

ICP-OES Analysis of Siddha Formulation *Venkara Mathirai*

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ABSTRACT

Background: The Venkara Mathirai (VM) is a herbomineral formulation used for treating ulcer, anaemia and Arthritis. Objective: The objective of the present study is to detect heavy metals (arsenic, lead, cadmium, mercury) and other elements within the permissible limits as per WHO guidelines present in the Siddha herbo-mineral Formulation “Venkara Mathirai”. Materials and

Methods: The ingredients were collected and purified and the drug was prepared as per Siddha literature “Siddha Vaithiya Thirattu”. Here, the drug was subjected to standardization by simultaneous ICP-OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV).

Result: This paper revealed the therapeutic safer level of heavy metals and other elements present in Venkara Mathirai, as per WHO guidelines with the help of simultaneous ICP-OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV).

Conclusion: From the ICP-OES analysis reveals that Venkara Mathirai are free from heavy metals there by proving the safety of its utilization in siddha system. This study forms the base for the pharmaceutical analysis of Venkara Mathirai (VM) which will be followed by safe and efficacy studies later.

Keywords: Venkara Mathirai, Siddha medicine, ICP-OES, Ulcer.

INTRODUCTION

The Siddha system of medicine is the most primitive medical system and mainly practiced in the southern part of India, which treats not only the body but also the mind and the soul. The word ‘Siddha’ comes from the word ‘Siddhi’ which means ‘an object to be attained’ or ‘perfection’ or ‘heavenly bliss’. Siddhi generally refers to Ashtama Siddhi that the eight great supernatural powers which are enumerated as Anima etc. Those who attained or achieved the above said powers are known as Siddhars. Medicine, as everyone knows is not merely a science but an art as well. Siddha medicine is claimed to revitalize and rejuvenate dysfunctional organs that cause the disease. This system possesses bountiful forms of herbal, herbo-mineral combinations. It consists not merely of compounding Mixtures, preparing decoctions, pills, plasters and drugs of all kinds; but it also deals with the different processes of life. Venkaram (Sodium Biborate) a type of Karasaram is used In many preparation in its purified form. Internally, Venkaram has Lithotriptic, Diuretic and Emmenagogue action and when applied it has got Sedative and Antiseptic action. “Venkara mathirai” prepared by the combination of Venkaram, Indhuppu, Nervalam, Chukku,

Milagu, Thippilli, Perungayam, Kantha podi, Kalarchi paruppu and Kadukkai (Reference: Siddha Vaithiya Thirattu – Pg.no 45). Indicated for Envagai Gunman, Paandu, Soolai, Andavatham, Magodharam and Vippuruthi. The literature review reveals so far, no scientific evaluations were carried out this particular preparation. Here the drug was subjected to standardization by simultaneous ICP-OES analysis equipment (PERKIN ELMER OPTIMA 5300 DV) to detect heavy metals (arsenic, lead, cadmium, mercury) and other elements, which should be within the permissible limits as per WHO guidelines.

MATERIALS AND METHODS

The Siddha drug Venkara Mathirai selected from a classical Siddha literature cited in The Siddha Vaithiya Thirattu pg. No 45

Ingredients of Venkara Mathirai

- Venkaram (Sodium baborate)
- Indhuppu (Sodium chloride impura)
- Kaantham (Magnetic oxide of iron)
- Nervalam (Croton tiglium)
- Chukku (Zingiber officinale)
- Milagu (Piper nigrum)
- Thippili (Piper longum)
- Kazharchi paruppu (Caesalpaenia crista)
- Perunkaayam (Ferula asafoeitida)
- Kadukkai (Terminalia chebula)

ICP-OES analysis was done in Sophisticated Analytical Instrument Facility IITM, Chennai-36

Collection, Identification and Authentication of the Drug:

The required raw drugs were purchased from a well reputed Siddha drug store. The drugs are identified and authenticated By the HOD, Department of Gunapadam, Government Siddha Medical College and Hospital, Palayamkottai, Tirunelveli.

Methods of Purification:

All the Ingredients have been completely purified as per the Siddha Literature in the presence knowledge of Guide/Faculty Members.

Preparation of Medicine:

The purified drugs are prepared as per the procedure mentioned in siddha literature.

ICP-OES Study of Venkara Mathirai:

Principle of ICP Optical Emission Spectrometry (ICP-OES) ICP, abbreviation for Inductively Coupled Plasma, is one Method of optical emission spectrometry. When plasma energy Is given to an analysis sample from outside, the component elements (atoms) are excited. When the excited atoms return to Low energy position, emission rays (spectrum rays) are released and the emission 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. To generate plasma, first, argon gas is supplied to torch coil, and high frequency electric current is applied to the work coil at the tip of the torch tube. Using the electromagnetic field created in the torch tube by the high frequency current, argon gas is ionized and plasma is generated. This plasma has high electron density and temperature (10000K) and this energy is used in the excitation emission of the sample. Solution samples are introduced into the plasma in an atomized state through the narrow tube in the centre of the torch tube.

Equipment:

Equipment for ICP optical emission spectrometry consists of a light source unit, a spectrophotometer, a detector and a data processing unit. There are several types of equipment based on differences in the Spectrophotometer and the detector. The most common type is shown in Figure 1.

1.Sequential type

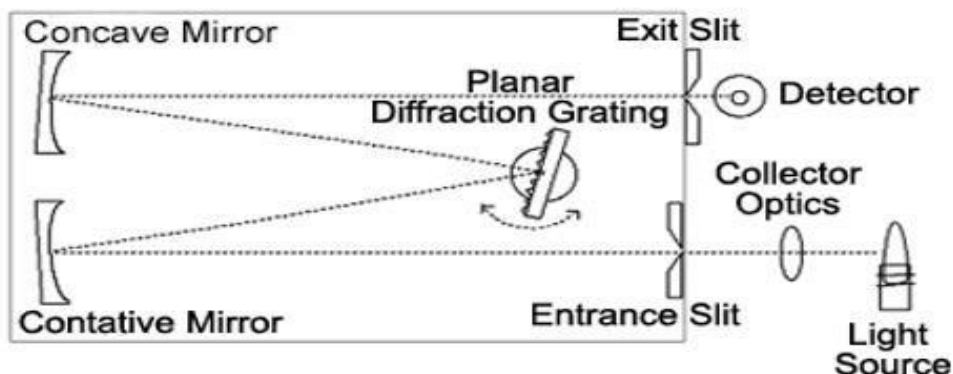


Fig. 1. Sequential type ICP-OES

A spectrophotometer with a Czerny-Turner monochromator, and a detector with a photomultiplier is most common for this type. With this equipment, programmed wavelength of the Spectrophotometer is consecutively varied to measure multiple elements. This

causes rather long measuring time, however, with its high-resolution spectrophotometers, it is favourable for measurement of high-matrix samples.

2.Simultaneous Type

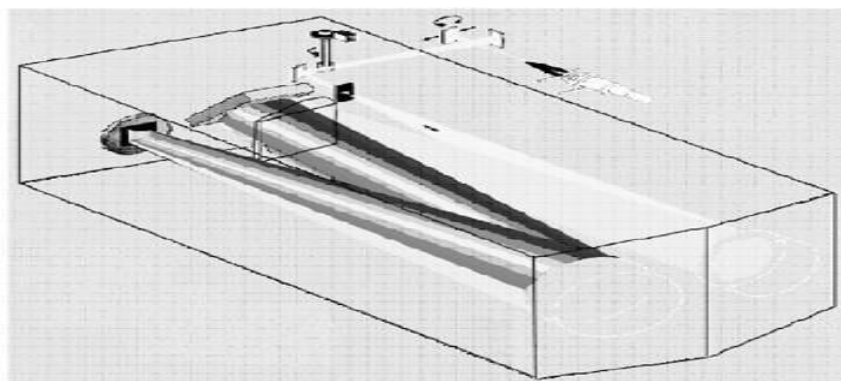


Fig. 2. Simultaneous ICP-OES

This type typically uses an echelle cross disperser in Spectrophotometers and semi-conductor detector such as CCD for the detector. Echelle cross disperser disperses light of measurable wavelength range two-dimensionally by combining prism and echelle diffraction grating. Combination of echelle cross disperser and a CCD detector enables multi-element measurement at any wavelength. The most notable feature of this equipment is the high-speed measurement, providing information on all 72 measurable elements in measurements of 1 to 2 minutes normally.

Siddha drug analysis:

Venkara Mathirai (VM) drug has attracted attention because it is thought to contain a person's health history on some level and is thought To act as an excretory organ for heavy metal in the body. However, there are problems because there are few usable samples and knowledge about multiple elements is required. With simultaneous analysis equipment, we can collect useful information with a small amount of sample.

Equipment: Simultaneous ICP-OES, PERKIN ELMER OPTIMA 5300 DV

Sample preparation: 0.5g of VM drug is measured, and then Dissolved in a decomposition vessel with nitric acid into

10ml Solution. Partial spectral profile and analysis results shown in Table.

RESULT

Table 1 Elements of the Venkara Mathirai V. Mathirai -----(wt:0.320431g)

SL. NO	ELEMENTS	WAVELENGTH	CONCENTRATION
1	As	188.979	BDL
2	C	193.030	175.1210 mg/L
3	Ca	315.807	301.103mg/L
4	Cd	228.802	BDL
5	Cu	327.393	01.245mg/L
6	Fe	238.204	11.154mg/L
7	Hg	253.652	BDL
8	K	766.491	01.110 mg/L
9	Mg	285.213	BDL
10	Na	589.592	571.380 mg/L
11	Pb	220.353	BDL
12	P	213.617	207.310 mg/L
13	S	180.731	01.1701 mg/L
14	Zn	206.200	01.290 mg/L

***BDL-Below detection limit**

DISCUSSION

Heavy metal Viz. arsenic (As), cadmium (Cd), mercury (Hg), Lead (Pb), and other elements such as iron (Fe), potassium (K), Magnesium (Mg), sodium (Na), phosphorus (P), sulfur (S), zinc (Zn) of Venkara Mathirai on table 1 was found to be within the Permissible limits as per WHO guidelines.

CONCLUSION

From the ICP-OES analysis reveals that Venkara Mathirai are free from heavy metals there by proving the safety of its utilization in siddha system. This study forms the base for the pharmaceutical analysis of Venkara Mathirai (VM) which will be followed by safe and efficacy studies later. So, this study will be a step forward to scientific validation of Venkara Mathirai.

Declaration by authors

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Conflict of interest: The authors declare no conflict of interest

REFERENCE

1. Dr. K. N. Kuppusamy Muthaliyar, Dr. K. S. Uththamarayan, Siddha Vaithiya Thirattu, Directorate of Indian Medicine and Homeopathy, 2006.
2. K. S. cotton Mudaliyar, Gunapadam (Porutpanbu Nool), Directorate of Indian Medicine and Homeopathy, 2008; 1. Cotton cotton is the salary
3. Dr. R. Thiyagarajan, Gunapadam (Thaathu seeva vaguppu), Directorate of Indian Medicine and Homeopathy, 2009.

4. S. Somasundaram, Maruthuva Thavaraviyal, Elangovan pathipagam, Tirunelveli, 2009; 1.
5. Principle of ICP Optical Emission Spectrometry (ICP – OES): Hitachi High–Tech GLOBAL [Internet]. Hitachi – Hitech.com, 2022, Available from http://www.hitachihightech.com/global/products/science/tech/ana/icp/descriptions/icpoe_s.html

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