WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 18, 915-924. Research Article ISSN 2277–7105

PHYSIOCHEMICAL ANALYSIS IN STANDARDIZATION OF SIDDHA POLYHERBAL FORMULATION KANA KUDINEER

Dr. S. Simal[1]*, Dr. C. Shanmuga Priya[2] and Dr. A. Satheesh Kumar[3]

[1]Pg Scholar, Department of Kuzhanthai Maruthuvam, Government Siddha Medical College, Chennai.

[2]HOD, Department of Kuzhanthai Maruthuvam, Government Siddha Medical College, Chennai.

[3]Lecturer II, Department of Kuzhanthai Maruthuvam, Government Siddha Medical College, Chennai.

Article Received on
31 July 2024,

Revised on 20 August 2024,
Accepted on 09 Sept. 2024

DOI: 10.20959/wjpr202418-33903

***Corresponding Author**
Dr. S. Simal
Pg Scholar, Department of Kuzhanthai Maruthuvam, Government Siddha Medical College, Chennai.

ABSTRACT

Introduction: Siddha Medicine, a precious gem in the treasury of Indian heritage, embodies the wisdom of the ages offering year compassionate and comprehensive approach to health and wellness. Siddha medicine emphasizes the use of natural remedies including plants minerals and metals to treat various ailments. Most of the Siddha medicines are effective but they have not been standardized yet. Standardization of Siddha Polyherbal formulation becomes essential to establish the monograph of the particular formulation along with this, it encompasses the Genuity, purity and safety of the preparations intended for usage in patients. “Kana Kudineer”(KK), a polyherbal formulation in Siddha medicine, is traditionally used to treat bronchial asthma, also known as Sooli Kanam. Asthma is a major non-communicable disease affecting both children and adults. Inflammation and narrowing of the small airways in the lungs cause asthma symptoms which can be any combination of cough, wheeze, shortness of breath and chest tightness. **Aim and Objective:** To standardize kana kudineer(KK) a siddha polyherbal formulation using physiochemical analysis and other analytical techniques such as HPTLC and TLC. Materials And Methods- Siddha poly herbal formulation “Kana kudineer”, Siddha drug mentioned in the textbook of Pillai Pini Maruthuvam part 2 which is used to treat childhood bronchial asthma. A scientific approach was undertaken to standardize the siddha polyherbal

formulation KK by conducting a through physiochemical evaluation, HPTLC and TLC thereby ensuring the establishment of its quality and efficacy parameters. **Results:** The results obtained from physicochemical evaluation shows that the Total ash value of Kana kudineer (KK) was "3.5±0.26%", in which the acid insoluble ash was "6.16±0.68%", loss on drying at 105ºC of the formulation KK was noted to be "4.86±0.55" in which watersoluble extract value and alcohol soluble extract value was "23.13±2.41", and "2.18±2.78" respectively. The pH value of the drug 7.52 which is indicates it is slightly alkaline(basic). HPTLC finger printing analysis of the sample reveals the presence of eight prominent peaks corresponds to the presence of eight components present with in it. **Conclusion:** The preliminary physiochemical analysis of the siddha drug KK provides a foundational fingerprint for future clinical studies, thereby facilitating the establishment of its safety, efficacy and quality parameters.

KEYWORDS: Kana kudineer, polyherbal formulation, physiochemical analysis, HPTLC, Sooli kanam.

INTRODUCTION

Siddha medicine one of the oldest traditional systems of medicines has been a vital part of India's cultural heritage for millennia. It's any two approach to health and disease rooted in the concept of Panja mahabudas (five elements) and Tridosha (three humus) has been effective in preventing and managing various health conditions. Traditional medicine has been cornerstone of healthcare for centuries with Siddha medicine being a prominent system of India. Polyherbal formulations are a hallmark of Siddha medicine leveraging the synergistic potential of multiple helps to address various health conditions. However the lack of standardisation and scientific evaluation has elevated the widespread acceptance and integration into modern healthcare. There is increasing awareness and general acceptability for the use of herbal drug in today's medical practice. Standardization is a very much important for establishment of consistency in chemical profile and biological activity for production of herbal formulation. Each formulations were standardized on the basis of organoleptic, microscopical, physical characteristic and physiochemical properties. This study aims to bridge this gap by applying cutting edge analytical techniques to investigate the standardization, physiochemical properties of Siddha Polyherbal formulation. By elucidating the scientific basis of these formulations we seek to promote evidence based development, ensure quality control and explore their therapeutic potential in the context of modern

healthcare. Kudineer means decoction or formulation prepared by a combination of medicinal plant ingredients. Thus the present study deals with standardization and physiochemical analysis of Siddha poly herbal formulation "Kana kudineer", Siddha drug mentioned in the textbook of Pillai Pini Maruthuvam part 2 which is used to treat childhood bronchial asthma. Till now there is no clear documentation available on standardization and physiochemical investigation aspect of this formulation. This is proved through the systematic standardization of the test drug by physiochemical and HPTLC finger printing aspects according to PLIM guidelines.

MATERIALS AND METHODS

SELECTION OF THE TRIAL DRUG

For this present study, the Polyherbal formulation "Kana Kudineer" a compound drug preparation for Sooli Kanam (Childhood Bronchial Asthma) has been chosen from classical Siddha literature –"Pillai Pini Maruthuvam" -Part 2, Page no:173.

Table No 1: Ingredients with Botanical name of Kana kudineer.

S.No	Ingredients	English name	Botanical name	Quantity
1	Aththi mottu	Fig bud	Ficus racemosa	35 gm
2	Aal mottu	Banyan bud	Ficus bengalensis	35 gm
3	Arasu mottu	Peepul bud	Ficus religiosa	35 gm
4	Marutham pattai	Arjuna Myrobalan	Terminalia arjuna	35 gm
5	Aththi pinju	Fig	Ficus racemosa	35 gm
6	Paruththi pinju	Cotton Plant	Gossypium herbaceum	35 gm
7	Naththaisoori ver	Shaggy button weed	Spermacoce hispida	35 gm
8	Muththakaasu	Nut grass	Cyperus rotundus	35 gm
9	Kirambu	Cloves	Syzygium aromaticum	35 gm
10	Athividayam	Indian atees	Aconitum heterophyllum	35 gm
11	Jaathikkaai	Arillus of the nut	Myristica fragrans	35 gm
12	Omam	Bishops weed	Trachyspermum ammi	35 gm

COLLECTION OF THE DRUG MATERIALS

The raw drugs Ficus racemosa (mottu and pinju), Ficus benghalensis(bud), Ficus religiosa(Bud), Terminalia arjuna(bark), Gossypium herbaceum (pinju), Spermacoce hispida(root), Cyperus rotundus, Syzygium aromaticum, Aconitum heterophyllum, Myristica fragrans, Trachyspermum ammi were bought from authenticated country drug store in Chennai.

IDENTIFICATION AND AUTHENTICATION OF THE DRUGS

All the raw materials were identified and authenticated by the Botanical and Pharmacological experts at Government Siddha Medical College, Arumbakkam and Chennai. The specimen sample of each raw materials are Ficus recemosa, Ficus benghalensis, Ficus religiosa, Terminalia arjuna, Gossypium herbaceum, Spermacoce hispida, Cyperus rotundus, Syzygium aromaticum, Aconitum heterophyllum, Myristica fragrans, Trachyspermum ammi has been labelled and were kept in the PG Gunapadam department, Government Siddha Medical College. Chennai-106 for future reference.

METHODS OF PURIFICATION

The purification process for the drugs was based on the ancient Siddha literature Sikicha Rathna Deepam Sarakku Suthimuraigal.

The ingredients, including Ficus racemosa, Ficus religiosa, Ficus benghalensis and Gossypium herbaceum, Myristica fragrans were roasted.

Trachyspermum ammi was soaked in lime water and dried.

Syzygium aromaticum was fried in low flame.

Spermacoce hispida and Aconitum heterophyllum was thoroughly washed.

Terminalia arjuna was dried with a cloth and gently scrape off the outer skin.

Cyperus rotundus was washed thoroughly and clean the outer skin.

PREPARATION OF THE DRUG

Equal quantity of Ficus religiosa, Ficus benghalensis Terminalia arjuna, Ficus racemosa, Gossypium herbaceum, Spermacoce hispida, Cyperus rotundus are heated in low flame and make them in a coarse powder. Then equal quantity of Syzygium aromaticum, Aconitum heterophyllum, Myristica fragrans, Trachyspermum ammi are heated in low flame and make them in a coarse powder.Mix all of them and tie in a cotton cloth and drop the knot into the 1.3 litre of water and boil it until it comes in the 1/8part of the whole amount of water.

STANDARDIZATION OF THE DRUG

Organoleptic characters of KK

State, nature, odour, touch, flow property, appearance of the drug was noted.

These following studies were done at Noble Research Solutions, Perambur at Chennai.

PHYSIOCHEMICAL ANALYSIS OF KANA KUDINEER(KK)

Percentage Loss on Drying

Test drug was accurately weighed in evaporating dish. The sample was dried at 105°c for 5 hours and then weighed.

Determination of Total Ash

Test drug was accurately weighed in silica dish and incinerated at the furnace a temperature 400oC until it turns white in color which indicates absence of carbon. Percentage of total ash will be calculated with reference to the weight of air-dried drug.

Determination of Acid Insoluble Ash

The ash obtained by total ash test will be boiled with 25 ml of dilute hydrochloric acid for 6mins. Then the insoluble matter is collected in crucible and will be washed with hot water and ignited to constant weight. Percentage of acid insoluble ash will be calculated with reference to the weight of air-dried ash.

Determination of Alcohol Soluble Extractive

Test sample was macerated with 100 ml of Alcohol in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105oC, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Determination of Water Soluble Extractive

Test sample was macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand and for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105oC, to constant weight and weigh. Calculate the percentage of water-soluble extractive with reference to the air-dried drug.

pH determination

Required quantity of test sample was admixed with distilled water and the subjected to screening using pH meter.

Particle size determined by

Solubility test

A pinch of sample was taken in a dry test tube and to it 2ml of the solvent was added and shaken well for about a minute and the results were observed. The test was done for solvents like Chloroform, Ethanol, Water, Ethyl Acetate, Hexane, Dimethyl sulphide (DMSO) and the results were observed individually.

Thin Layer Chromatography (TLC)Analysis

Test sample was subjected to thin layer chromatography (TLC) as per conventional one dimensional ascending method using silica gel 60F254, 7X6 cm (Merck) were cut with ordinary household scissors. Plate markings were made with soft pencil. Micro pipette were used to spot the sample for TLC applied sample volume 10-micro liter by using pipette at distance of 1 cm at 5 tracks. In the twin trough chamber with the specified solvent system After the run plates are dried and was observed using visible light Short-wave UV light 254nm and light long-wave UV light 365 nm.

High Performance Thin Layer Chromatography Analysis

HPTLC method is a modern sophisticated and automated separation technique derived from TLC. Pre-coated HPTLC graded plates and auto sampler was used to achieve precision, sensitive, significant separation both qualitatively and quantitatively. High performance thin layer chromatography (HPTLC) is a valuable quality assessment tool for the evaluation of botanical materials efficiently and cost effectively. HPTLC method offers high degree of selectivity, sensitivity and rapidity combined with single-step sample preparation. Thus this method can be conveniently adopted for routine quality control analysis. It provides chromatographic fingerprint of phytochemicals which is suitable for confirming the identity and purity of phototherapeutics.

Chromatogram Development

It was carried out in CAMAG Twin Trough chambers. Sample elution was carried out according to the adsorption capability of the component to be analysed. After elution, plates were taken out of the chamber and dried.

Scanning

Plates were scanned under UV at 366nm. The data obtained from scanning were brought into integration through CAMAG software. Chromatographic finger print was developed for the

detection of phytoconstituents present in each sample and their respective Rf values were tabulated.

RESULTS

Organoleptic characters

Figure 1.

Table No. 2: Organoleptic characters.

S.No	Specification	Character of Kana kudineer Chooranam	Character of Kana kudineer
1	State	Solid	Liquid
2	Nature	Coarse fibrous	Non viscous
3	Odour	Characteristic	Pungent characteristic
4	Touch	Hard	Non greasy
5	Flow property	Free flowing	Free flowing
6	Appearance	Dark brownish	Dark brownish

Physicochemical parameters

Table No 3: Results of Physiochemical Evaluation of Kana kudineer.

S.no	Parameter	Mean(n=3) SD
1	Loss on Drying at 105°c(%)	4.86 ± 0.55
2	Total Ash(%)	3.5 ± 0.26
3	Acid Insoluble Ash(%)	6.16 ± 0.68
4	Water Soluble Extractive (%)	23.13 ± 2.41
5	Alcohol Soluble Extractive (%)	2.18 ± 2.78
6	PH	7.52

Table No 4: Solubility profile.

S.no	Solvent used	Dispersibility
1	Chloroform	Insoluble
2	Ethanol	Soluble
3	Water	Soluble
4	Ethyl acetate	Insoluble
5	DMSO	Soluble

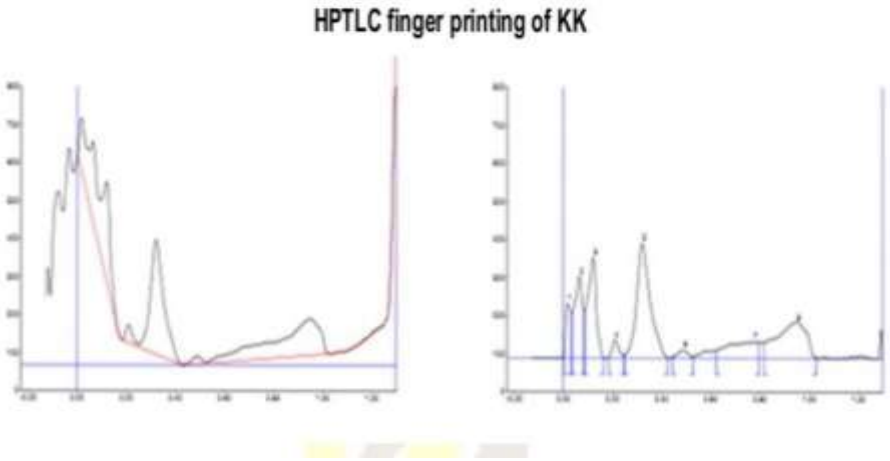

Figure 2.

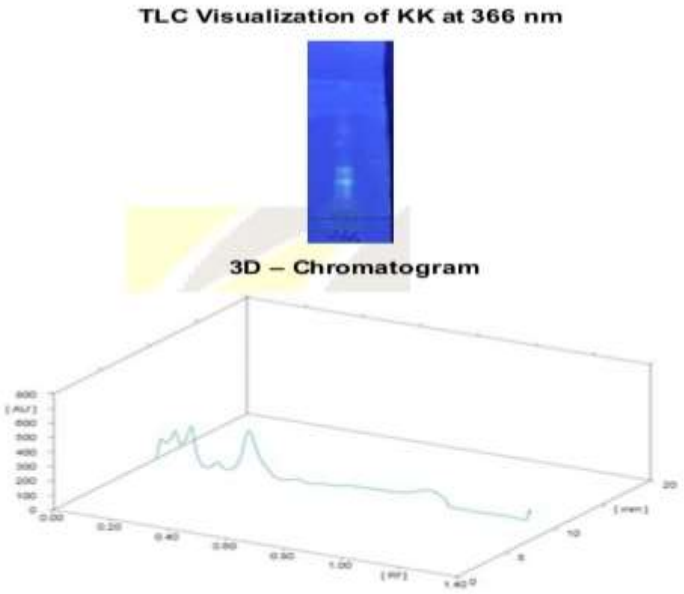

Figure 3.

Table no 5: PEAK TABLE.

Peak	Start Rf	Start height	Max Rf	Max height	Max%	End Rf	End Height	Area	Area%
1	0.00	21.9	0.02	142.8	12.68	0.03	119.0	1434.5	5.74
2	0.04	119.5	0.07	214.0	19.00	0.08	124.3	3219.4	12.89
3	0.09	125.6	0.12	263.7	23.42	0.16	0.4	4205.6	16.84
4	0.19	1.0	0.21	46.4	4.12	0.25	6.5	563.8	2.26
5	0.25	6.8	0.32	300.7	26.70	0.43	0.5	7568.9	30.31
6	0.45	2.6	0.49	21.0	1.87	0.53	0.6	380.7	1.52
7	0.63	20.7	0.78	42.6	3.78	0.80	41.3	2458.0	9.84
8	0.82	41.6	0.95	95.0	8.43	1.03	1.0	5143.1	20.59

HPTLC finger printing analysis of the sample reveals the presence of eight prominent peaks corresponds to the presence of eight components present with in it.Rf value of the peaks ranges from 0.04 to 0.82.

DISCUSSION

The drug KK was coarsely powder with heart texture and dark brownish colour. Fresh preparation of its extract shows non-Greasy, dark brownish with pungent characteristic. Oral bio availability depends on several factors including aqueous solubility, drug permeability etc. The drug KK soluble in specific solvent like ethanol, water and DMSO nearby proves it's efficiency of solubility increasing in bio available at in the stomach indirectly. The result derived from the physiochemical evaluation divulge that loss on drying at 105° c(%) value of KK was 4.86 ± 0.55 which indicates the moderate moisture content could increase the stability and shelf life of the drug which is suitable for medicine preparation. Total Ash value(%) 3.5±0.26 which notes the presence of inorganic components. water soluble extractive and alcohol soluble extractive value (%) was “23.13±2.41”,and “2.18±2.78” respectively. Which indicates that the drug contains potential for better dissolution and absorption. The pH value of the drug was 7.52 which indicates that the drug is slightly alkaline and that the drug is well suited for most biological applications. Rf value of the peaks ranges from 0.04 0.82. This study constitutes a preliminary exploration of KK physiochemical properties providing a essential foundation for future research endeavors. Which can build upon these insights to elucidate the complex characteristics of this Siddha herbal formulation. By expanding on this study discoveries, subsequent research can deeper into the therapeutic potential of KK, ultimately contributing to a more comprehensive understanding of its properties and applications in traditional medicines.

CONCLUSION

This study successfully standardized Kana Kudineer (KK) in accordance with PLIM guidelines and established protocols. The comprehensive standardization of this Siddha herbal formulation involved a range of parameters, including Organoleptic characters, Physicochemical parameters, TLC visualization at 366nm and HPTLC fingerprinting analysis. The results of this standardization effort will serve as a valuable tool for authenticating and evaluating the safety and quality of KK. The results of this analysis show that KK possesses significant biological activity and can be used to develop novel therapeutic strategies for disease treatment.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Principal and faculty members of the postgraduate department Kuzhanthai Maruthuvam, Government Siddha Medical College, Chennai, Tamil Nadu, India, for their valuable support, guidance, and advice throughout this research work. Additionally, we would like to extend our thanks to The Tamil Nadu Dr. M.G.R. Medical University and Noble Research Solutions, Chennai, for their contributions to this study.

REFERENCES

1. Pillai Pini Maruthuvam part 2 Indian Medicine and Homeopathy Department Chennai - 106, Second edition, 2014.
2. C.Kannusami pillai, Sigicha Rathna Deepam ennum vaiththiya nool, Chennai, 1951.
3. India Pharmacopeia I Volume I, Government of India, Ministry of Health and Family welfare, Indian Pharmacopeia commission, 2014.
4. Pharmacopoeial Laboratory for Indian Medicine (PLIM) Guideline for standardization and evaluation of indian medicine which include drugs of Ayurveda, Unani and Siddha systems.
5. D Wagner H. Plant Drug Analysis. A thin Layer chromatography Atlas. 2nd ed. Heidelberg: Springer-Verlag Belgium, 2002; 305: 227. epartment AYUSH. Ministry of Health & Family Welfare, Govt. of India.
6. Pharmacopoeial Laboratory for Indian Medicine (PLIM) Guideline for standardization and evaluation of indian medicine which include drugs of Ayurveda, Unani and Siddha systems. Department AYUSH. Ministry of Health & Family Welfare, Govt. of India.