Pharmaceutical Analysis of Phalatrikadi Syrup – A Polyherbal Ayurvedic Hematinic Drug

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Context: Concepts regarding standardization and quality control of Ayurvedic drugs can be traced back to the ancient times. Based on their observations, principles of drug processing and ideal qualities of finished drugs etc. have been documented. Even though the principles developed based upon the scientific parameters prevailing in those days, they are to be viewed and answered looking at the advancement of science and technology of present scenario.

Material and Methods: Phalatrikadi syrup a poly herbal formulation containing Haritaki, Bibhitaki, Amalaki, Guduchi, Vasa, Nimba Bhunimba and Katuka and was prepared and subjected to pharmacopeial procedures for analysis of organoleptic, physicochemical, phytochemical and fingerprinting for standardization.

Observation and Results: Findings are pH (Direct) 4.32, Specific gravity 1.389, Refractive Index 1.417, Viscosity (Ostwald) 397.82, Loss on Drying 19.72%, and Total Ash 0.098%, Acid insoluble ash 0.00%, Total solids 80.27%, Total Sugar 76.92, Total Tannin 0.88%. A test for functional group shows presence of carbohydrates, reducing sugar, tannins, amino acids, saponin glycosides, flavonoids, and steroids in Phalatrikadi Syrup. Microbial test analysis of Phalatrikadi syrup showed no any microorganism contamination.

Conclusion: Phalatrikadi Syrup shows all values in the standard range as per API and suggestive of authenticate and standard pharmaceutical preparation of Phalatrikadi syrup.

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Keywords: Phalatrikadi syrup; polyherbal; physicochemical; HPTLC fingerprinting.

1. INTRODUCTION

According to Ayurveda a medical quartet with optimum qualities is an essential requisite for the treatment of many diseases [1]. Drug is an important component among them. The drug should lend itself to diverse forms for delivery; have several desirable properties to counter diseases; be available in plenty; and be suitable for administration in line with time and location [2]. The combinations of medicines described in the textbooks of Ayurveda are the outcome of thorough analysis and observations of clinical trials by the ancient Acharyas.

Phalatrikadi Kwath mentioned in the Panduroga Cikitsa of Chakradatta which is well known for its therapeutic and nutritive value in the management of Pandu (Anaemia) [3]. The ingredients are Amalaki (Emblica Officinalis Gaertn.), Haritaki (Terminalia chebula Retz.), Bibhitaki (Terminalia belerica Roxb.), Guduchi (Tinospora cordifolia wild.), Vasa (Adathoda vasica Nees.), Katuka (Picrorrhiza kurroa Royle.), Bhunimba (Andrographis panniculata Pennel.), Nimba (Azadiracta indica A. Juss.), Sitakhanda (Sugar candy) and Honey (Table 1). It is indicated in Pandu, Kamala and Halimaka.

Antianemic effect of Phyllanthus emblica [4], Terminalia chebula [5] as well as hemopoietic action of Azadiracta indica [6] was proven in experimental studies. In paediatric age group palatability being at most concern the form of drug has been changed from Kwath (Decoction) to syrup which also enhances the shelf-life of the drug and makes convenient for the storage and consumption. Ancient form of drugs needs to be converted in to convenient forms using modern technology is much essential to accommodate in present lifestyle

In the present study, Phalatrikadi kwath is modified to Phalatrikadi syrup without altering the quantity of ingredients and subjected to analytical study through organoleptic, physico-chemical, phytochemical, and HPTLC fingerprinting methods.

2. MATERIALS AND METHODS

2.1 | Collection, Identification and Authentication of Raw Drugs

Raw drugs procured from the herbal raw drug dealer from Vadodara, Gujrat. Then identification and authentication of all the raw drugs were done at ALARSIN pharmaceuticals, Mumbai.

2.2 Methodology of Preparation of Phalatrikadi Syrup

2.2.1 Preparation of Phalatrikadi Kwath (Decoction) [7]

Required quantity of Amalaki, Haritaki, Bibhitaki, Guduchi, Vasa, Katuka, Bhunimba, Nimba were pounded to form coarse powder and then soaked overnight in eight parts of potable water. On next day, this mixture was heated on medium flame in a stainless steel vessel till the quantity of liquid reduced to one fourth and then filtered.

2.2.2 Preparation of syrup

To this filtered kwath, prescribed quantity of powdered sugar candy added and stirred till it dissolves completely, then whole mixture heated again on low flame until solution attains onethread consistency. After cooling, honey was added into the syrup and was packed in sterile air tight container.

Phytochemical and Analytical Study:

Organoleptic characters, physicochemical parameters, phytochemical analysis, microbial limit test and HPTLC study done at Vasu Research Centre, GIDC, Makarpura, Vadodara. (Sample ID- AD/20/033 Dated: 06/02/2020)

Phalatrikadi syrup was analyzed by employing various analytical parameters. Organoleptic characters like colour, odour, consistency, taste were carried out. Physicochemical study to analyze Loss on Drying at 105°C, Total Ash Value, Acid Insoluble Ash, pH, specific gravity, Refractive index, Viscosity and Total solids was done [8,9]. Phytochemical identification of Alkaloids, Flavonoids, Saponin glycoside, steroids, proteins, amino acids, carbohydrates, reducing sugar, were assessed as per standard procedure [10,9]. Total sugar (%) by UV spectrophotometer, Total Tannin (%) were also estimated [10]. Microbial limit test was also carried to find presence of organisms [8].

HPTLC Finger Printing [11,12,13]: 5 grams of syrup sample weighed and diluted with 10 ml of distilled water. Mixture transferred to a separate funnel and partition done with 20 ml of ethyl acetate. The layer of ethyl acetate collected and
3. RESULTS AND DISCUSSION

Organoleptic characters of the Phalatrikadi syrup were illustrated in Table 2. The dark brown colour of kwath turned to brown after adding sugar into the syrup. Physicochemical parameters pH (Direct) of any liquid provides the quantitative indication of the acidity or alkalinity of a solution which was 4.32 i.e. acidic. Specific gravity of syrup reference value n(40°C) 1.389 which is equal to the referred value, 1.30, as Specific gravity of Phalatrikadi syrup was1.389 which is equal to the referred value, which suggests that the quality of prepared syrup is within normal limits. Refractive index 1.417, Viscosity (Ostwald) 397.82, loss on drying was 19.72%, Total Ash value 0.098% w/w, Acid insoluble ash 0.00% w/w and Total solids were 80.27. Total solids are the measure of the insoluble ash 0.00% w/w and Total solids were 80.27. Total microbial and fungal count was nil in Phalatrikadi syrup by Microbial limit test. Thus, the self-preservation action of sugar in the Syrup. Due to high osmotic pressure in Syrup it does not allow the growth of bacteria, fungi and moulds, thus preventing decomposition.

Chromatographic study (HPTLC) of final product Phalatrikadi syrup carried to establish fingerprinting profile. RF values and colour of the spots in chromatogram developed in Toluene: Ethyl acetate: Formic acid: Methanol in the ratio of 6:3:0:1:1 respectively. After derivatization in CAMAG-dip tank for one minute with Vanillin- sulphuric acid reagent visualized in short and long UV. The plate was scanned at 254 nm, 366 nm, 540 nm and Rf, colour spots and densitometric scan were recorded.

On phytochemical analysis of syrup, Carbohydrates, Reducing sugar, Tannin, Alkaloids and steroids are present in the sample (Table 3). Total microbial and fungal count was nil in Phalatrikadi syrup by Microbial limit test. (Table 4). Which indicates that the medicine was prepared in hygienically under aseptic condition. Thus, the self-preservative action of sugar in the Syrup.

| Name     | Botanical name                              | Part used   | Ratio |
|----------|---------------------------------------------|-------------|-------|
| Amalaki  | Emblica officinalis Gaertn.                 | Dried fruit | 1 Part|
| Haritaki | Terminalia chebula Retz.                   | Dried fruit | 1 Part|
| Bibhitaki| Terminalia bellericia Roxb.                | Dried fruit | 1 Part|
| Guduchi  | Tinospora cordifolia Willd.                | Stem        | 1 Part|
| Vasa     | Adathoda vasica A. Juss.                   | Panchang    | 1 Parts|
| Katuka   | Picrorrhiza kurrao Royle.                  | Rhiizome    | 1 Part|
| Bhunimba | Andrographis panniculata Pennel.           | Panchang    |       |
| Nimba    | Azadiracta indica Nees.                    | Stem bark   |       |
| Sitakanda| Sugar candy                                 | -           | 70%w/v|
| Honey    | Honey                                       |             | 1/6" part|
Phalatrikadi syrup contains Terminalia bellirica [14] fruit its extracts and phyto -constituent ellagic acid exhibited appreciable radical scavenging, antioxidant and hepatoprotective activity in aceclofenac-induced liver injury which are important for treating Anemia. Triphla churna have significant role to clearance of HBs Ag rapidly and normalise Liver Transminase in Hepatitis B infection and hence Phalatrikadi syrup also acting on Kamla [15].

Table 2. Organoleptic characters and physicochemical parameters of Phatarikadi Syrup

| Sl. No | Parameters                  | Results                                           |
|-------|-----------------------------|---------------------------------------------------|
| 1     | Description                 | Brown coloured viscous liquid with characteristic odour |
| 2     | pH (Direct)                 | 4.32                                              |
| 3     | Specific gravity            | 1.389                                             |
| 4     | Refractive Index            | 1.417                                             |
| 5     | Viscosity (Ostwald)         | 397.82                                            |
| 6     | Loss on Drying              | 19.72%                                            |
| 7     | Total Ash                   | 0.098                                             |
| 8     | Acid insoluble ash          | 0.00%                                             |
| 9     | Total solids                | 80.27%                                            |
| 10    | Total Sugar                 | 76.92                                             |
| 11    | Total Tannin                | 0.88                                              |

Fig. 1. HPTLC plate showing banding pattern and Rf values at 254 nm
Table 3. Phytochemical analysis of Phalatrikadi syrup

| Test for         | Result |
|------------------|--------|
| Carbohydrates    | +++    |
| Reducing sugar   | +++    |
| Amino acids      | -      |
| Protein          | -      |
| Alkaloid         | -      |
| Tannin           | ++     |
| Flavonoids       | +      |
| Saponin glycoside| -      |
| Steroids         | +      |

Table 4. Microbial limit test of Phalatrikadi syrup

|                | Result          |
|----------------|-----------------|
| Total plate count | 20 cfu*/ml      |
| Total yeast &Mould count | Absent      |
| Escherichia coli    | Absent       |
| Salmonella         | Absent        |
| Staphylococcus aureus | Absent  |
| Pseudomonas aeruginosa | Absent |

* Colony forming unit

Fig. 2. HPTLC plate showing banding pattern and Rf Values at 366 nm
4. CONCLUSION

Poly herbal preparations are best analyzed for quality through its physicochemical and phytochemical analysis. HPTLC fingerprinting is an essential method to validate same preparation for assessment of quality and to authenticate the drug for its reproducibility. The analytical data and HPTLC finger print profile obtained in the present study for Phalatrikadi syrup with suitable solvent system will help to develop preliminary standards for the authenticating, reproduction, assessment of quality and safety for Phalatrikadi syrup.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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