

# FOURIER TRANSFORMATION INFRARED ANALYSIS AND FUNCTIONAL GROUP IDENTIFICATION OF THE SIDDHA MEDICINAL DRUG CHITTHIRA MOOLATHI PODI (CMP).

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## Abstract-

**Introduction:** Siddha medicine is one of the most traditional forms of Ayush medicine. Siddha medicine is based on the panjaboodhas. Taste of herbs and minerals all contain a combination of one or more of the boodhas. The medicinal preparation was originated by many Siddhars. Chitthira moolathi podi is a herbomineral combination drug. It was mentioned in the book agathiyar kurunthirattu.

**Aim:** To explore the characterization of the functional group in chitthira moolathi podi (CMP).

**Materials and Methods:** The collected raw drugs were purified as per the referred textbook, then dried, powdered and kept in clean air tight container. The drug was subjected to FT-IR spectrophotometer and the functional group studied through FTIR study.

**Result:** FT-IR Spectroscopy characterization showed that the presence of functional groups like Alkyl Halides, Alkenes, Aromatics, Primary alcohol, Sulfoxide, Amine, Alenes, Amides, Ester, Alkane.

**Conclusion :** The functional group ensure the efficacy and therapeutic effect of the drug. CMP is highly therapeutic and availability value used cured in Vadha diseases.

**Key words:** Traditional medicine, FT- IR, Functional group, Chitthira moolathi podi, CMP.

## Introduction:

Siddha system of Medicine is based on the panchabhuthas of air, space, fire, water and earth. Due to the association of these Pancha Boodhas, Vatham, Pittham and Kapham, which are said to be life humors, are produced. Many diseases are formed due to the abundance and deficiency of these vital humors. Taste of herbs and minerals all contain a combination of one or more of the Boodhas. Thus medicine based on Pancha boodhas was originated by many Siddhars. Agathiyar, Theraiyar, Yuki, Bokar are notable among them. Innumerable books written by such Siddhars deal with symptoms of diseases and their explanations, diagnosis, explanations of herbs, methods of medicine preparation and their medicinal uses. Siddha Medicine is divided into internal medicine and external medicine. Chooranam (Powder formation), Kudineer (decoction), Parpam, Centhooram etc. are included in internal medicine. Patru, Otradam, Thokkanam (Massage), Attaivald (Leech therapy) etc. are included in external medicine. Chitthira moolathi podi (CMP) is form of chooranam. CMP is a herbo mineral drug of 11 herbs and 5 salts. This is mentioned in the book Agathiyar Kurunthirattu page number 5[1]. Covering with herbs like chitramoolam, mavilangpatti and salts like induppu etc. The raw materials contain many chemicals. Vadha diseases (Neuro musculoskeletal diseases) like inflammatory and degenerative diseases are cured by their anti inflammatory, immunomodulator, analgesic activities of this functional group of CMP. 80 types of vadha diseases can be cured, if this medicine is administered in proper dosage and adjuvant.

There have been many studies to find out the chemicals in this medicine and their pharmacological actions. Among them, FT-IR spectrophotometer is a analytical technique to detect the functional group of a drug. Therapeutic activity of herbal formulation depends on its Phytochemical constituents. FTIR is used to determine the organic compounds including chemical bond and inorganic materials.

## Materials and methods :

### Ingredients :

**Table 1. Ingredients of the Chitthira moolathi podi.**

S. No	Tamil Name	Botanical Name or Chemical Name	Family	Part used	Quantity (Equal ratios)
1	Kodiveli	Plumbago zeylanica L.	Plumbaginaceae	Root	35 gm
2	Mavilangu	Crataeva religiosa Forst.	Capparaceae	Bark	35 gm
3	Murungai	Moringa oleifera Lam.	Moringaceae	Bark	35 gm
4	Kondrai	Cassia fistula L.	Fabaceae	Bark	35 gm
5	sangan	Clerodendrum inerme L.	Verbeanaceae	Bark	35 gm
6	Erukku	Calotropis gigantea L.	Asclepidoideae	Bark	35 gm

7	Vembu	Azadiracta indica A.juss.	Meliaceae	Bark	35 gm
8	Vellarugu.	Enicostemma axillare Lam.	Gentianaceae	Whole plant	35 gm
9	Chukku	Zingiber officinale L.	Zingiberaceae	Rhizome	35 gm
10	Milagu	Piper nigrum L.	Piperaceae	Dried fruit	35 gm
11	Thippili	Piper longum L.	Piperaceae	Dried fruit	35 gm
12	Indhuppu	Sodium chloride Impura (Rock salt)	-	Crystal form	35 gm
13	Valaiyaluppu	Sodium silicate	-	Crystal form	35 gm
14	Sotruppu	Sodium Chloride	-	Crystal form	35 gm
15	Kalluppu	raw salt	-	Crystal form	35 gm
16	Kariuppu ( Pidalavanam)	Black salt	-	Crystal form	35 gm

#### Source of raw drug :

The plant raw drugs are collected from medicinal plant gardens & fields at Tirunelveli, Kanyakumari. And raw drugs are collected from Naattu marunthu kadai at nagarkovil.

#### Identification and authentication of raw drug :

Collected plant raw drugs will be analyzed and authenticated by Botanist, Department of Medicinal Botany and Gunapadam expert, Department of Gunapadam at Govt. Siddha Medical College, Palayamkottai.

#### Method of drug Preparation:

Purification of above drugs was done separately. Then they were dried and then ground and made into a powder form. Then they all were mixed thoroughly. Now the powder taken as the trial drug.

Route of administration:- By oral

Dose: - Adequate amount should be given for physical strength and severity of disease.

Indication - 80 types of vadh diseases (Neuro musculoskeletal diseases)

Study place -FTIR evaluations were conducted at Siddha Regional Research Institute (SRR), Trivandrum, kerala.

#### FT-IR study method :

The drug was subjected to FT-IR analysis using KBr pressed disk technique on Analytical Technologies FT-IR spectrophotometer (Model: INFRA 3000-50) and the characteristic peaks were detected and recorded. [4] &[5]

#### Result and Discussion :

FTIR spectroscopy was performed to detect the presence of functional groups in CMP.

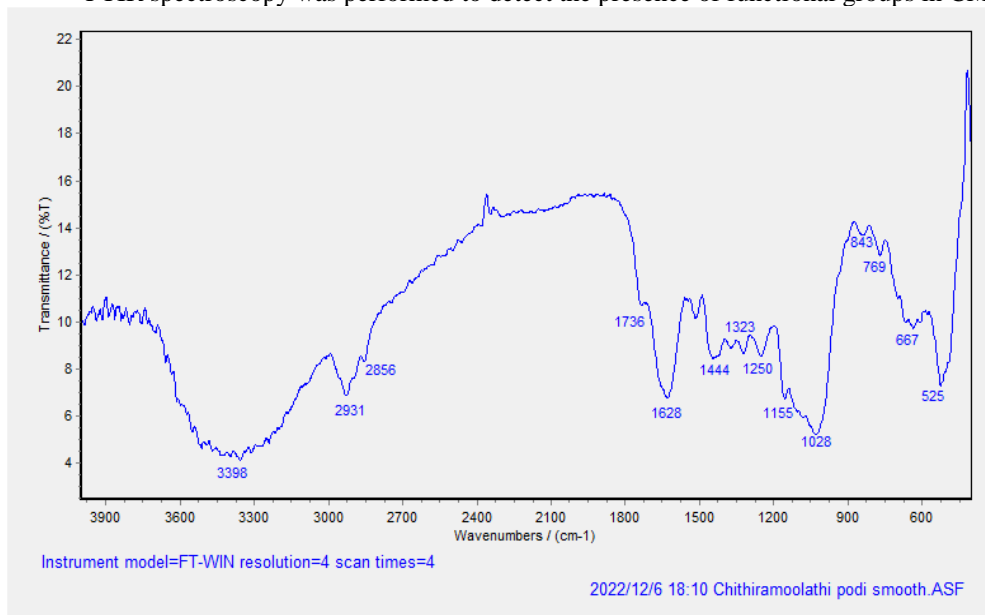


Figure: 1. FT-IR analysis of CMP

Table: 2. FTIR Interpretation of Chithiramoolathi Podi (1)

S. No	Peak	Characteristic Absorptions (cm <sup>-1</sup> )	Possible Functional Group	Class
1	525	300 - 600	C-Br Stretch	Alkyl Halides
2	667	600 - 900	C - H Bend	Alkynes
3	769	600 - 900	C - H out of plane	Aromatics

4	843	600 - 900	C – H out of plane	Aromatics
5	1028	900 - 1200	C – O Stretching	Primary Alcohol
6	1155	900 - 1200	S=O stretching	sulfoxide
7	1250	1200 - 1500	C-N stretching	Amines
8	1323	1200 - 1500	C-N stretching	Amines
9	1444	1200 - 1500	Ar C-C Stretching	Aromatics
10	1628	1500 - 1800	Ar-CH=CHR	Alkenes
11	1736	1500 – 1800	C = O Stretching	Esters
12	2856	2700 - 3000	C-H stretching	Alkane
13	2931	2700 - 3000	C-H stretching	Alkane
14	3398	3300 - 3600	N-H stretching	Amides

FTIR study of Chithira moalathi podi exhibits the peak value at 525, 667, 769, 843, 1028, 1155,1250,1323,1444, 1628, 1736, 2856, 2931, 3398 having C-Br stretch, C-H Bend, C-H out of plane, C-O, S=O, C-N, AR C-C, Ar-CH=CHR, C=O,C-H,N-H Stretching. [2],[3]

This peak value indicate the presence of some organic functional group such as Alkyl Halides, Alkynes, Aromatics, Primary alcohol, Sulfoxide, Amines, Alkenes, Amides, Esters, Alkane. These functional groups have some pharmaceutical properties and are briefly discussed below, [4]

**Alkyl halides** - Alkyl halides have little biological activity. They have antibacterial and antifungal activity. Compound of alkyl halide is used as a general anaesthetic for surgical procedure. They serve as starting materials for the synthesis of a variety of organic compounds as well as solvents for generally non- polar molecules.[9], [10]

**Alkyne** - Alkyne derivatives have anti-fungal activity and they play an important role in pharmaceutical industry. A tropical analgesic used as an adjunct to receive severe arthritic pain.[8]

**Aromatic compounds**-they have anti-microbial, anti-diabetic and anti-oxidant activity [11]

**Primary Alcohol** - Alcoholic group of substances acts as antimicrobial, antiseptic and antiinflammatory agents. It is also used as an antidote, disinfectant.Alcohol is one of the potent diuretic agents. It inhibits the release of hormone vasopressin (ADH) which decreases water excretion by the kidneys by increasing water reabsorption in the collecting ducts. [6]

**Sulfoxide**- help reduce inflammation and pain, and may also be beneficial in reducing leakage during chemotherapy treatment. And they have anti-microbial, anti-inflammatory, Anti-oxidant and diuretic activity.[15]

**Amine**-This is used for analgesic, anesthetics, anti-cancer and Antipsychotic. And they have anti-microbial activity, antiviral, anti-inflammatory activity. They play an essential role in cell membrane stabilization, immune function and prevent chronic disease. They are important source of amino acids which regulate the vitamin level in our bodies. Amine are also useful for neurotransmitters like serotonin for our bodies.[7]&[14]

**Alkane** - It is used to enhance the antioxidant activity of the drug.[12]

**Ester** - Ester has anti-microbial & anti-spasmodic and anesthetics property and they have anti-inflammatory activity . Ester is used in the treatment of RA.[13]

**Alkene** - This is used as a general anaesthetic. This is also used to prepare some organic compounds such as, ethyl alcohol, acetic acid and acetaldehyde.[12]

## Conclusion:

The instrumental analysis FTIR study for CMP shows the presence of functional group through the stretch and bend which is responsible for its functional activity. In consists activities such as antimicrobial, antiinflammatory,analgesic and antioxidant.This study help to standardize this Siddha herbomineral formulation of CMP. Pharmaceutical properties of this drug will helps to treat vadha diseases (Neuro musculoskeletal diseases).After this, by studying the efficacy and safety of this drug, it can be properly standardized.Thus this drug can be taken to the next level of isolation of the active principle which is responsible for the therapeutic effect.

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