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Research Article

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Assessment of Functional group in Herbo mineral formulation of Neerchurukku Chooranam through Fourier Transform Infrared Spectroscopy.

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Abstract

Background:
The Neerchurukku Chooranam(NC) is a herbo mineral drug used for the treatment of Neerchurukku(UTI).
Objective:
This study is aimed at evaluating the morphology and elemental characterization of the Neerchurukku Chooranam.
Materials and methods:
The ingredients were collected and purified and the drug was prepared as per Siddha literature Noikazhukku Siddhaparikaram. 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),C-HStretch (alkene and Aromatic compound), C-H bending (1,4 disubstituted), C=O Stretching (α, β unsaturated ester,C-Br Stretching (Halo compound), and C-CI Stretching (Halo compound) which ensures the therapeutic effect of the drug.
Conclusion:
The instrumental analysis FT-IR study for Neerchurukku chooranam shows the presence of functional groups through the stretch and bends which is responsible for its functional activity. The functional groups present in the sample Neerchurukku Chooranam have anti-microbial, Sedative and hypnotic activities. This will ensure the efficacy and therapeutic effect of the drug Neerchurukku Chooranam. This study forms the base for the pharmaceutical analysis of the Neerchurukku Chooranam.

Keywords: FT-IR, Neerchurukku Chooranam, functional groups, herbo mineral siddha formulation, Neerchurukku.

Introduction

According to, Yugi munivar described, the *Neer Noikal* in his text yugi vaithya chinthamani is Neerinai perukkal noi and Neerinai arukkal noi. The *Neerchurukku* is described, in the category of neerinai arukkal noi. *Neerchurukku* can be correlated in modern aspect as urinary tract infection (UTI) according to their causes, sign and symptoms. Urinary tract infection is one of the infectious diseases affecting both sexes, but most common in females. As per WHO an estimated 50% of females reported had UTI at some points of their lives. UTI is affecting 150 million people each year worldwide and is very common disease in the society particularly in a summer season.

Causes of UTI:

- Inadequate or consuming small amount of oral fluids
- Retention of urine
- Renal uretic stone
- Diabetics
- Chronic prostatitis in Male

The severe UTI is occurring more frequently in diabetic patients. In a study from Europe, asymptomatic bacteria were more prevalent among women with diabetes (26%) than in women without diabetes (6%). Diabetic patients are at a high risk of development of UTIs. In Siddha system, medicines have been prescribed for the management to *Neerchurukku* from ancient era by the available natural resources such as plants, animal products, metals & minerals. It has many evidence in manuscripts, Siddha literatures and published articles now.

Materials and Methods

The required raw Drugs were purchased from Herbal Drug Store, Thackkalay, Kannyakumari, Tamilnadu. It was identified and authenticated by the Department of Medicinal Botany and Gunapadam experts at Government Siddha Medical College and Hospital, Palayamkottai.

Table 1. Ingredients of Neerchurukku chooranam (plants)

S.No	Tamil name (Herb)	Botanical name	Family	Parts used
1.	Nelli vattral	*Phyllanthus emblica*	Euphorbiaceae	Dry Fruit
2.	Panam Kalkandu	*Borassus flabellifer*	Arecaceae	Palm candy

Table 2. Ingredients of Neerchurukku chooranam (minerals)

S.No	Tamil name (Mineral)	Chemical name
1.	Padikaram	Aluminium potassium sulphate

Purification of the raw drug

The ingredients of Neerchurukku Chooranam were purified according to the proper procedures described in Siddha classical literature.

Padikaram (Aluminium potassium sulphate): It is dissolved in water, filtered and boiled till it attains jelly consistency. It is cooled to obtain the purified form.

Nelli vatral(*Phyllanthus emblica*): Clean and remove the dust and other materials

PanamKalkandu (*Borassus flabellifer*): Clean and remove dust and other materials

Method of preparation

Purified raw drugs were made into fine powder separately and mixed together homogenously. Then it is filtered using pure white cloth.

Results and Discussion

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 Neerchurukku Chooranam.

Figure 1:FT-IR Spectra of Neerchurukku Chooranam.

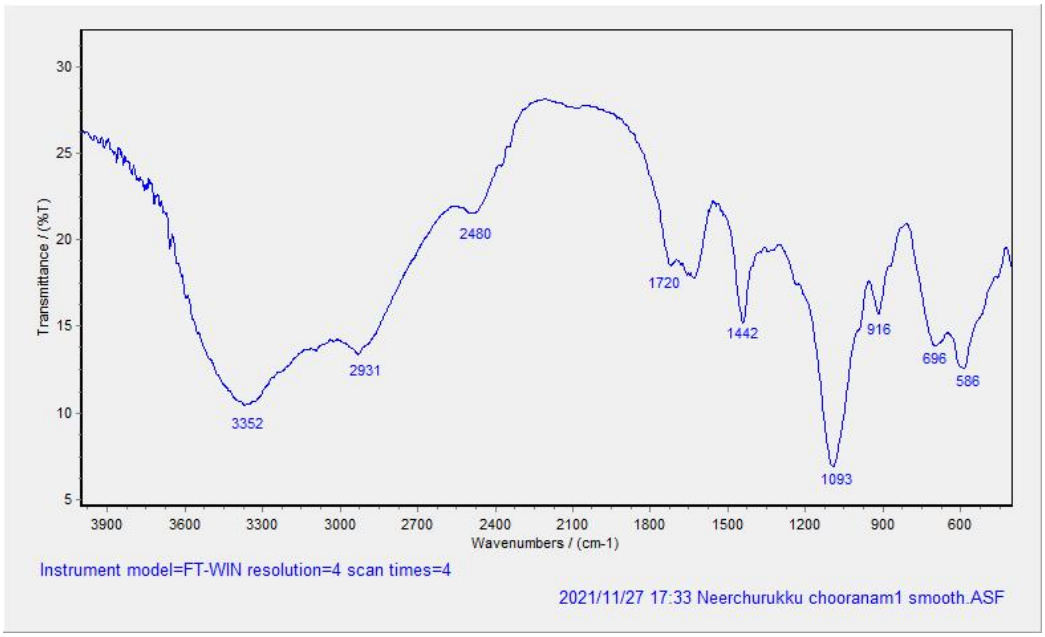

Table 3. FT-IR result of Neerchurukku chooranam (Minerals)

S.No	Wave Number (cm^{-1})	Vibrational Modes of Neerchurukku Chooranam in IR region	Functional groups
1	3352	O-H Stretching	Alcohol.
2	2931	C=H Stretching	Alkene.
3	2480	C-H Bending	Aromatic compound.
4	1720	C=O Stretching	α, β unsaturated Ester
5	1093	S=O Stretching	Sulfoxide
6	916	C-H Bending	1,4 Disubstituted
7	696	C-Br Stretching	Halo compound.
8	586	C-Cl Stretching	Halo compound.

From the above analysis, the test drug Neerchurukku Chooranamn is known to have Alcohol, Alkane, Aromatic compound,α, β unsaturated Ester, Sulfoxide, 1,4 Disubstituted and Halo compound. These compounds have some pharmaceutical properties and are responsible for the therapeutic action of the drug.

From the above results, the sample Neerchurukku Chooranam is known to have the functional groups likeO-H Stretching (Alcohol),C-HStretch (alkene and Aromatic compound), C-H bending (1,4 disubstituted), C=O Stretching (α, β unsaturated ester,C-Br Stretching (Halo compound), and C-CI Stretching (Halo compound).

The functional groups present in the Neerchurukku Chooranam has Anti-microbial, Sedative and hypnotic activities. This will ensure the efficacy and therapeutic effect of the drug NeerchurukkuChooranam. This study forms the base for the pharmaceutical analysis of the Neerchurukku Chooranam.

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