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# Assessment of Functional group in Herbal Formulation Thottar Chinungi Chooranam through Fourier Transform Infrared Spectroscopy

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## Abstract

The main objective of the study to characterize the herbal formulation Thottar Chinungi Chooranam using FTIR analysis. Fourier Transform Infrared Spectroscopy also known as FTIR analysis or FTIR spectroscopy. Now a days FTIR technique is being in practice globally. Thottar chinungi chooranam is a siddha formulation referenced by gunapadam mooligai. It has been indicated for diabetes mellitus. Thus this trial drug was analyzed through FTIR and the results was noted. The FTIR spectroscopy applied in the mid infrared region  $3000\text{ cm}^{-1}$  to  $500\text{ cm}^{-1}$ . The FTIR shows the presence of functional groups like Alcohol, Carboxylic acid, alkane, halo compound, amine and salt.

**Keywords:** FTIR, Thottar Chinungi, Diabetes Mellitus, Siddha

## Introduction

Indian traditional medicine is based on different system including Ayurveda, Unani, and Siddha. In all siddha formulation medicinal plants plays a crucial role.

*Mimosa pudica* known as sensitive plant or humble plant. The plant is a spiny subshrub and grows to a height of about 30cm (1 foot) belong to the family of Mimosaceae. It is a popularly known medicinal plant for its medicinal use in

Ayurveda and Siddha system of Indian medicine and locally known as “Thottal Vadi”.

During the last years the use of FTIR to determine the structure of biological macromolecules has dramatically expanded. The complete three dimensional structure of a protein at high resolution can be determined by X Ray and crystallography. The new technique of FTIR spectroscopy requires only small amounts of proteins (1mm) in a variety of environments. Therefore high quality spectra can be obtained

relatively easy without problems of background fluorescence, light scattering and problems related to the size of the proteins. The omnipresent water absorption can be subtracted by mathematical approaches. Methods are now available that can separate subcomponents that overlap in the spectra of proteins. These facts have made practical biological systems amenable to studies by FTIR spectroscopy.

## Materials and Methods

The drug was subjected to FT-IR analysis using KBr pressed disk technique on Analytical Technologies FT-IR spectrophotometer (Model: INFRA 300050) and the characteristic peaks were detected and recorded.

Figure: 1



### Reference:-

I had selected the trial drug Thottar Chinungi chooranam mentioned in Gunapadam Mooligai (Page No 556).

### Source of Raw drug:-

The raw drug was collected from Thakkaley, Kanyakumari district, Tamilnadu.

### Purifications and preparation of Thottar chinungi chooranam:-

Cut and removes the stalks and unnecessary parts of leaves and roots of Thottar chinungi.

It is dried in shade and processed to obtain fine powder. Then it is filtered using pure white cloth.

Table 1: Ingredients of Thottar chinungi Chooranam

S. No	Tamil name	Botanical Name	Parts used	Quantity	Family
1	Thottar chinungi	<i>Mimosa pudica</i>	Leaves and roots	Q. S	Mimosaceae

**Dosage:** 1 to 2 gram

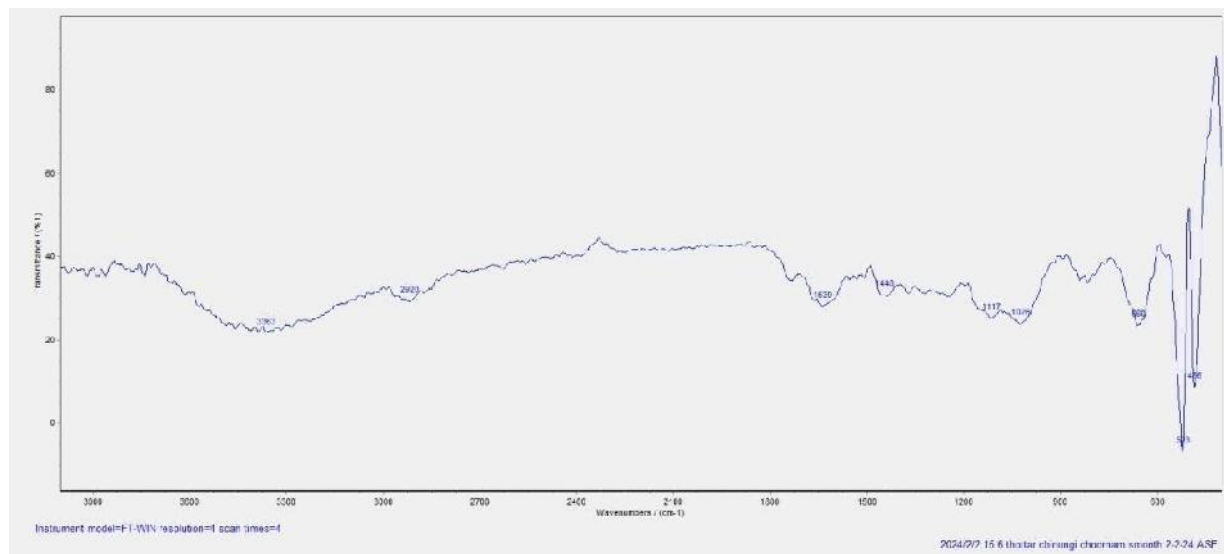
**Adjuvant:** Hot water

## Results

### FT-IR analysis:-

FT-IR Spectra were recorded at Siddha Regional Research Institute, Poojappura, Thiruvananthapuram, Kerala. Instrument model= FT-WIN was used to derive the FT-IR Spectra of Thottar Chinungi Chooranam.

**Figure: 2 - FTIR Spectral of Sample Thottar chinungi chooranam**



**Table: 2. FTIR Spectral of Thottar chinungi chooranam**

S. No	Peak	Possible Functional Group	Class
1	486	C-I stretching	halo compound
2	523	C-Br Stretch C-I stretching	alkyl halides halo compound
3	660	C-H bend C-Br Stretch	Alkynes halo compound
4	1026	Si-OR	Misc
5	1117	P=O phosphate C-O stretching	Misc Aliphatic ether Second alcohol
6	1448	Ar C-C stretch	aromatic
7	1639	C=C stretch N-H bending	alkenes amine
8	2920	-CH <sub>2</sub> - O-H stretching N-H stretching CH stretching	Alkanes Carboxylic acid Amine salt alkane Alcohol
9	3363	ArO-H Bonded O-H stretching N-H stretching	Phenol Alcohol Aliphatic primary amine

From the above analysis, the Thottar Chinungi Chooranam is known to have Amine, Alcohol, Carboxylic acid, Alkane, Amine salt, Halo compound, cyclic alkane, conjugated alkene, aliphatic primary amine, ether. These compounds have some pharmaceutical properties and are responsible for the therapeutic action of the drug. They are briefly discussed below.

#### **Amines:-**

Commonly used as pain killers. Amines are used as primary neurotransmitter. It is an antidepressant. It has analgesics, anti histamine properties too. Amines used as decongestant.

#### **Carboxylic acid:-**

The carboxyl group consisting of a carbonyl (C=O) with a hydroxyl group (O=H) attached to the same carbon atom and is usually written as -COOH or CO<sub>2</sub>H. Carboxylic acids also play significant roles in the medicinal fields.

The most important roles that carboxylic functions play in pharmaceuticals are solubilizer acting in modulating solubility, lipophilicity, and cell permeation e.g. antibiotic or antihistaminic drug classes. Prodrug and or bioprecursor acting as compounds not biologically active but converted into active ones in specific conditions. e.g. antihypertensive, antithrombotic or antiviral classes. Providing specific interactions with an enzyme triggering or blocking its biological response e.g. blood cholesterol reducing drug, nonsteroidal anti inflammatory drugs. Carboxylic acid containing drugs play a major role in the medical treatment of pain and disease. Carboxylic acid involve in carbohydrates digestion and absorption.

#### **Alcohol:-**

It also possesses several concentration-dependent pharmacological actions, including sedative, carminative, cooling, antipyretic, rubefacient, cleansing, and antiseptic properties.

#### **Alkane:-**

Immunosuppressants, anti-infective, antifungal agents, antiinflammatory agents, and retinoids.

Alkanes are organic compounds that consist entirely of single-bonded carbon and hydrogen atoms and lack any other functional groups.

#### **Halo Compound:-**

Halo alkanes are hydrocarbons consisting of aliphatic alkanes with one or more hydrogen atoms replaced by halogens. In halo alkanes, the halogen atom gets attached to the sp<sup>3</sup> hybridized carbon atom of the alkyl group. Halo alkanes are generally colorless and odorless compounds.. They are used in medicine.

### **Conclusion**

From the above study concluded the Thottar Chinungi Chooranam is known to have the functional groups like N-H stretching (primary aliphatic amine), O-H stretching (Alcohol), O-H stretching (Carboxylic acid), C-H stretching (Alkynes), N-H stretching (Amine salt), C=C stretch (Alkenes), Aro-H (Phenol), C-I stretching (halo compound), C-O stretching (aliphatic ether). The functional groups present in the Thottar chinungi chooranam have antidiabetic, anti-oxidant, hypolipidimic activities. This will ensure the efficacy and therapeutic effect of the drug Thottar chinungi. This study forms the base for the pharmaceutical analysis of the Thottar Chinungi Chooranam.

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