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Original article

Physico chemical, Chromatographic and Spectroscopic Evaluation of Siddha Compound Formulation "Neerchurukku Chooranam"

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ABSTRACT:
Neerchurukku Chooranam is a siddha Herbo mineral preparation and used in Neerchurukku (UTI). Neerchurukku can be correlated with urinary tract infection (UTI) in modern medicine according their causes, sign and symptoms. As per WHO an estimation 50% of females were reporting UTI. The aim of this study is to evaluate the Physiochemical, Chromatographic and Spectroscopic analysis of Neerchurukku Chooranam. Standardization of a Siddha medicine is important to ensure its efficacy and safety.The physico chemical parameters like determination of loss on drying at 1050C, total ash, acid insoluble ash, Water soluble ash, Sulphated ash, pH (4% water extract), Volatile oil, Alcohol soluble extractives and Water-soluble extractives were carried out by standard methods.

Keywords: Neerchurukku Chooranam (NC), Urinary tract infection (UTI), Physico chemical parameters, HPTLC, UV visible Spectroscopy.

1. INTRODUCTION

In Siddha aspect, Yugi described the disease *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 [1].

Causes of UTI:

- Inadequate or consuming small amount of oral fluids
- Retention of urine
- Renal uretic stone
- Diabetis
- Unhygienic Sexual activities
- 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 [2, 3]. It has much evidence in manuscripts, Siddha literatures and published articles now.

2. MATERIAL 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: It is dissolved in water, filtered and boiled till it attains jelly consistency. It is cooled to obtain the purified form [4].

Nelli vatral: Clean and remove the dust and other materials

Kalkandu: 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.

Physio chemical analysis

The physio chemical parameters like determination of the LOD at 105 ^{0}C, total ash, acid insoluble ash, water soluble ash, sulphated ash, pH, volatile oil, alcoholic soluble extractives and water-soluble extractives were carried out by standard methods [5].

High performance thin layer chromatography (HPTLC) studies

Developing solvent system

A number of solvent systems were tried and a system which gave the maximum resolution was selected as the solvent system for the extract. The optimum separations of constituents were achieved using the specified solvent system [6].

Sample application

The extracts were applied as different tracks of different concentrations of width 8 mm each on silica gel 60 F_{254} pre-coated aluminium sheets through CAMAG micro litre syringe using Automatic TLC Sampler 4 (ATS4).

Development of chromatogram

After sample application the plate was introduced vertically in a CAMAG developing chamber (10 cm × 10 cm) pre-saturated with the mobile phase selected [7].

Documentation

The developed chromatogram was air dried to evaporate solvents from the plate and the plate was kept in CAMAG Vizualizer and the images were captured under UV light at 254 nm and 366 nm.

Densitometry

The plate was scanned at 254 nm and 366 nm using TLC Scanner 4 and the finger print profiles were documented. The R_f values and finger print data were recorded with win CATS software associated with the scanner.

Post chromatographic derivatisation

The plate was derivatized using vanillin-sulphuric acid reagent, heated at 105^0 C by placing on CAMAG TLC plate heater till the colour of the bands appeared. Then the plate was visualized under white light and the chromatograms were documented. The plate was scanned at 575 nm and the R_f values and finger print data were documented.

Ultra violet visible (UV-Vis) spectroscopy

The alcohol extract of the drug was subjected to Ultra Violet-Visible spectroscopic analysis. The extract was scanned at wave length ranging from 190 to 1100 nm using UV-VIS spectrophotometer (Model: UV3120) and the characteristic peaks were detected and recorded.

3. RESULT AND DISSCUSSION

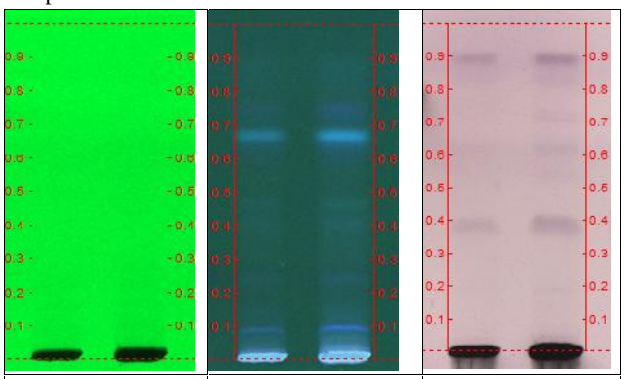
The physico chemical data obtained for the Neerchurukku chooranam are given in Table 3

Table 3: Physico chemical parameters of Neerchurukku chooranam

Sl. No.	Tests	Result %
1	LOD at 105^{0}C	27.73
2	Total Ash	6.31
3	Acid insoluble ash	0.34
4	Water soluble ash	4.63
5	Sulphated ash	6.05
6	pH (4% water extract)	3.0
7	Volatile oil	Nil
8	Alcohol soluble extractives	30.45
9	Water soluble extractives	49.21

These parameters are useful for establishing the profile quality of herbomineral drug and is important for its evaluation. The results observed in table 3 were LOD at 105^{0}C was found to be 27.73%, total ash 6.31%, acid insoluble ash 0.34%, water soluble ash 4.63%, sulphated ash 6.05%, pH 3.0%, volatile oil nil, alcohol soluble extractives 30.45% and water-soluble extractives 49.21%.

HPTLC study can be considered as an important tool in routine drug analysis. In the present study HPTLC finger printing is used as a parameter for standardization of a samples.



Under UV short	Under UV long	Under white light after derivatisation

Fig 1: HPTLC profile of alcohol extract of Neerchurukku chooranam view in UV short; viewed in UV long; viewed in visible light after derivatization using vanillin-sulphuric acid; solvent system; toluene; ethyl acetate-5:2; volume applied; tract 1-5 µl; tract 2- 10µl

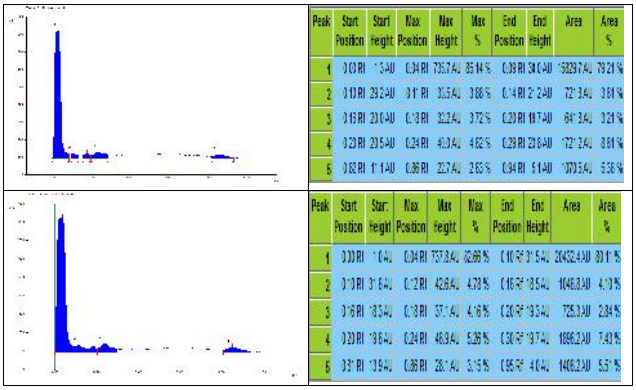


Fig2 a: HPTLC finger print profile of 5µl and 10µl of alcohol extract of Neerchurukku Chooranam at 254nm

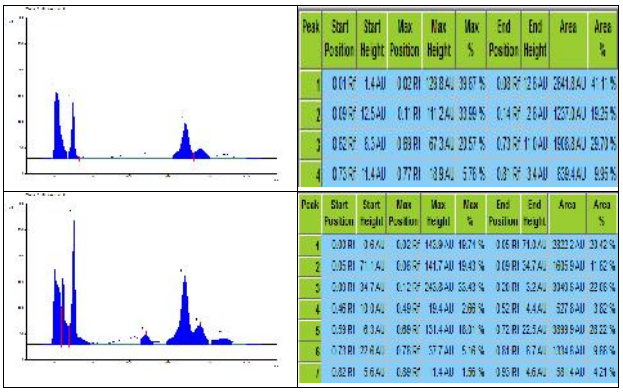


Fig2 b: HPTLC finger print profile of 5µl and 10µl of alcohol extract of Neerchurukku Chooranam at 366nm

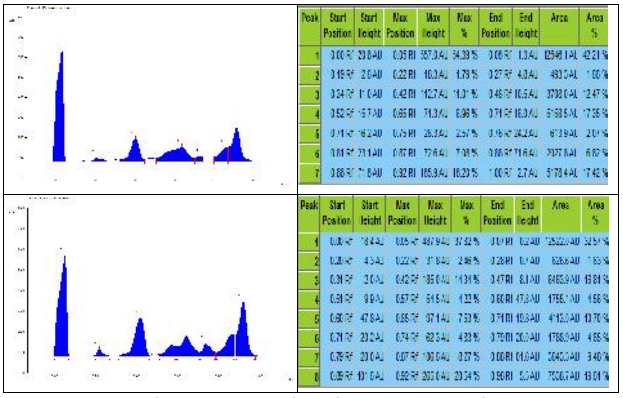


Fig 2 c: HPTLC finger print profile of 5µl and 10 µl of alcohol extract of Neerchurukku chooranam at 575nmafter derivatization.

The HPTLC finger printing pattern of alcohol extract of NC was developed at 254nm, 366nm and at 575nm after derivatization with vanillin sulfuricacid. The solvent system-tolueneethyl acetate -5;2 effectivly resolved the chemical constituents the alcohol extract of NC. HPTLC photo documentation profile of alcohol extract of Neerchurukku Chooranam at the 254nm, 366nm and at 575nm after the derivatization is given in finger printing profile and the Rf value and percentage area of peaks are shown in fig2a, fig2b and fig 2c.

In fig 2a on observation 4 bands appeared under 254nm UV with Rf 0.10, 0.16, 0.20 and 0.81out of which Rf value at 0.20 has the maximum area of 8.61%indicating the presence of highest concentration of the phytoconstituents.

In fig 2b on observation 6 bands appeared under 366nm UV with Rf 0.05,0.09, 0.59,0.62, 0.73 and 0.82 out of which Rf value at 0.62 has the maximum area of 29.70%indicating the presence of highest concentration of the phytoconstituents.

In fig 2c on observation 7 bands appeared under 2575 nm UV with Rf 0.19,0.31, 0.52, 0.60, 0.71, 0.79 and 0.89 out of which Rf value at 0.89 has the maximum area of 19.61%indicating the presence of highest concentration of the phytoconstituents.

UV Spectroscopy

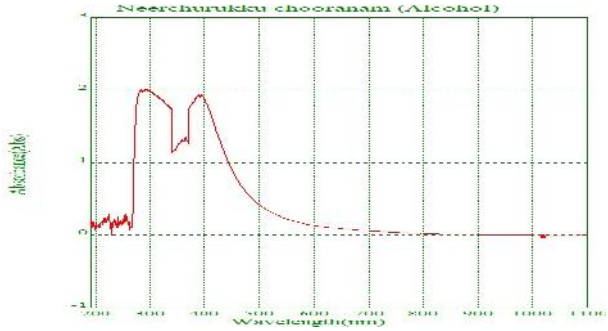


Fig 3: Ultra Violet – visible spectrum of alcohol extract of Neerchurukku chooranam

The UV Vis spectrums of alcohol extract of Neerchurukku chooranam are shown in fig 3. The qualitative UV Vis spectrum of the extract was recorded from wavelength 200-1100. The wave length 300 to 400 is the highest range of absorbance in Neerchurukku Chooranam. The spectrum obtained can be considered unique for alcohol extract of Neerchurukku Chooranam.

4. CONCLUSION

The Neerchurukku Chooranam having important role for treating the Neerchurukku (UTI) in siddha system of medicine. In the present study Neerchurukku Chooranam were thoroughly investigated to analyze their quality, safety and standardization for their uses.

Physico chemical parameters observed were LOD at 105^0C.The different physicochemical parameters, the developed HPTLC finger print help in the in the proper identification and quality control of the Neerchurukku Chooranam and also provide semi quantitative information about the major active phytoconstituents present in the Neerchurukku Chooranam extract.

In HPTLC fingerprinting pattern of alcohol extract of Neerchurukku Chooranam showed peak of Rf value 0.20 at 254nm, Rf value 0.62 at 366nm and Rf value 0.89 at 575nm after derivatisation.

In UV study revealed, that the 2 peaks in 2Abs and 1.95Abs on 300nm and 400nm for this study.

5. REFERENCES

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