Vengara parpam was subjected into characterization through FTIR. The FTIR peaks of Vengara parpam constitute some functional group such as alcohol, phenols, alkyl, amines, aromatic, carboxylic acids, ether, fluroalkanes, chloroalkanes and iodoalkanes. If further research will followed based on this research work, helps to utilize the medicinal effect of this Siddha drug clinically in a safe manner.

Keywords: Vengara parpam, Siddha medicine and Therapeutic effect

Introduction

The medicinal plants and the herbal preparations are preferred nowadays due to minimal side effects and the presence of abundant antioxidants and micronutrients which possesses a better therapeutic efficiency. In the recent years a new breakthrough has occurred in the medical field over the usage of herbals and minerals and it is quite evident when we check the usage of herbals for many health hazards (Galib *et al.,* 2011; Savarimuthu Michael *et al.,* 2011). Adulteration of the drugs and misidentification of the herbs may also lead to serious effects and problems in pharmaceutical industry. To overcome this problem, standardization of drug paves the way for the establishment of consistent purification methods, consistent chemical, biological, physico-chemical profile and elemental presence. Hence, the WHO has published

certain guidelines for the standardization procedures (WHO, 2007). The World Health organization defines herbal medicines as those containing plant parts or plant materials in raw state or processed form containing active principles (WHO, 2000). Siddha system possesses bountiful forms of herbal, herbo-mineral preparations in which many combinations, new formulations are developed and practiced every now and then. Amongst the herbo-mineral preparations, Parpam is acclaimed medicinal form obtained by repeated incinerations of purified metal along with juices of medicinal plants.

Vengara parpam is indicated as one of the best raw drug source in siddha medicine for its wide medicinal uses. In ancient days it is widely used as a drug of choice for the treatment of Antipyretic, Anti microbial, Refrigerant, Stimulant, and stomachic actions. In siddha system the symptoms of fever is correlated with "Suram". Siddha system offers a wide range of remedies for fever, "Vengara Parpam" is one of the herbo mineral drug indicated for the treatment of various diseases (Jothilakshmi *et al.,* 2013). It also has anti urolithiatic effect (Nalini *et al.,* 2015). In the present investigation, validation of the safety and efficacy of a Siddha herbo-mineral preparation was done, by Spectroscopy analysis.

Material and Methods

The medicine Vengara Parpam has been purchased from SKM Siddha and Ayurvedha Company (India) Limited, Saminathapuram, Modakurichi, Erode and used as such for the present study. The Perkine Elmer Spectrum One Fourier Transform Infrared (FTIR) Spectrometer was used to derive the FTIR Spectra of Vengara Parpamin Potassium Bromide (KBr) matrix with scan rate of 5 scan per minute at the resolution $4cm^{-1}$ in the wave number region $450\text{-}4000cm^{-1}$ and the emission lines have been indexed by using the standard reported values (Robert *et al.,* 1990).

Result and Discussion

In the FTIR Spectra analysis, this Vengara Parpam showed the association of functional groups and 14 effective peaks were obtained between 4000 cm^{-1} to 450 cm^{-1}. The results of FTIR Spectra analysis are presented in figure 1 and Table 1 which exhibits the peak value at 3402, 2922, 2133, 1635, 1492, 1446, 1326, 1253, 1152, 1078, 858, 764, 605 and 435 cm^{-1} having O-H Stretch, C-H Stretch, C-C Stretch, N-H Stretch, C-C Stretch, C-C Stretch, C-O Stretch, C-O Stretch, C-O Stretch, C-X Stretch, C-H Stretch, C-HStretch, C-X Stretch and C-X Stretch. This peak indicates the presence of some organic functional groups such as

alcohol, phenols, alkyl, amines, aromatic, carboxylic acids, ether, fluroalkanes, chloroalkanes and iodoalkanes.

Figure 1: FTIR Spectra of Venkara Parpam

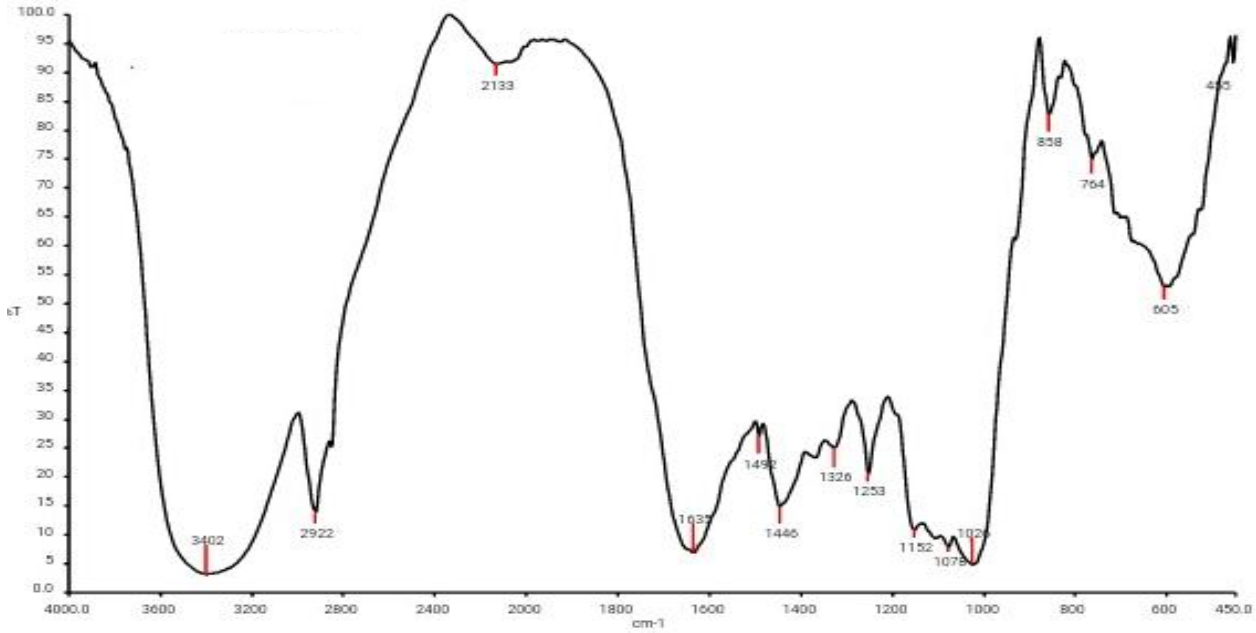

Table 1. FTIR Interpretation of Vengara Parpam

Bond	Type of bond	Specific type of bond	Absorption peak cm-1	Appearance
O-H	Alcohol, Phenols	High concentration	3402	-
C-H	Alkyl	Methylene	2922	Medium to strong
C-C	C=C	Terminal alkynes	2133	Weak
N-H	Primary amines	Any	1635	Strong
C-C	Aromatic C=C	Any	1492	Strong
C-C	Aromatic C=C	Any	1446	Weak to strong
C-O	Carboxylic acids	Any	1326	-
C-O	Ether	Aromatic	1252	-
C-O	Alcohols	Tertiary	1152	Medium
C-X	Fluroalkanes	Ordinary	1078	-
C-H	Aromatic	Para disub. benzene	858	Strong
C-H	Aromatic	Meta disub. benzene	764	Strong
C-X	Chloroalkanes	Any	605	Weak to medium
C-X	Iodoalkanes	Any	435	Medium to strong

The presence of these identified functional groups in medicinal compound can be responsible for their therapeutic function (Jothilakshmi *et al.,* 2013). In the modern system of medicine, every drug in the market has been standardized on the basis of the active principles present in

that drug which is more useful for curing the specific diseases. This is lacking in the Indian system of medicine. In order to overcome the difficulty a novel attempt has been made to standardize the Siddha drug by using the simple and well known Infrared spectral method.

An infrared spectroscopic study of different samples of parpam clearly indicates that the final product is identical in all the cases irrespective of mixing the different plant or vegetable juices available in the different regions used for the preparations (Nalini *et al.,* 2015). Moreover the spectral analysis helps to speculate the functional groups present in the drugs. From the nature of the functional groups, the curative property of the drug can be easily determined scientifically (Meenadevi *et al.,* 2010). Number of siddha medicine available in the market can be tested for the quality of drug by using the IR spectroscopic analysis and it is a potential tool for testing the quality of Indian medicine in the market.

Conclusion

The study clearly indicates the major portion of the compounds. Scientific validation of traditional medicines through standardization will provide the knowledge regarding the mechanism of drug action. FTIR Characterization on siddha drug "Vangara parpam" creates the fingerprints to standardize this drug. These results may form the base for further structural determination of this siddha formulation.

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