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The physico-chemical properties of Siddha herbo- mineral formulation of *Attathi Chooranam*

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Abstract

The herbal products need to be standardized before releasing into the market as per WHO guidelines. Evidence based scientific explanation and quality matching International standards to reassure the efficacy of Siddha medicine. ***Attathi chooranam*** (ATC) is a classical Siddha herbo-mineral drug. ATC has seven medicinal plant parts and one mineral substance with equal quantity of *Saccharum officinarum*, and is indicated for *Vatha* related *soothaka* (ovarian) disorders and *Gunmam*.

The aim of this study was to evaluate the physico-chemical analysis of the drug *ATC*. The ingredients were authenticated, purified and made into micronized powder. Various physico-chemical parameters were evaluated by the standard methods.

Organoleptic characters were determined colour – brown, odour- typical and taste – little sweet consistency. Physicochemical parameters such as loss on drying at 105 °C was 7.25 %; Ash values were determined by total- Ash 15.50 %, water- soluble ash 1.35 %, acid-insoluble ash-nil and sulphated ash 9.69%; Water-soluble extractive value 38.75 % and alcohol-soluble extractive value 46.68%. The ATC had pH 4.8, volatile oil 1.25%, total fat 8.81%, swelling index 2 ml and foaming index negligible. It is concluded that the Siddha herbo-mineral combination of ATC is physico-chemically evaluated and standardized.

Keywords: Physico-chemical, Vatha disorders, *Soothakam*, Herbo-mineral.

1. Introduction

The various traditional system of medicine has been using in many countries, but Siddha medicine is predominantly practiced in South India. Evidence based scientific explanation is needed to understand the concept of Siddha system of medicine and demands quality matching with international standards to reassure the efficacy of Siddha medicine is necessary for the global acceptations.

Any herbal products that should be standardized before releasing to the market (Paridhavi et.al) regarding the guidelines of WHO. Herbal drugs standardization is very necessary in AYUSH systems. The development of this traditional system safety, efficacy and quality will help not only to preserve the traditional heritage but also to rationalize the use of natural products in health care (Mukherhee PK 2003). India can emerge as the major country and play the main role in production and standardized the effective herbal formulations by using modern techniques of standardization.

Attathi chooranam (ATC) is a classic Siddha drug chosen from the text *Anupokavaithiya navaneetham* (part-8). *Atta* means eight and *athi* means first, original, root and etc. ATC is commonly used for ovarian disorders (*Vatha* related *Soothakanoikal*). This herbo-mineral drug is being used effectively in curing *vatha* and *pitha related* diseases. There are seven medicinal plants such as *Piper longum* Linn., *Zingiber officinale* Rosc., *Nigella sativa* Linn., *Cuminum cyminum* Linn., *Piper nigrum* Linn., *Ferula asafoetida* Linn., and *Carum coptium* Benth & Hook. F., and one mineral substance impure sodium chloride included at this ATC. Further *Saccharum officinarum* which is the equal quantity with the above whole substances also added to form this ATC.

The physico-chemical properties of drug ATC such as ash values, extractive values, behaviors of powder were evaluated with different tests based on the standardization. These physico-chemical properties should be determined in any new preparation of drug in the laboratory.

Table 1. Ingredients of ATC

S.No:	Ingredients	Botanical name	Family name	Part used	Quantity
1	*Thippili*	*Piper longum* Linn.	Piperaceae	Dry fruit	8 parts
2	*Chukku*	*Zingiber officinale* Roscoe.	Zingiberaceae	Dry rhizhome	7 parts
3	*Karunjchirakam*	*Nigella sativa* Linn.	Ranunclaceae	Seeds	6 parts
4	*Natchirakam*	*Cuminum cyminum* Linn.	Apiaceae	Seeds	5 parts
5	*Milagu*	*Piper nigrum* Linn.	Piperaceae	Dry fruit seeds	4 parts
6	*Inthuppu*	Sodium chloride impure (Chemical name)			3 parts
7	*Perungayam*	*Ferula asafoetida* Linn.	Umbelliferae	Gum resin	2 parts
8	*Omam*	*Carum coptium* Benth & Hook.F.	Apiaceae	Seeds	1 part
9	*Sarkarai*	*Saccharum officinarum*	Poaceae	Jaggery	36 parts

Aim and objectives

The aim of this study is to evaluate the physico-chemical properties of ATC.

3. Materials and Methods

3.1 Collection and Identification of plant materials

The ingredients were authenticated by the Professors of department of Gunapadam and Medicinal Botany at Government Siddha Medical College and Hospital, Palayamkottai.

3.2. Purification of raw drugs:

The raw drugs were purified as per the methods mentioned in the Siddha literature.

3.3. Preparation of the drug *Attathi chooranam* (ATC)

All the drugs were dried well in shadow and made into micronized powder (Table No.1&Figure 1).

3.4. Determination of Physico-Chemical Parameters.

Powdered samples were subjected to physicochemical analysis including percentage of total ash, acid-insoluble ash, water soluble ash, and sulphated ash were calculated as per the Indian Siddha pharmacopoeia. Methods were used for the study of extractive value such as water-soluble extract and alcohol extract, pH value, volatile oil, total fat content, loss on drying test were determined according to the methods outlined by Pharmacopoeia of India. The swelling index and foaming index were determined as per WHO guidelines. The extracts were concentrated under low pressure at room temperature.

4. Results and Discussion

ATC was evaluated in order to establish its organoleptic characters and physico-chemical parameters by this study. Indian pharmacopoeia and Siddha pharmacopoeia and also developing monographs using the various quality parameters outlined.

4.1. Organoleptic characters:

Colour – Brown.
Odour – Typical
Taste – Little sweet consistency

4.2. Physicochemical Parameters:

The results of the physicochemical parameters are given in table 2. Loss on drying is the loss of weight in percentage (mass percentage). It determined the amount of volatile matter of any kind (including water and volatile oil) that can be driven off under the condition specified (hot air oven and desiccators). The presence of moisture content in the powder formulation of the drug is always unwanted because it may lead to deterioration of formulation and must be controlled in order to ensure the stability of product (Rajan Kaushika et al 2015). Loss on drying of ATC was 7.25% which included the moisture substances in acceptable amount and good indication for its stability. It is expected to maintain within 15 % as the good product.

Table 2. Results of physiochemical evaluation

S.No	Parameters	Result of Attathi chooranam
1.	Loss on drying at 105°C	7.25%
2.	Total- Ash	15.50 %
3.	Sulphated ash	9.69%
4.	Acid- Insoluble ash	Nil
5.	Water- soluble ash	1.35%
6.	Water- soluble extractive value	38.75%
7.	Alcohol- soluble extractive value	46.68%
8.	pH	4.8
9.	Volatile oil	1.25%
10.	Total fat	8.81%
11.	Swelling index	2ml
12.	Foaming index	negligible

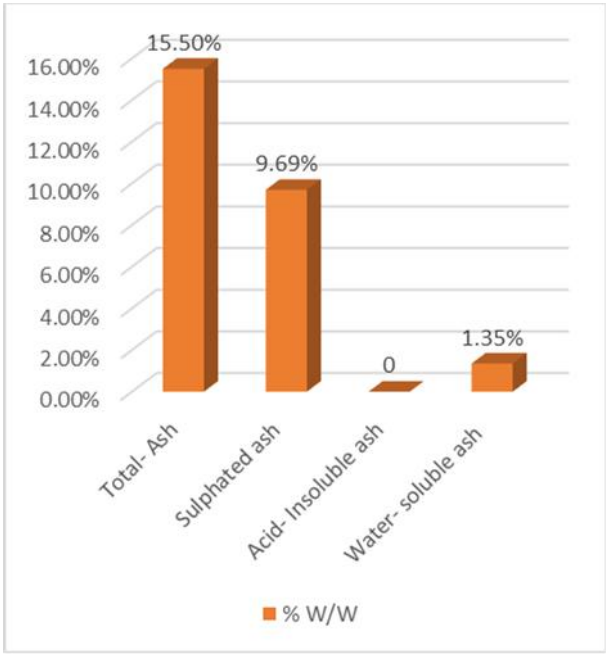

Figure 1 : Ash values of ATC

Ash values are useful to determine the quality and purity of the crude drugs in powder form. The total ash content is the measure of inorganic constituents present in the drug and that should indicate the inorganic impurity. It is difficult to remove by purification even if the inorganic impurity is less in amount which are not objectionable if only traces are present. High ash content explains its unsuitable nature to be used as drug. In this study, the ash content of a crude drug is determined by total- ash 15.50%, Sulphated ash 9.69%, acid- insoluble ash -nil and Water- soluble ash1.35%.

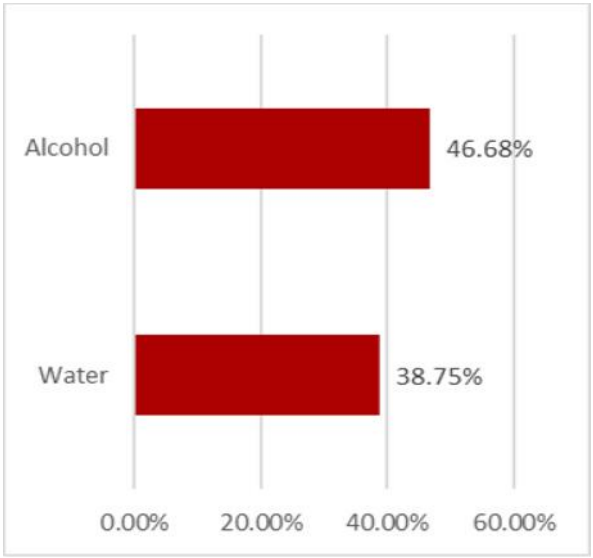

Figure 2: Percentage of extractive value

Extractive values of crude drugs were useful for their evaluation and these values indicated the nature of the constituents present in a crude drug. The alcohol soluble extractive value was 46.68 % and water-soluble extractive value was 38.75 % and which indicated that the ATC included comparatively more organic matter.

The pH value of this drug was 4.8 which is slightly acidic in nature. In the study volatile oil also evaporated and the drug ATC has 1.25% volatile oil and 8.81% of total fat of the drug were calculated in the process.

The Swelling Index determination was based on the addition of water or a swelling agent as specified in the test procedure. Swelling Index is used to measure a coal's swelling properties. Swelling index of ATC was 2 ml.

Frothing is signifying the occurrence of saponins. When an aqueous decoction is shaken, many medicinal plant materials contain saponins that can cause persistent foam. The foaming ability of an aqueous decoction of plant materials and their extracts was measured in terms of a foaming index (Rohit Kumar et al 2017). Foaming Index of this plant material ATC was negligible because not produced froth during the process.

5. Conclusion

There are many numbers of herbal products available in the market. The quality of herbal drugs is determined by many factors, which contribute directly or indirectly to the safety, effectiveness and acceptability of the product. It is also considered that the development of modern analytical tools in testing various quality parameters for the effective quality control of herbal product cannot be over emphasized.

Based on pharmacopoeias guidelines, various parameters of drug ATC like loss on drying at 105 °C, ash values such as total- ash, sulphated ash, acid- insoluble ash and water- soluble ash, water- soluble extractive and alcohol- soluble extractive values, pH, volatile oil, total fat, swelling index and foaming index were evaluated in this study. According to this study the Siddha herbo-mineral combination of ATC was standardized so as to ensure the quality & purity.

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