



**ORIGINAL RESEARCH PAPER**

**Siddha**

**BIO CHEMICAL AND FTIR CHARACTERIZATION OF SIDDHA CLASSICAL FORMULATION INJI CHOORANAM - 2**

**KEY WORDS:** FTIR, Biochemical analysis, Siddha, Inji Chooranam - 2

**Mathan. K.\***

M.D.(Siddha) III year, Dept.of Sirappu Maruthuvam, GSMCH, Palayamkottai.  
\*Corresponding Author

**Ahamed mohideen. M.**

Associate Professor, Dept.of Sirappu Maruthuvam, GSMCH, Palayamkottai.

**Sivaranjani. K.**

Research Officer(Siddha), SCRU, CCRS, Govt.of India.

**ABSTRACT**

**Background:** The *Inji Chooranam -2* is a Poly herbal Siddha formulation used for treating *Suvainmai* (Ageusia), *Oon Veruppu*(Anorexia), *Pakka Vayu*(Hemiplegia), *Kulai Erivu*, *Vayvu*, *Kozhai* and *Suthaga Vayvu* (Dysmenorrhoea).

**Objectives:** To identify and characterize the compounds present in the poly herbal Siddha formulation "*Inji Chooranam -2*".

**Materials and Methods :** *Inji Chooranam -2*" has the ingredients such as *Inji*, *Thippili*, *Milagu*, *Thippili Mulam*, *Elam*, *Chukku*, *Jathikai*, *Sadamanjil*, *Seeragam*, *Sombu*, *Kostam*, *Sirunagapoo*, *Ilavankappathiri*, *Vettiver*, *Kirambu*, *Jathipathiri*, *Thalisa Pathiri*, *Naatu Sarkarai*, *Nei*(Ghee) as its ingredients. The formulation was prepared as per the Siddha literature "*Siddha vaidhya thirattu*". Biochemical analysis and FTIR Characterisation was carried out using Standard analytical techniques.

**Result:** FTIR Characterisation of Inji Chooranam 2 shows the presence of some functional group such as Alkyne, Nitro Compound Carbon-di-oxide, Carboxylic Acid, Sulphonamide, An Aromatic Ester, Fluro Compound, Aromatics, Halo Compounds The Bio chemical analysis of *Inji Chooranam - 2* contains Calcium, Starch, Sulphate, Ferrous Iron, Unsaturated compound and Reducing sugar. This preliminary study forms the basis of Pharmaceutical analysis followed by the safety and efficacy studies.

**INTRODUCTION:**

Siddha system of medicine is mainly practiced in the southern part of India as it originates from Tamilnadu. It is one of the earliest traditional medicine system in the world which treats not only the body but also the mind and soul. According to Siddha the five basic elements (Panchapootham) are present in all living and non-living things of the universe in various proportions. In the Siddha system of medicine, all vital processes (Physiological, Biochemical, Metabolic) have been classified under three functional heads (Uyir – thaathukal) namely Vali, Azhal, Iyyam (Vaatham, Pitham, kabam). Variety of Siddha medicines has been formulated to treat various diseases. These modern analytical equipments are helpful to get knowledge regarding the organic and inorganic groups present in the formulations.

FTIR characterization was done for the poly herbal Siddha formulation "*Inji Chooranam - 2*" to identify the functional group. Each molecule or chemical structure will produce a unique spectral fingerprint, making FTIR analysis a great tool for chemical identification. Bio chemical analysis was done to evaluate the acid and basic radicals present in the formulation.

**MATERIALS AND METHOD:**

*Inji Chooranam - 2*, a Shastric Siddha poly herbal formulation has the following ingredients

S.NO	DRUG NAME	BOTANICAL NAME	QUANTITY
1	Inji	<i>Zingiber officinale</i>	3 parts
2	Thippili	<i>Piper longum</i>	3 parts
3	Milagu	<i>Piper nigrum</i>	3 parts
4	Thippili Mulam	<i>Piper longum</i>	1 part
5	Elam	<i>Elettaria cardamomum</i>	1 part
6	Chukku	<i>Zingiber officinale</i>	1 part
7	Jathikai	<i>Myristica fragrans</i>	1 part
8	Sadamanjil	<i>Nardostachys jatamansi</i>	1 part
9	Seeragam	<i>Cuminum cyminum</i>	1 part
10	Sombu	<i>Foeniculum vulgare</i>	1 part
11	Kostam	<i>Saussurea lappa</i>	1 part
12	Sirunagapoo	<i>Cinnamomum wightii</i>	1 part
13	Ilavankap Pathiri	<i>Cinnamomum zeylanicum</i>	1 part
14	Vettiver	<i>Vetiveria zizanioides</i>	1 part
15	Kirambu	<i>Syzygium aromaticum</i>	1 part
16	Jathipathiri	<i>Myristica fragrans</i>	1 part
17	Thalisa Pathiri	<i>Abies spectabilis</i>	1 part

18	Naatu Sarkarai	<i>Saccharum officinarum</i>	10 parts
19	Nei(Ghee)	-	q.s

**Purification of drugs:**

All the ingredients were completely purified as per the method mentioned in the Siddha literatures in the presence of Guide / Faculty members. Then the trial drug *Inji chooranam - 2* was prepared as per the method mentioned in the *Siddha Vaidhya thirattu*.

**Method of Preparation:**

Scrap off the skin from Inji, chop into pieces, fry in ghee and powder. Powder the item 2 to 17 individually. Mix these powders, Inji powder and item 18 and store in an air tight container.

**Dose:**

1 to 2 Grams (Once in a day Morning)

**Vehicle:**

Luke warm water

**Duration:**

48 Days

**Important Therapeutic Use:**

*Suvai Inmai* (Ageusia), *Oon Veruppu*(Anorexia), *Pakka Vayu*(Hemiplegia), *Kulai Erivu*, *Vayvu*, *Kozhai* and *Suthaga Vayvu* (Dysmenorrhoea)

**FTIR ANALYSIS OF INJI CHOORANAM - 2:**

**Details regarding the analysis:**

FTIR spectra analysis was carried out at Kalasalingam academy of research and education (International research centre) Srivilliputhur.

**FTIR Spectrum analysis:**

Fourier transform infrared spectroscopy is an important and more advanced technique. It is used to identify the functional group to determine the quality and consistency of the sample material and can determine the amount of compound present in the sample.

In FTIR- infrared is passed from a source through a sample. This infrared is absorbed by the sample according to the chemical properties and some are transmitted. The spectrum that appears denotes the molecular absorption and transmission. It forms the molecular fingerprint of the sample. It is recorded as wavelength and the peaks seen in the spectrum indicate the amount of material present.

Fig.1. Image of the FTIR spectrum.

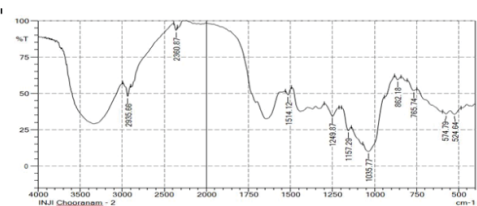


Table.2: FTIR Data interpretation of *Inji Chooranam - 2*

Wave number	Vibrational modes of <i>Inji Chooranam - 2</i> In IR region	Functional groups
2935.66	C-H Stretch	Alkyne
2360.87	C=O=C Stretch	Carbon dioxide
1514.12	N=O Stretch	Nitro compound
1249.87	C-O stretch	Aromatic ester, Carboxylic acid
1157.29	C-F Stretch	Fluro compound
1035.77	S=O Stretch	Sulphonamide
862.18	C-H Bending	Aromatics
765.74	C-Cl Stretch	Halo Compound
547.79	C-Cl Stretch	Halo Compound
524.64	C-Br Stretch	Halo Compound

**BIO-CHEMICAL ANALYSIS OF "INJI CHOORANAM - 2":**

The Drug *Inji Chooranam - 2* was subjected to various test to confirm the presence of acid and basic radicals.

**CHEMICALS AND DRUGS:**

All the chemicals used in this studies were of analytical grade obtained from Department of Biochemistry, Government Siddha Medical College & Hospital, Palayamkottai.

**METHODOLOGY:**

5gms of the drug was weighed accurately and placed in a 250ml clean beaker then 50ml of distilled water is added and dissolved well. Then it is boiled well for about 10 minutes. It is cooled and filtered in a 100ml volumetric flask and then it is made to 100ml with distilled water. This fluid is taken for analysis.

Table 3: QUALITATIVE ANALYSIS

S.No	EXPERIMENT	OBSERVATION	INFERENCE
01	<b>TEST FOR CALCIUM</b> 2ml of the above prepared extract is taken in a clean test tube. To this add 2ml of 4% Ammonium oxalate solution	A white precipitate is formed	Indicates the presence of Calcium
02	<b>TEST FOR SULPHATE</b> 2ml of the extract is added to 5% Barium Chloride solution.	A white precipitate is formed	Indicates the presence of Sulphate
03	<b>TEST FOR CHLORIDE</b> The extract is treated with Silver Nitrate solution	No white precipitate is formed	Absence of Chloride
04	<b>TEST FOR CARBONATE</b> The substance is treated with concentrated HCl	No brick effervescence is formed	Absence of Carbonate
05	<b>TEST FOR STARCH</b> The extract is added with weak Iodine solution	Blue colour is formed	Indicates the presence of Starch
06	<b>TEST FOR FERRIC IRON</b> The extract is acidified with Glacial acetic acid and Potassium Ferro cyanide.	No blue colour is formed	Absence of Ferric iron
07	<b>TEST FOR FERROUS IRON</b> The extract is treated with concentrated Nitric acid and Ammonium thiocyanate solution	Blood red colour is formed	indicates the presence of Ferrous iron

08	<b>TEST FOR PHOSPHATE</b> The extract is treated with Ammonium molybdate and concentrated nitric acid	No yellow precipitate is formed	Absence of phosphate
09	<b>TEST FOR ALBUMIN</b> The extract is treated with Esbach's reagent	No yellow colour precipitate is formed	Absence of Albumin
10	<b>TEST FOR TANNIC ACID</b> The extract is treated with Ferric Chloride.	No blue black colour precipitate is formed	Absence of Tannic acid
11	<b>TEST FOR UNSATURATION</b> Potassium permanganate solution is added to the extract	It get decolourised	Indicates the presence of Unsaturated compound
12	<b>TEST FOR THE REDUCING SUGAR</b> 5ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and add 8-10 drops of the extract and again boil it for 2 minutes.	Colour change occurs	Indicates the presence of Reducing sugar
13	<b>TEST FOR AMINO ACID</b> One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well.	No violet colour is formed	Absence of Amino acids
14	<b>TEST FOR ZINC</b> The extract is treated with Potassium Ferro cyanide.	No white precipitate is formed	Absence of Zinc

**FTIR RESULTS AND DISCUSSIONS:**

In FT-IR spectra analysis, this sample *Inji Chooranam - 2* exhibits the peak value at 2935.66, 2360.8, 1514.12, 1249.87, 1157.29, 1035.77, 862.18, 765.74, 547.79, 524.64 having C-H Stretch, C=O=C Stretch, N=O Stretch, C-O stretch, C-F Stretch, S=O Stretch, C-H Bending, C-Cl Stretch, C-Cl Stretch, C-Br Stretch.

This indicates the presence of some organic functional groups such as Alkyne, Carbon dioxide, Nitro compound, Aromatic ester, Carboxylic acid, Fluro compound, Sulphonamide, Aromatics, Halo Compound, Halo Compound, Halo Compounds respectively.

The presence of alkyne protects against bacteria and fungal infections. The presence of aromatics are good pain relievers has anti-pyretic, anti-inflammatory auto-immune activities. likewise the presence of other these identified functional groups in the medicinal compound are also responsible for the therapuc function of drug "*Inji Chooranam -2*"

**BIO CHEMICAL RESULTS AND DISCUSSIONS:**

The Biochemical analysis of the trial drug *Inji Chooranam - 2* was tabulated above in **Table 3**.

The Bio chemical analysis of *Inji Chooranam - 2* contains

- Calcium
- Starch
- Sulphate
- Ferrous Iron
- Unsaturated compound
- Reducing sugar

**CONCLUSION:**

The instrumental analysis FTIR study for "*Inji Chooranam - 2*" shows the presence of functional groups through the stretch and bends which is responsible for its therapeutic activity. *Inji Chooranam - 2* is a Siddha polyherbal formulation taken from a classical literature used in the treatment of *Pakka vayu* and other ailments listed. The formulation is also screened for its Bio chemical properties. The presence of functional group revealed from FTIR analysis is responsible for its therapeutic value. It has to be

subjected for further studies to validate its efficacy and safety.

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**CONFLICT OF INTEREST:**

The authors declare no conflict of interest

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Nil

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