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FTIR CHARACTERIZATION ANALYSIS OF THE SIDDHA FORMULATION PARANGISAKKAI CHOORANAM (PSC)

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ABSTRACT
The aim of the present study is to evaluate the polyherbal siddha formulation Parangisakkai chooranam using (FT-IR) fourier transform infrared spectrometry analysis. This study investigates the phytochemical profile of Parangisakkai Chooranam (PSC) by analysing its functional groups. The FTIR spectrum of the formulation revealed characteristic absorption bands corresponding to hydroxyl, aliphatic, carbonyl, aromatic, and ether/amine functional groups. Major peaks were identified and analysed. The findings suggest that FT-IR is a reliable tool to quantify different functional groups and to elucidate the chemical structure and bonding present in Parangisakkai Chooranam.

INTRODUCTION
The Siddha system is one of the oldest traditional systems of medicine, believed to have originated in tamilnadu. it is based on the principle that Human health depends on the balance of three humors. Among various formulations Parangisakkai chooranam is widely used in practice for its therapeutic purpose. It is indicated drug Soothaga vaayu(PCOD) mentioned in classical Siddha literature. FT-IR was done in the present study to analyse functional groups present in this formulation. It is an versatile and powerful tool for qualitative and quantitative analysis of phytoconstituents. Increasing applications in recent years for siddha herbal medicine preparations with more scientific approach, RecentlyFT-IR has become increasingly useful in the fields of evaluating herbal qualities. These functional groups indicate the presence of diverse bio active compounds such flavonoids, polyphenols, terpenoids, glycosides, and alkaloids. The broad O–H band indicate polyphenolic content, while sharp C=O and C–H bands confirm ester, carbonyl, and aliphatic chain functionalities. The spectral results of parangisakkai chooranam highlight the presence of chemical complexity and pharmacologically relevant bioactive constituents. This supports both therapeutic potential and the scientific validation of the tradtional siddha formulations.

MATERIALS AND METHODS
The herbal formulation PSC formulation was taken from Siddha text (SIGICHARATNA DEEPAM-)-Page no:115. The raw drugs are identified and authenticated by Gunapadam department in Government Siddha Medical College, Palayamkottai-627002, Tamil nadu.

INGREDIENTS OF PSC

S.No	Tamil Name	Botanical Name	Family	Part used
1.	PARANGICHAKKAI	*SMILAX CHIINA*	Lilliaceae	Tuber
2.	CHUKKU	*ZINGIBER OFFCINALE*	Zingiberaceae	Rhizome
3.	THIPPILI	PIPER LONGUM	Piperaceae	Dried unripe fruit
4.	ELAM	ELETERIA CARDAMOM	Zingiberaceae	seed
5	VAIVILANGAM	EMBELIA RIBES	myrisnaceae	fruit
6	SANNALAVANGA PATTAI	CINNAMOMUM VERUM	Lauraceae	Bark
7	OMAM	CARUM CAPTICUM	Apiaceace	Seed

8	KUROSANI OMAM	HYOSCYAMUS NIGER	solanaceae	seed
9	SITHIRAMOOLAVER PATTAI	PLUMBAGO ZAYLANCICA	Plumginaceae	root
10	SITRARATHAI	ALPINIA UFFICINARUM	Zingiberaceace	Rhizome
11	MODI	PIPER LONGUM	Piperacece	Root
12	PERARATHAI	ALPINIA GALANGAL	ZINGIFERACEAE	Rhizome
13	SIRUTHEKKU	CLERODENDRUM SERRATUM	VERBINACEAAE	Root
14	DHANIYA	CORIANDRUM SATIVAM	Apiacae	fruit
15	SEERAGAM	CUMINUM CYMINUM	Apiaceae	fruit
16	KARUNGSEERAGAM	NIGELLA SATIVA	Ranunculaceace	seed
17	ADHIMATHURAM	GLYCYRRHIZA GLABRA	Fabaceace	root
18	VETIVER	VETTIVERA ZIZNOIDES	poaceae	Root
19	VILAMICHUM VER	PLECTRANTHUS VETIVEROIDES	Poaceae	Root
20	MUTHANGASU	CYPERUS ROTANDUS	cyperaceae	Tuber
21	KICHILIKILANGU	KAEMPFERIA GALANGAL	zingiberaceae	Rhizome

DOSAGE : 3 to 6 gram
ADJUVANT : Hot water

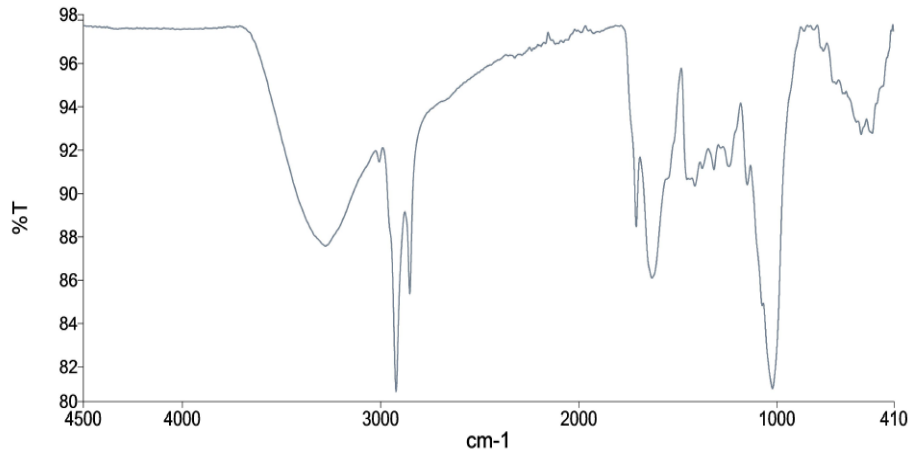
Machine: Bruker Alpha-E by ATR module, Software: OPUS version 7.

FTIR ANALYSIS
FT-IR Analysis Report

Project ID **NRS/AS/1562/07/2025**

Sample –ID **ParangisakkaiChooranam -PGC**

FT-IR SPECTRUM OF SAMPLE PGC



FT-IR PEAK TABLE

Observed Peak (cm^{-1})	Probable Functional Group(s)	Group Type	Assignment
~3260	O–H stretching / N–H stretching	Hydroxyl / Amine group	Phenolic compounds, alcohols, or amines
~2925, ~2850	C–H stretching	Aliphatic chains	Fatty acids, terpenoids, methyl/methylene groups
~1720	C=O stretching	Carbonyl	Esters, ketones, aldehydes, or carboxylic acids
~1610	C=C aromatic stretching	Aromatic ring	Flavonoids and aromatic phytochemicals
~1410	C–H bending	Alkanes	CH_2/CH_3 bending
~1240–1040	C–O stretching / C–N stretching	Ether / Alcohol / Amine	Glycosides, alkaloids, proteins
~880–720	Aromatic ring bending / out-of-plane bending	Aromatics	Substituted benzene rings, phenolics

METHODOLOGY

Sample processed using Bruker Alpha-E by ATR module (attenuated total reflectance). Sample positioned on the Crystal platform with perfect alignment of keeping anvil in up position. To ensure that the sample makes good contact angle with the crystal prior to start of the IR radiation exposure. Spectra measurement was achieved with desired wavelength and the corresponding observational peaks/ waves were recorded with wavenumber were subjected to further interpretation. Software used for the analysis is OPUS version 7 for functional group analysis. Signal detection processed through DTGS detector. Baseline correction adjusted as per the requirement

DISCUSSION

The FTIR analysis of Parangisakkai Chooranam (PGC) revealed characteristic absorption bands corresponding to hydroxyl, aliphatic, carbonyl, aromatic, and ether functional groups. The presence of a broad O–H stretching vibration (~3260 cm^{-1}) indicates phenolic compounds, alcohols, or amines, supporting the polyphenolic content of the formulation. Peaks at ~2925 and ~2850 cm^{-1} confirm aliphatic chains, which are typical of fatty acids and terpenoids. The strong C=O stretching band around ~1720 cm^{-1} suggests the presence of esters, ketones, aldehydes, or carboxylic acids.

The peak at ~1610 cm^{-1} corresponds to aromatic C=C stretching, indicating flavonoids and other aromatic phytochemicals. Bands observed in the 1240–1040 cm^{-1} region suggest the presence of ether and C–N stretching vibrations, which are consistent with glycosides, alkaloids, and proteins. Furthermore, peaks in the ~880–720 cm^{-1} region confirm substituted aromatic structures. These results are in agreement with earlier phytochemical investigations that highlight the diverse bioactive nature of traditional polyherbal formulations.

CONCLUSION

The FTIR analysis of Parangisakkai Chooranam revealed hydroxyl, aliphatic, carbonyl, aromatic, and ether functional groups, indicating the presence of polyphenols, flavonoids, terpenoids, glycosides, and alkaloids. These bioactive compounds are linked to antioxidant, anti-inflammatory, insulin-sensitizing, and hormone-modulating activities, which are particularly relevant in managing Polycystic Ovarian Disease (PCOD).

The antioxidant and endocrine-balancing potential of polyphenols and flavonoids, together with the metabolic effects of terpenoids and glycosides, support its pharmacological significance. Thus, the chemical profile of Parangisakkai Chooranam substantiates its traditional use for PCOD and underscores its potential as a multi-targeted polyherbal formulation.

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