



Physicochemical Analysis of Nandukkal Parpam

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ABSTRACT

Nandukkal parpam is a herbo mineral siddha formulation extensively used in the treatment of Renal calculi. Physico chemical analysis of nandukkal parpam i.e. quantitative parameters such as pH, ash (%w/w), acid insoluble ash (%w/w), loss on drying @105 °C, water soluble extractive, alcohol soluble extractive, calcium content and foreign matter were tested was carried out in the present study. Qualitative analysis of the formulation showed the presence of elements of chlorides, phosphate, carbonate, silicate, iron and calcium. 19.87% of calcium content was found in the drug. No foreign matter was found out in this formulation.

KEYWORDS : Nandukkal parpam, Siddha formulation, physicochemical parameters.

INTRODUCTION

Siddha Materia Medica classifies drugs into 3 major parts based on their origin i.e, Mooligai vaguppu (plant kingdom), Thaathu vaguppu (Mineral kingdom) and Jeeva vaguppu (Animal kingdom). Nandukkal (Fossil crab stone) is a marine product, which is one of the mineral that comes under Uparasam, a sub classification of Thaathu vaguppu (Mineral kingdom)[1]. Ethno medicines provide many effective formulations for human diseases. The literature available in marine ethno medicine is very limited [2]. Fossil stone crab is present in nature in sea shores which has got diuretic property. It is used in the treatment of strangury, urinary calculus, chronic ascites, gonorrhoea, leucorrhoea and phlegm [1].

Nandukkal parpam is a combination of siddha drug consisting of five constituents, one of which is reported to have anti urinary calculus properties. It was prescribed by the siddha practitioners for diseases such as urinary obstruction, inflammation of urogenital tract, gravel in urine and bladder [3]. Administration of nandukkal parpam significantly reduced the ethylene glycol induced calcium oxalate crystals in wistar rats [4]. UV spectroscopy study showed that this drug contains calcium as a major element [5].

Standardization of formularies and drugs is a major challenge. The safety, acceptability and efficacy of various drugs and formularies need to be documented before they can be promoted for human consumption [6]. World Health Organization (WHO) has emphasized the need to ensure quality control of Siddha formulations by using modern techniques and by applying suitable parameters and standards (WHO, 2007) [7]. Evaluations of physicochemical parameters are essential to standardize the siddha formulations. Analytical specifications of parpam are given in Protocol for testing Ayurvedic, Unani and Siddha medicines. According to this Nandukkal parpam was subjected to Standardization.

Material and Methods

Test sample

The test sample Nandukkal parpam was purchased from the Indian medical practitioners' co-operation pharmacy and stores Ltd. Chennai, and submitted for analytical tests to Captain Srinivasa murti Research Institute of Ayurveda and Siddha Drug Development, Arumbakkam, Chennai-106 (CSMDRIA Lab Code No.1310259).

Physicochemical parameters

Organoleptic characters (colour, appearance, odour, taste, touch), different quantitative parameters such as pH, ash (%w/w), acid insoluble ash(%w/w), loss on drying @105°C, water soluble extractive, alcohol soluble extractive, calcium content and foreign matter were tested

according to the prescribed standard methods[6-10] in Captain Srinivasa murti Research Institute of Ayurveda and Siddha Drug Development, Arumbakkam, Chennai-106. Qualitative analysis was carried out in Biochemistry laboratory, National Institute of Siddha, Chennai -47

Organoleptic characters

The organoleptic characteristics of powdered samples namely their appearance and colour in day light, smell and their taste were also studied.

Loss on drying:

The powdered sample was dried in an electrical oven at 105 °C until reaches a constant weight.

Determination of pH of Aqueous Solution:

The powdered material (80 µm mesh) was suspended in glass distilled water. After 2hrs, filtered and the clear solution was measured for pH.

Total Ash Value

5 gm of test sample was ignited in an electric furnace at 500 – 5500C in silica crucible until the sample reaches a constant weight.

D. Water Soluble Ash Value

The water insoluble matter was collected in an ash less filter paper and ignited in an electric furnace at 450 °C in silica crucible until reaches a constant value. The weight of insoluble matter was subtracted from the weight of the total ash to indicate the weight of water soluble ash.

E. Acid Insoluble Ash Value

Total ash obtained was heated with addition of 25 ml of dilute HCl for 10 min. It was filtered in an ash less filter paper (Whatman No. 41) and the residue was ignited in the furnace to get a constant weight.

Qualitative Tests

5gm of Nandukkal parpam was weighed accurately and placed in a 250ml clean beaker and added with 50ml of distilled water. Then it was boiled well for about 10 minutes. Then it was cooled and filtered in a 100ml volumetric flask and made up to 100ml with distilled water.

Test for Chloride:

2ml of the extracts was added with 2ml of dil.HNO₃ until the effervescence ceased. Then 2ml of silver nitrate solution was added. Presence of Cloudy appearance indicated the presence of chloride.

Test for Phosphate

2ml of the extract was treated with 2ml of ammonium molybdate solution and 2ml of con.HNO₃. Presence of yellow cloudy appearance

indicated the presence of phosphate.

Test for Iron:

2ml of extract was added with 2ml of thiocyanate ammonium solution. Appearance of mild red colour indicated the presence of Iron. With this additional 2ml of thiocyanate ammonium solution and 2ml of con HNO_3 was added. Appearance of blood red colour indicated the presence of Iron.

Test for Calcium:

2ml of the extract was added with 2ml of 4% dil. ammonium oxalate solution. Cloudy appearance and white precipitate indicated the presence of calcium.

Test for Alkaloids:

Solvent free extract, 50 mg was stirred with few ml of dilute hydrochloric acid and filtered. To a few ml of filtrate, 1 – 2 ml of Dragendorff's reagent was added. A prominent yellow precipitate indicated the test as positive.

Results and Discussion

The organoleptic characteristics of Nandukkal parpam was solid in nature, gray colour in day light and the smell and taste was not to be found characteristic. The values of the physicochemical parameters depicted in Table.1. It was observed that in the drug 1.29% loss on drying was found which indicates that the moisture content of the formulation is within the range. Moisture content/ LOD of the sample are less than 5% w/w, so it could prevent microbial growth. Total ash in the given sample was found 83.98 %w/w whereas acid insoluble ash was found 36.50%w/w. The value of total ash in the formulation is high because the method of preparation of this drug is calcinations procedure. Total ash value used to estimate the inorganic material such as silicate, carbonates, oxalates and phosphates. The value of total ash indicates that the inorganic contents of the formulation are below the limits. pH of the drug was found 8.10. Water soluble extractive value of this formulation is 0.72% and no significant value was observed in alcohol soluble extractive. 19.87% of calcium content was found in the drug. No foreign matter was found out in this formulation. Qualitative analysis of the for-

mulation revealed that Nandukkal parpam possesses the elements of chlorides, phosphate, carbonate, silicate, iron and calcium. It was found that alkaloids are also present in this formulation as the drug includes the juices of *Aerva lanata* and *Rhaphanus sativus*. In addition to the qualitative tests the formulation does not contain sulphate, sulphide, magnesium, ammonium, mercury, arsenic, aluminium, zinc, copper and sodium. Tannic acid, amino acid, unsaturated compounds are not found in this formulation.

Conclusion

The analysis of physico chemical characteristics of Nandukkal parpam indicates the consequence of drug standardization before introduce into the market. More scientific studies need to be carried out to evaluate the safety and efficacy of this formulation.

Table.1 Physicochemical parameters

S.No	Parameters	Results
1.	pH	8.10
2.	Ash (%w/w)	83.98
3.	Acid insoluble ash (%w/w)	36.50
4.	Loss on drying @105° C	1.29%
5.	Water soluble extractive (Whatman no:42)	0.72%
6.	Alcohol soluble extractive (Whatman no:42)	Negligible
7.	Calcium content	19.87%
8.	Foreign matter	Nil

Table.2 Qualitative analysis of Nandukal parpam

S.No	Parameters	Results
1.	Chloride	present
2.	Phosphate	present
3.	Carbonate	present
4.	Silicate	present
5.	Calcium	present
6.	Iron	present
7.	Alkaloids	Present

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