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Assessment of functional group in herbal formulation Vishnukiranti Kudineer Chooranam through Fourier Transform Infrared Spectroscopy.

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Abstract

Siddha medicine traditional system of healing that originated in South India and is considered to be one of India's oldest systems of medicine.The siddha medicine is used to to treat various diseases especially in vatha disease. The siddha medicine Vishnukiranti kudineer is a single drug used for the treatment of ceganavatham (cervical spondylosis) **Aim:** Siddha medicine Vishnukiranti kudineer was subjected into the characterization through sophisticated analytical equipment FTIR to identify the presence of functional groups. **Materials and methods:** The ingredients were collected and purified and the drug was prepared as per Siddha literature "Gunapadam(First Edition Mooligai Vaguppu)".Here the drug was subjected into characterisation through FT-IR analysis. **Results:** The FT-IR characterization shows that the presence of functional groups like O-H stretching (alcohol), O-H stretching (Carboxylic acid) ,C-C stretching (amine),O-H bending (phenol),C-O stretching (esters), C=N stretching (vinyl ester) which ensures the therapeutic effect of the drug.

Keywords: FT-IR, Vishnukiranti kudineer, functional groups, siddha medicine, cervical spondylosis, ceganavatham.

Introduction

Siddha science is an ancient medical system for mankind. Siddha system is based on various amazing principles such as theory of arusuvai, theory of panchabootham, concept of 96 principles, and concept of nadi. The siddha medicine is used to treat various diseases especially in vatha disease. Fourier Transform Infrared Spectroscopy (FTIR) identifies chemical bonds in a molecule by producing and infrared absorption spectrum. It is also used to determine the organic compounds (eg: carbohydrate, protein and lipid).

Materials and Methods

Collection of raw materials:

The raw drug was collected from the Thackkalay, Kanyakumari.

Authentication of raw materials:

The raw drug was identified and authenticated by the Medicinal Botanist and Gunapadam experts at Government Siddha Medical College and Hospital, Palayamkottai.

Process of preparation:

The adulterants in the whole plant were removed and dried in the shade. The whole plant were coarse powdered and then bottled up.

Table 1:Ingredients of Vishnukiranti kudineer Chooranam.

S.No	Tamil Name	Scientific name	Parts Used	Quantity
1.	Vishnukiranti (Whole plant)	*Evolvulus alsinoides*(Linn).	Whole plant	Q.S

Dosage: 30ml/Twice a day (Orally)

Shelf life: 3 hours

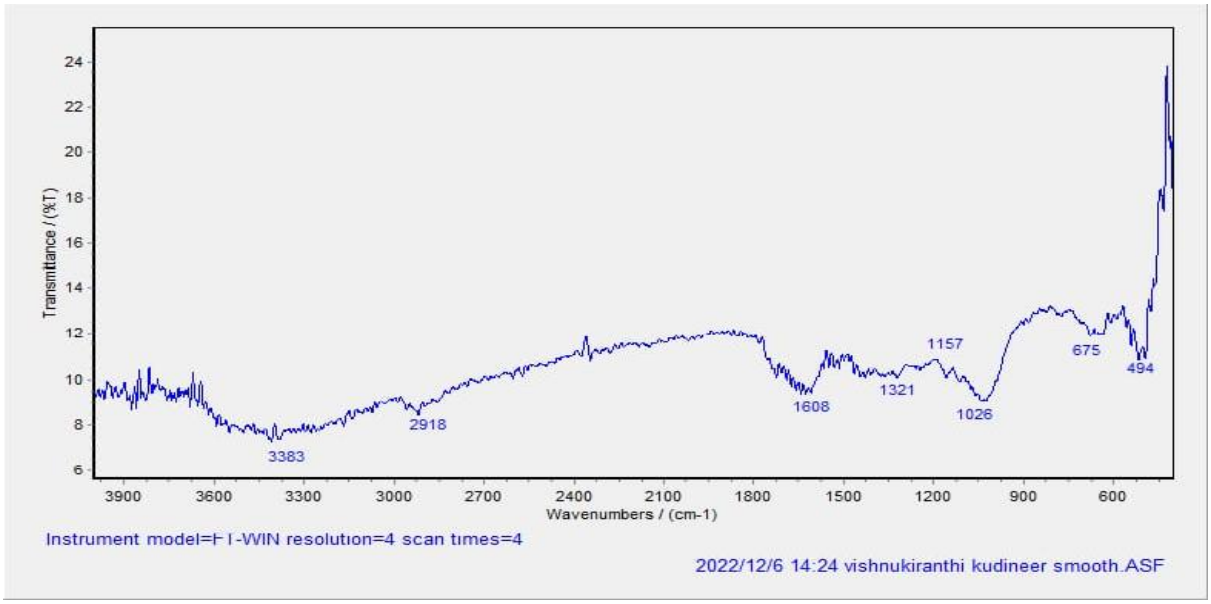
Indication: Ceganavatham (Cervical spondylosis)

Results and Discussion

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 Vishnukiranti kudineer Chooranam.

Figure 1:FT-IR Spectra of Vishnukiranti kudineer chooranam



S.No	Wave Number (cm^{-1})	Vibrational Modes of Vishnukiranti pkudineer Chooranam in IR region	Functional groups
1	3383	N-H Stretching O-H Stretching	Aliphatic primary amine. Alcohol
2	2918	O-H Stretching C-H Stretching N-H stretching	Alcohol, amine salt, Alkane, carboxylic acid
3	1608	C-C Stretching N-H bending	Amine, cyclic alkene, conjugated alkene
4	1321	C-FStretching O-H Bending S-O stretching C-N stretching	Fluoro compound, phenol, sulfone, aromatic amine
5	1157	C-F stretching C-O stretching	Fluoro compound, ester, tertiary alcohol
6	1026	C-N stretching C-F Stretching	Amine, Fluro compound
7	675	C-Br stretching C-Cl stretching C=C bending	Halo compound, alkene trisubstitutes.

From the above analysis, the test drug Vishnukiranti kudineer Chooranam is known to have alcohol, aliphatic prime, alkane, amine salt, carboxylic acid, cyclic alkane, conjugated alkene, phenol, sulfone, aromatic amine, ester, tertiary alcohol, alkene substitutes compound. These compounds have some pharmaceutical properties and are responsible for the therapeutic action of the drug. They are briefly discussed below.

Aliphatic primary amines:

Aliphatic amines are generally too sterically hindered to contribute much to the cure . Aliphatic amines constitute the largest group of epoxy curing agents They can be used as is or addicted to modify volatility, toxicity, reactivity and stoichiometry.

Alcohol:

Moderate alcohol consumption reduces biomarkers of inflammation, including c-reactive protein (CRP), interleukin-6, and TNF-alpha receptor 2," says Karen Costenbader, MD, MPH, a rheumatologist at Brigham and Women's Hospital in Boston. Alcohol's anti-inflammatory effects are also thought to be one of the reasons it appears to lower cardiovascular disease risk in moderate drinkers. Alcohol is an effective analgesic that delivers clinically-relevant reductions in ratings of pain. It can be applied to skin fissures, canker sores and fever blisters as a styptic and antiseptic.

Carboxylic acid:

It has analgesic, antipyretic, and anti-inflammatory activity. Non-steroidal anti-inflammatory drugs (NSAIDs) with free carboxylic acids are used worldwide to treat inflammatory and immune diseases such as pain, rheumatoid arthritis, and cancer but is mainly used as analgesics in the short term management of moderate to severe pain.Carboxylic acid in the highest primary functional group of Acetyl salicylic acid. It has antiplatelet activity, which prevent clot formation.

Esters:

It has anti inflammatory activity. Anti oedematogenic assay demonstrate anti inflammatory activity of Borneol Esters in an experimental model acute inflammation.

Amine:

Biological amines have analgesic properties. Amines have Anti-inflammatory properties. Biological amine play an essential role in cell membrane stabilization, immune function and prevention of chronic disease as they participate in the nucleic acid synthesis and Protein synthesis. Besides they are compounds created as a growth regulation, neural transmission and inflammatory mmediator.

Phenols

Phenolic compounds are able to inhibit either the production or the action of pro inflammatory mediators resulting in anti inflammatory capacity. Plant-based compounds containing phenol are known to be anti-oxidants. This means that they can stop the reaction of free radicals with other molecules in your body, preventing damage to your DNA as well as long-term health have anti-oxidant property.

Sulfones:

It has a Anti inflammatory, Analgesic, Anti cancerous, Anti microbial, Anti malarial activity.

Fluoro compound:

The physicochemical properties and analgesic action of six fluorinated analogues of 4-hydroxyacetanilide (paracetamol) have been investigated. Fluorine substitution adjacent to the hydroxyl group increased lipophilicity and oxidation potential whilst substitution adjacent to the amide had little effect on lipophilicity but led to a greater increase in oxidation potential[16].

Conclusion

From the above results, the sample Vishnukiranti kudineer Chooranam is known to have the functional groups likeO-H Stretching- alcohol, N-H stretching -Aliphatic primary amine, O-H stretching-alkane, O-H stretching-alcohol, N-H stretching – amine salt, O-H stretching-carboxylic acid, N-H bending- amine, C=C stretching- cyclic alkane, C=C stretching – conjugated alkene, C-F stretching-Fluoro compound, O-H bending-Phenol, S=O stretching – sulfone, C-N stretching-aromatic amine, C-F stretching- fluoro compound, C-O stretching – ester, C-O stretching- Tertiary alcohol, C-F stretching- Fluoro compound, C-N stretching-amine, c-cl stretching halo compound, C=C bending-alkene tri substitutes, C-Br-stretching- halo compound. The functional groups present in the sample Vishnukiranti kudineer Chooranam have Analgesic, Anti-inflammatory, Anti oxidant activities.T his will ensure the efficacy and therapeutic effect of the drug Vishnukiranti kudineer Chooranam. This study forms the base for the pharmaceutical analysis of the Vishnukiranti kudineer Chooranam.

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