

Naatu Kozhi Iragu Parpam - Heavy Metal Analysis by ICP-OES

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ABSTRACT

INTRODUCTION: Siddha medicine is a system of traditional medicine originating in ancient tamilnadu in south India. In siddha literature gunapadam - thathu jeeva vaguppu by Dr.R. Thiyagarajan, 40 types of feathers are indicated as medicine for various diseases. Feathers are unique feature to birds and it constitute over 90% of protein and composed of two types of keratins - alpha and beta. Chicken feathers are the waste product of poultry industry which creates a major solid waste problem. Disposal of this waste is a global environment problem, therefore finding the right and effective way to use this will be one of the greatest supports for eco-friendly environment. So, this study is taken to analyse "NAATU KOZHI IRAGU PARPAM" to use feathers in an effective way through traditional method with siddha literature evidence.

OBJECTIVE: To analyse NAATU KOZHI IRAGU PARPAM by ICP – OES.

MATERIALS AND METHODS: The ingredients such as country fowls feather and karisalai juice were used. The drug was prepared as per siddha literature Gunapadam- thathu jeeva vaguppu.

RESULT AND CONCLUSION: ICP – OES analysis indicates the presence of elements in NAATU KOZHI IRAGU PARPAM with their concentration, this forms the basic foundation to further clinical research which will be followed by the identification of the various activities of NAATU KOZHI IRAGU PARPAM.

Keywords: ICP – OES, Iragu parpam, Sinusitis, chicken feather.

INTRODUCTION

Chickens are one of the most common and widespread domestic animals, with a total population of 23.7 billion as of 2018 up from more than 19 billion in 2011. There is more chicken in the world than any other bird. There are numerous cultural references to chickens in myth, folklore, religion and in language and literature. Feathers are a feature that are unique to birds and while they may look pretty and add to the overall aesthetic appeal of a chicken, they do serve other important purposes. One of the main waste products of food industry are feathers. Chicken feathers are the waste product of poultry industry which creates a major solid waste problem. Around 24 billion chickens per year are killed across the world which is discarding four billion pounds of poultry feather. Disposal of this bulk waste is a global environment problem according to pollution of land and underground water resources. Therefore, finding the right and effective way to reuse poultry feathers will be one of the most important achievements in future. This study is taken to use feather in an effective traditional way with siddha literature evidence by emphasizing the quote "Back to root"

FEATHERS IN SIDDHA

In siddha literature "GUNAPADAM THATHU JEEVA VAGUPPU" by Thiyagarajan, Various types of feathers is indicated for various diseases. Country

fowls feather is one among them. The medicine named “*NAATUKOZHI IRAGU PARPAM*” is done according to the above literature and is undergone for ICP-OES analysis.

AIM

The aim of the study is to analyse the elements present in Naatu kozhi iragu parpam and to make use of chicken feather in an effective way.

MATERIALS AND METHODS

INGREDIENTS:

TAMIL NAME	BOTANICAL NAME	FAMILY	PART USED
Karisalai	Eclipta alba	Asteraceae	Leaves

TAMIL NAME	ENGLISH NAME	ZOOLOGICAL NAME
Naatu kozhi iragu	Country Chicken feathers	Gallus domesticus gallus

COLLECTION OF DRUGS:

Chicken feathers were collected from country chicken farm at Palayamkottai, Fresh karisalai leaves were collected from farm at Earal, Thoothukudi.

AUTHENTICATION OF RAW DRUGS:

All the above drugs have been authenticated by Dr. Kingsly MD(S)., HOD, Department of PG Gunapadam, Government siddha medical college and hospital, Palayamkottai.

PREPARATION OF NAATU KOZHI IRAGU PARPAM

The feathers of country chicken are cut into pieces and it is burnt to get purified. One Palam (35 grams) of purified country chicken feather powder is ground with four Palam (140 grams) juice of Eclipta alba and it is made into villai, then it dried in sunlight, which is then subjected to putam process with 9 cow dung cakes. The parpam is then cooled, collected and stored in air tight container.

DOSAGE: Kadalai alavu (170 mg)

ADJUVANT: Butter

SHELF LIFE: 100 years



Figure 1: Description the medicine – Naatu kozhi iragu parpam

Instrumental Analysis with Inductively Coupled Plasma Optical Emission Spectroscopy ICP-OES:

ICP-OES is an instrument widely used for the analysis of the heavy metals and trace elements in the samples in both qualitative and quantitative manner.

Working Principle Of ICP-OES

When plasma energy is given to the sample from outside, the elements (atoms) in the components of samples are excited and the excited atoms return to its low energy position. In the meantime, it emits rays (spectrum rays) and the emission of rays that correspond to the photon wavelength are measured. The element type is determined based on the position of the photon rays, and the content of each element is determined based on the rays' intensity.

ICP-OES analysis of NKP:

0.5 gram of Naatu kozhi iragu Parpam sample is dissolved in 10 ml of Nitric acid and the Solution is taken in a decomposition vessel. Analysis is done in the instrument PERKIN ELMER OPTIMA 5300 DV.

RESULT

Inductively Coupled Plasma Optical Emission Spectroscopy ICP-OES analysis result of Naatu kozhi iragu Parpam

TABLE 1 - ICP – OES ANALYSIS OF NAATU KOZHI IRAGU P ARPAM [PERKIN ELMER OPTIMA 5300 DV ICP – OES]

Elements	Elements Symbol	Wavelength (nm)	Concentration
Aluminium	Al	396.152	BDL
Arsenic	As	188.979	BDL
Carbon	C	193.030	54.123mg/L
Calcium	Ca	315.807	02..180mg/L
Cadmium	Cd	228.802	BDL
Copper	Cu	327.393	BDL
Iron	Fe	238.204	0.258mg/L
Mercury	Hg	253.652	BDL
Potassium	K	766.491	01.821mg/L
Magnesium	Mg	279.077	01.104mg/L
Sodium	Na	589.592	BDL
Lead	Pb	220.353	BDL
Phosphorous	P	213.617	146.341mg/L
Sulphur	S	180.731	01.254mg/L
Tin	Sn	235.485	00.098mg/L
Zinc	Zn	206.200	01.018mg/L

BDL – Below Detection Limit

The results indicate the presence of elements such as carbon, calcium, potassium, magnesium, phosphorus, sulphur, tin and zinc. Heavy metals such as aluminium, arsenic, cadmium, copper, mercury, sodium and lead are in below detection limit.

DISCUSSION

CP – OES analysis for *Naatu kozhi Iragu Parpam* (table - 1) indicates the presence of elements with their concentration such as Carbon (C) – 54.123mg/L, Calcium (Ca) – 02.180mg/L, Iron (Fe) - 05.258mg/L , Potassium (K) – 01.821mg/L, Magnesium (Mg) – 01.104mg/L , Phosphorous (P) – 146.341mg/L, Sulphur (s) – 01.254mg/L , Tin (Sn) – 00.098mg/L , Zinc (Zn) – 01.018mg/L.

The Heavy metals such as Aluminium (Al), Arsenic (As), Cadmium (Cd), Copper (Cu), Mercury (Hg), Sodium (Na), Lead (Pb) are in Below Detection Limit. Therefore the medicine is safe to consume and free from heavy metals.

CONCLUSION

The Siddha Medicine *Naatu kozhi iragu Parpam* is thus prepared and subjected to instrumental analysis. The heavy metals and trace elements were analysed in Inductively Coupled Plasma Optically Emission Spectroscopy instrument namely PERKIN ELMER OPTIMA 5300 DV. The results indicate the presence of elements such as carbon, calcium, potassium, magnesium,

phosphorus, sulphur, tin and zinc. Heavy metals such as aluminium, arsenic, cadmium, copper, mercury, sodium and lead are in below detection limit.

This concludes that, the *Naatu kozhi iragu parpam* is free from heavy metals and safer for human consumption and from the instrumental analysis result the elements present in the medicine shows its efficacy towards sinusitis. Further toxicity studies and clinical studies on *Naatu kozhi iragu parpam* is needed to strengthen its safety margin and its efficacy.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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