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Research Article

STANDARDIZATION OF POLY HERBAL AYURVEDIC FORMULATION: VYAGHRIHARITAKI AVALEHA (VHA) WITH A CLASSICAL VIEW POINT

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ABSTRACT
Vyaghriharitaki Avaleha (VHA) is an important Ayurvedic confectionary formulation containing Kantakari (*Solanum surattance*), Haritaki (*Terminalia chebula*) as main ingredients and minor ingredients as Trikatu and Chaturjataka. The present study was undertaken to re- validate the fingerprints given in the Ayurvedic Formulary of India. The samples of study *i.e.* VHA were specially prepared as per Ayurvedic Formulary of India (AFI) by Aryavaidyasala Pharmacy according to the set standards by following all GMP norms. The samples were evaluated for various physicochemical parameters. The results found are according with Ayurvedic Pharmacopoeia of India (API) except Water Soluble extractives, Acid insoluble ash, Sulphated ash and the pH. These physicochemical and fingerprints can be a guideline for drug standardization. Parameters selected and practiced till date does not reflect the picture of drug as a whole. Traditional practices depend upon organoleptics and non invasive methods. Hence, the non invasive techniques like Nuclear Magnetic Resonance (NMR) spectrometry followed by high discriminative statistical supports is prime need to standardize complex dosage form.
Key Words: Ayurveda, Vyaghriharitaki Leha, standardization.

INTRODUCTION

Ayurveda, the herbal predominant system of medicine is now well recognized not only in India, but also in the western world. With the growing need for safer drugs, attention has been drawn to the efficacy and standards of Ayurvedic formulations[1]. Ayurveda uses various dosage forms of formulations such as (pills, powders), liquid (ghritas, aristas etc) and semisolid like avaleha. Pharmaceutical preparations like Swarasa (expressed juice), Kalka (paste), Hima (cold infusion), Phanta (hot infusion), Kwatha (decoction) and Churna (powder) are the back bone of Ayurvedic formulations[2]. With these primary preparations, the other secondary formulations are prepared to increase the efficacy, shelf life and acceptability (palatability) etc. Vyaghriharitaki Avaleha (VHA) is one such formulation highly in vogue for the treatment of respiratory complaints. Kantakari and Haritaki are the prime ingredients and Trikatu and Trijata are the minor ingredients and it is prepared with jaggery base with addition of honey. Kantakari has been described to be possessing Tikta (bitter) and Katu (pungent) taste, Ruksha (dry), Laghu (easy for digestion) properties, Ushna Virya (hot potency) and Katu vipaka (pungent in post digestive effect), helps in improving digestion[3]. Kantakari is described as first line herb for the treatment of Kasa (cough)[4]. Kantakari **(***Solanum xanthocarpum)* has immunostimulatory[5] and cough relieving property in bronchial asthma[6].

Haritaki *(Terminalia chebula)* has immunomodulatory[7], cytoprotective[8], anticaries[9], antispasmodic and hypolipidemic property[10]. Hydrolyzable tannins present in *T. chebula* shows antimutagenicity in *Salmonella typhimurium*[11]. Guda (Jaggery) is Laghu, Deepana, Pushtikara[12]. Madhu (Honey) has Ruksha, Lekhana Srotovishodhana property along with Kapha hara and Kasa hara properties[13]. Trikatu and Chaturjata, when used as Prakshepa Dravyas act as Dipana, and Pachana and thus for enhancing the bio-availability of the medicine.

Brief Description about Preparation of Vyaghriharitaki Avaleha* Ref: AFI-PART –II-3:6

Ingredients with quantity of Vyaghriharitaki Avaleha is mentioned in Table 1.

Panchanga (whole plant) of Kantakari devoid of earthen contaminants was collected, dried then pounded up to a coarse powder form. This was passed through the sieve number 44. From Haritaki fruits, seeds were removed and pericarp portions of the fruits were collected and kept in a muslin cloth and Pottali was prepared. Coarse powder of Kantakari panchanga was added to gravimetrically four times of water and soaked for overnight Haritaki Pottali was also soaked in it. One fourth reduced decoction was prepared in mild heat. The soft pieces of Haritaki from the Pottali (bundle) were collected and fine paste was prepared. The decoction was filtered, then the jaggery was added to it and syrup (chasni) was prepared. Meanwhile Haritaki paste was added and continued heating till the preparation reached the consistency of Avaleha confirmed by the formation of semisolid preparation that does not disperse in water. When it became lukewarm, then clean, dry and fine powders (passed through sieve number 85) of the ingredients of Trikatu and Chaturjata (Prakshepa dravya) were added gradually and stirred until it was homogenously mixed. It was allowed to cool to the room temperature and then honey was added and mixed well.

MATERIALS AND METHOD

The formulation, Vyaghriharitaki Avaleha, was supplied by CCRAS, New Delhi, manufactured at Arya Vaidya Sala Factory, Kanjikode, Palakkad, Kerala, specially prepared by using the ingredients and method of preparation given in API. The analytical study of the drug was carried out using the test procedures given in API[14]. The result was compared with the standard parameters given in Ayurvedic Formulary of India (AFI). Also, the same is compared with the results of the analytical study done at the laboratory of Arya Vaidya Sala Factory, Kanjikode, Palakkad, Kerala.

PHYSICAL ANALYSIS

Organoleptical parameters like taste, colour, odour, touch were assessed.

OBSERVATIONS AND RESULT

Organoleptical Parameters

1. **Taste :** Sweet, Pungent
2. **Colour :** Brownish black
3. **Odor:** Pleasant
4. **Touch/Consistency:** Semisolid

Physico-Chemical Parameters

Physico-chemical parameters of *Vyaghrihareetaki Avaleha* was carried out and compared with API (Table 2).

High-Performance Thin Layer Chromatography Study

Adsorbent: Aluminum- backed Silica gel GF 60_{254} HPTLC plates

Solvent system – Toluene : Diethyl ether :: 5:5

Spray : Vaniline sulphuric acid

Sample Application: By Auto-sampler CAMAG Linomat 5

The findings of High-performance thin layer chromatography of at 366nm and 254nm UV light are shown in Table no. 3.

DISCUSSION

Standardization of herbal drugs is a burning topic in herbal drug industry today. Standardization is difficult because they are usually mixtures of many constituents and the active principles in most cases are unknown. However it is possible to generate a physico-chemical fingerprint for the standardization of these drugs with reference to authentic drugs, for checking variation between preparations from different companies and for evaluating batch to batch changes during long term storage.

Loss on Drying at 110^0C

The result obtained was 18.40% w/w and the API parameter is not more than 23% w/w whereas the result reported by the Arya Vaidya Sala laboratory is 16.56% w/w.

Ash Value

The result obtained was 2.86% w/w and the API parameter is not more than 4% w/w whereas the result obtained by the Arya Vaidya Sala laboratory is 3.46% w/w.

Water Soluble Extractives

The result obtained was 55.00% w/w and the API parameter is not less than 68.7 % w/w whereas the result obtained by the Arya Vaidya Sala laboratory is 67.06% w/w.

Methanol Soluble Extractives

The result obtained was 48.91% w/w and the API parameter is not less than 20% w/w whereas the result obtained by the Arya Vaidya Sala laboratory is 10.90% w/w.

Acid Insoluble Ash

The result obtained was 0.29% w/w and the API parameter is not more than 0.15% w/w whereas the result obtained by the Arya Vaidya Sala laboratory is 0.41% w/w.

pH

The result obtained was 5.0 and the API parameter is 5.5-5.6 whereas the result obtained by the Arya Vaidya Sala laboratory is 5.10.

Sulphated Ash

The result obtained was 5.01% w/w and the API parameter is not more than 0.41% w/w.

There were almost similar results in Loss on drying at 110^0 C, Ash value, and methanol soluble extractives and the variation was found in Water Soluble extractives, Acid insoluble ash, Sulphated ash and the pH. Arya Vaidya Sala Lab results of Water Soluble extractives, Acid insoluble ash and the pH are also not in accordance with the API-parameters. If the materials used in the preparation of Vyaghriharitaki Avaleha are of pharmacopoeial standards, then the variations in the analytical parameters can be mainly due to variation in consistency of the Syrup (chasni) and the variation in the jaggery and honey. Difference may also occur due to the control sample procured by Kotakkal and by pharmacopieal formulation manufacturing unit has variation in climatic and regional zone in raw material. It also happens when raw material processing adapted by manufacturing unit is different.

Plain chromatography is non specific and performed in absence of selective reactive moiety (selected component), but they report fingerprinting on pattern of extracted component on silica gel as solid phase and specific mobile phase.

Novel techniques like NMR (Nuclear magnetic resonance) spectrometry may be used to determine the standards for herbs and metabolite detection techniques to evaluate the quality and also the degradation of a polyherbal formulation. It may be a promising analytical tool for the detection of a wide range of compounds of a plant. NMR can identify and quantify metabolites of which no *a priori* knowledge is needed[15]. NMR based methods have the advantage of acquiring relatively little sample preparation, being non-destructive and allowing the determination of molecular structures of individual compounds, even in mixtures. It therefore has a great potential as a method for quality control of phytopharmaceuticals[16]. NMR has the advantage of being non-destructive, even in mixture samples[17]. The determination of chemical changes occurring in the various constituents during food storage, using NMR technology can be a promising tool for evaluating the performance of the package with respect to its ability of preserving food[18]. Other non-invasive techniques like Fourier Transform Infrared spectroscopy (FTIR), Colour and Visual Specroscopy, electronic nose and tongue etc can also be useful.

One more option will be to make standards to check the standard of formulation like procurement of herbs, various steps in the method of preparation. In case of Vyaghriharitaki avaleha, the method of preparation is relatively simple. So, if the ingredients where taken of the pharmacopeia standard and method of preparation is taken care of then that only thing to be verified that the consistency of the final product. If ingredients are verified for their standards, then there will only be concern about the method of preparation and their evaluation. Now the things remain is to detect the degradation of the medicine due to multivariate like type of packaging, storage condition etc. for this the better option will be metabolite detection and NMR technique.

Classical Perspective

Medical treatment is dependent on four prime factors- Physician, Medicine, Nursing staff and Patient. Physician, the master and controller of the other factors, needs the help of other factors. After physician, it is the medicine which is of great importance. Without medicine, the physician is almost helpless. But, what if the medicine is not genuine? In present era, when the physicians are dependent on the pharmaceutical industry, it is not easy to recognize the authenticity of a drug unless it is standardized. And it is more dangerous situation than the absence of medicine. Physician believes that he is prescribing the medicine with a particular diagnosis in the mind, but if he fails to observe expected outcome then there will be doubt whether his clinical judgment was right or

wrong? To overcome this situation, standardization of drug and formulations are very essential. Though, we are not sure that even after standardization also we can procure genuine medicine, as we do not countercheck its quality on day to day basis and the market of fake or substandard medicine is not small, but still standardization of medicines is important to prove genuineness of the medicine.

The practice of the individual physician identifying drugs and preparing medicines himself for the use of his patients has been largely supplemented by the Pharmaceutical Industry. No longer, except in a few cases, does the physician, particularly in the urban area, undertake to prepare his own requirements of drugs; he prefers to purchase them straight from the market. Even the patient has become more sophisticated and prefers purchasing a readymade drug from a manufacturer instead of obtaining it from his own physician. On account of increasing urbanization, the tendency is towards more and more dependence on readymade preparations. The increasing needs of the population and the chronic shortage of authentic raw materials have made it incumbent that some sort of uniformity in the manufacture of Ayurvedic medicines should be brought about. Evolution of standards for Ayurvedic drugs, in the modern sense, considering the vast number of such drugs and their formulation, is a time-and money-consuming task, and will take considerable time for its achievement. The Ayurvedic pharmacopoeia Committee is doing a great effort in this field.

Theoretically, Vyaghriharitaki Leha is a preparation in which its prime components Kantakari and Haritaki are potent kasahara drugs. Other ingredients- Trikatu and Chaturjat, which are used as prekshepa dravyas are used for enhancing the absorption and bio-availability of the prime drugs. The remaining two components – jaggery and honey are having srotoshodhana and khaphahara properties. The other significant property of jaggery and honey is its action as preservatives. So, this formula is comparatively more stable form of kasahara drugs, so that patient need not have to prepare decoction every time, with the additional beneficial effects of jaggery and honey on respiratory system. The ingredients are limited and if those are taken of pharmacopoeial standards, then the only care which is to be taken is to remove the free water content during the process of Avaleha preparation. Because, this residual water content is mainly responsible for fungus growth leading to the decomposition of the avaleha preparation. From the therapeutic point of view, the variation in Water Soluble extractives, Acid insoluble ash, Sulphated ash are not of much concern if the ingredient are taken of pharmacopoeial standards, because these values may differ due to the variation in the consistency of the syrup (chasni) or the prepared leha. It may also occur due to the control sample procured by Kotakkal and by pharmacopieal formulation manufacturing unit has variation in climatic and regional zone in raw material. It also happens when raw material processing adapted by manufacturing unit is different. The variation in pH value can be a matter of concern if the pH is changed due to the decomposition (some times due to the presence of sugars Avaleha may get fermented, which is undesired) of the formulation. But, if it is due to the consistency of the syrup (chasni) or leha, little variation is acceptable.

It is true that faith should not be blind, but it is also true that we should not be so over-doubtful that we become faithless. Because, then becomes difficult to accept things, as we don't believe the authenticity of a formulation only on standardizing parameters, but we also depend on the faith on the person (or laboratory) who gives the report. What if we doubt on the person? One may say that we will cross verify it with some other person. But, what is the guarantee of authenticity of that person? And for how long we will run to confirm the authenticity? When we consider about the standardization of some ayurvedic drugs or any drug, we have to have some degree of faith on the manufacturer of the drug, at least in cases of formulations containing non-costly, easily available ingredients and relatively simpler SMPs and having simpler gross standardizing parameters. Vyaghriharitaki leha is one of such formulations. All the ingredients are easily available, and if little care is taken, least will be the chance of using non-standardized or adulterated materials. Also, after preparation of the leha, a qualified and averagely experienced professional can assure himself of its quality on gross observations like its organoleptic properties.

After the analytical study, two things are ascertained- 1) the formulation was as authentic one as it was expected to be on observing its organoleptic parameters, and 2) with such preservation techniques, leha preparations can be preserved for more than one year (the Expiry date mentioned on the formulation is three years from the date of manufacturing).

CONCLUSION

From the physician's point of view, it can be concluded that the Vyaghriharitaki leha (VHA) which was made available for the clinical trial is in standard form and can be used without any hesitation. This also gives us assurance about the one of the four factors responsible for the treatment i.e. the medicine. Now, the clinical efficacy of this vyaghriharitaki leha will depend on the remaining three factors viz. the physician, the nurse and the patient. The physician, being the master and the manipulator of other factors can enhance or undermine the drug's efficacy, depending on his knowledge, skill and limitations. From the physician's perspective, especially in case of formulations like Vyaghriharitaki leha, the physician's basic skills to judge the formulation on its organoleptic parameters are sufficient (if not completely dependable). This skill takes practice and time to develop. These subjective skills are as dependable as the 'on paper' objective analytical reports in day to day practice. Because, now days it take months together (sometimes years) for a formulation from manufacturing to reach to the patient. And nobody can give a guarantee that a formulation which was of the standard quality at the time of preparation will surely reach to the patient in the same standard form. So, physician should also improve his subjective judgment skill. Because, if he only depends on the standardization reports of the laboratory and not his senses, then this will also be a state of blind faith. And this situation is more dangerous. Of course, novel non-invasive techniques like NMR-based metabolomic analysis can be better tool for the quality analysis of the medicine.

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Table 1: Ingredients with quantity of Vyaghriharitaki Avaleha

Ingredients	Scientific English Name	Part used	Quantity
1. Kantakari	*Solanum surattense*	Pl. (Total Plant)	4.8 kg
2. Jala (for decoction)	Water		12.9*l* reduced to 3.07 *l*
3. Haritaki	*Terminalia chebula*	Fr.(fruit pericarp)	(100 in No.) 1.2 kg
4. Guda	Jaggery		4.8 kg
5. Sunthi	*Zingiber officinale*	Rz. (rhizome)	96 g
6. Marica	*Piper nigrum*	Fr. (fruit)	96 g
7. Pippalli	*Piper longum*	Fr. (fruit)	96 g
8. Tvak	*Cinnamomum zeylanicum*	St. B (stem bark)	48 g
9. Patra (Tvakpatra)	*Cinnamomum tamala*	Lf. (Leaves)	48 g
10. Ela (Sukshmaila)	*Elettaria cardamomum*	Sd.(seed)	48 g
11. Nagakesara	*Mesua ferrea*	Stmn.(stemen)	48 g
12.Pusparasa (Madhu)	Honey		288 g

(* Ref: AFI-PART –II-3:6)

Table 2: Comparative values for the parameters studied and reported by Kottakal pharmacy

Sr. No.	TEST	API Parameters	RESULT (Gujarat Ayurved University)	RESULT (Arya Vaidya Sala Lab)
1	Loss on drying at 110^0 C	NMT 23% w/w	18.40 %w/w	16.56 %w/w
2	Ash value	NMT 4% w/w	2.86 %w/w	3.46 %w/w
3	Water soluble extract	NLT 68.7% w/w	55.00 %w/w	67.06 %w/w
4	Methanol soluble extract	NLT 20% w/w	48.91 %w/w	10.90 %w/w
5	Acid insoluble ash	NMT 0.15% w/w	0.29 %w/w	0.41 %w/w
6	pH of 1% aqueous solution (by paper)	5.5-5.6	5.0	5.10
7	Sulphated ash	NMT 0.41% w/w	5.01 %w/w	Not done

***NMT- not more than **NLT= not less than**

Table 3: The findings of HPTLC at 366nm and 254nm UV light

Vyaghriharitaki Leha		
Wavelength	**No. of Spots**	**R_f value**
366 nm	06	0.01 0.07 0.14 0.20 0.24 0.51
254 nm	08	0.01 0.04 0.19 0.25 0.29 0.33 0.51 0.63

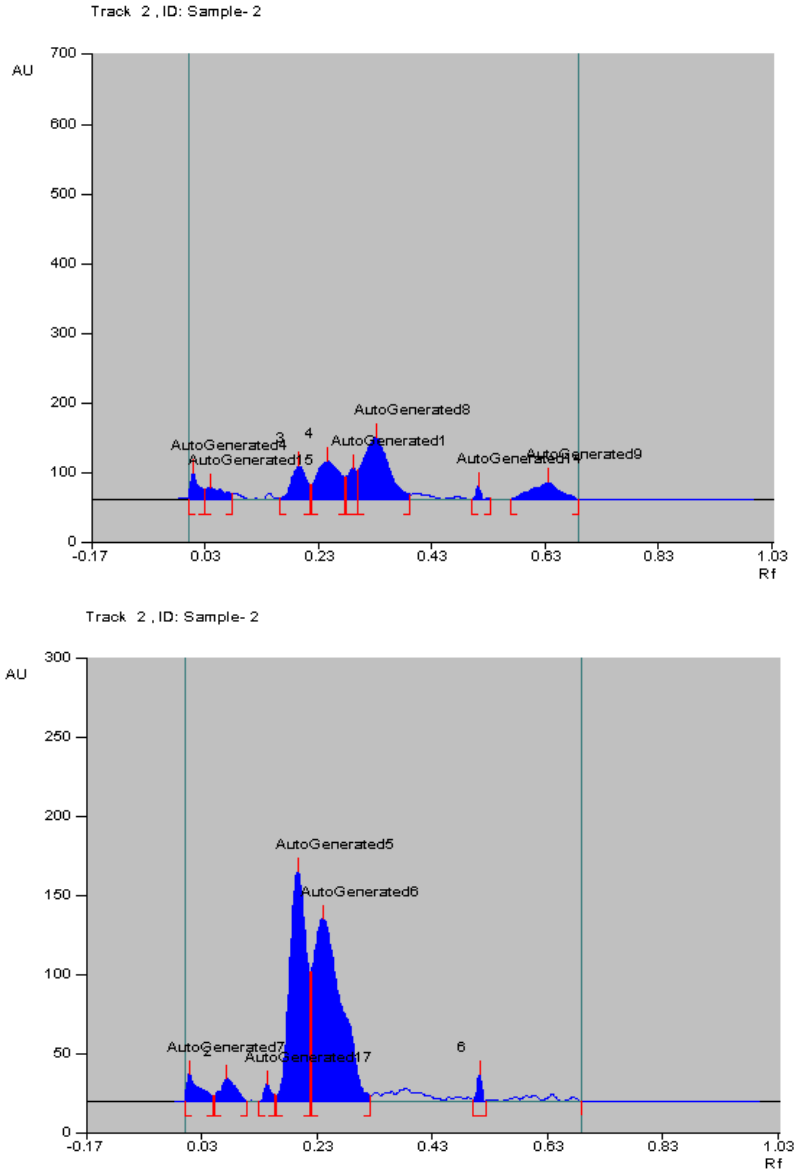

Fig. 1: Densitogram of Vyaghriharitaki avaleha at 254nm and 366nm.

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