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PHARMACOGNOSTIC STUDIES ON YAVAKSHARA AN AYURVEDIC ALKALINE PREPARATION

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ABSTRACT

Ayurveda advocates three principles namely hetu (cause) linga (symptoms) oushadha (treatment) for diagnosis and treatment of diseases. Oushadha or medicaments are used as important tools in bringing the healthy status back in diseased person. Kalpana are various dosage forms that are possible with different processing techniques using herbal mineral or animal raw drugs. Kshara is one among the Kalpana. The formulations that possess corrosive, pungent, saline, acrid nature and ksharana (scraping) property are termed as kshara. They are alkaline substance usually obtained by processing the ash of plant or mineral drugs. They are useful in varied surgical disease conditions because of which called as anushastra. Pratisaraniya (external use) and paneeya (internal use) kshara are the two types of kshara. The pratisaraniyakshara has been further sub classified according to its potential in to mridu (mild), madhya (moderate), and tikshna (intense). Further kshara has been classified on the basis of the number present in the group like dvikshara (two kshara), trikshara (three kshara), ksharapanchaka (five alkali) and ksharashtaka (eight alkali).Yava (*Hordeum vulgare* Linn.) is a drug known for its kshara properties and is included under ksharashtaka.

In this work, Yavakshara was prepared as per standard references and subjected for analysis. The raw material selected for the study were of genuine quality and were comparable with API standards. Physicochemical characters of the study drug were within the pharmacopeial limits. Pharmaceutical

and analytical studies on Yavakshara could generate preliminary standards of study drug. The pH of the final product supports its alkaline nature and justifies its inclusion under ksharashtaka; a group of eight alkaline herbs. Microscopic studies of final product could be used for future references as a standard monograph.

Keywords: Ksharashtaka, Yavakshara, preliminary standards

INTRODUCTION

Ayurveda, the science of life advocates number of formulations for the benefits of mankind. The principles of Ayurveda are mainly based on the Trisutra i.e., Hetu, Linga and Aushadhi. Among these Aushadhi plays a major role in the treatment. Aushadhi is used to maintain a good health as well as to cure diseases in humans. It is mainly administered according to the condition and convenience of the patient. In Ayurveda there is a description of different dosage forms which have been explained nearly 5000 years ago. These are explained in classics for the purpose of making it compatible without losing the potency or efficiency of the drugs **[1]**. These dosage forms which are designed by using the technique of customization according to the requirement of physician as well as patient are termed as Kalpana. They can be formulated in different dosage forms like solid, semisolid or liquid. One among such solid formulations is kshara Kalpana.

Kshara are alkaline substances which are obtained from the ash of drugs. It is used both internally as well as externally. Internally used kshara is called paniyakshara and externally used kshara is called pratisaraneeya kshara **[2]**. It is defined that the Kshara is a substance which has corrosive, pungent, saline, acrid nature and possesses the ksharana property **[3]**. The importance of kshara in Ayurveda can be understood by a total chapter being dedicated to it in Sushruta Samhita **[4]**.

As a formulation it has a great pharmaceutical as well as therapeutic importance. Pharmaceutically it can be in liquid form (Paneeya) or solid form (Pratisaraneeya). It can be designed in a particular level of potency namely mridu (mild), Madhya (moderate), and tikshna (intense) depending up on the requirement of the patient or disease **[5]**.

Therapeutically it has been given much importance in kaya chikitsa, shalya chikitsa, Shalakya tantra and even balaroga. It is useful in treating diseases like kustha, gulma, mutraghata, arsha, bhagandara and nadivrana **[6]**.

By virtue of this property it is included as anushastra which has many uses in surgical practice of ayurveda. It can be formulated in the form of solutions, powder or crystals, all of which have the basic quality of being

alkaline. Kshara is one among eighteen parts of herbal plants which can be used for medicinal purpose. On the basis of origin, the kshara are classified as vanaspatika (plant source), pranija (animal source) and khanija (mineral source). On the basis of the number present in the group, the kashara are classified like dvikshara, trikshara, ksharapanchaka and ksharashtaka. This classification includes group of alkaline materials with similar guna and karma **[7]**. Yava (*Hordeum vulgare*) is a drug known for its kshara properties and is included under ksharashtaka **[8-10]**.

Yava (*Hordeum vulgare* Linn.) belongs to Family Poaceae, an annual erect herb cultivated in India. They are source plant for agriculture products for its de husked fruits known as Barley in trade.It is called divya in sanskrit, barley in english, Yay, Jav,Jou in hindi and Javegodhi, barliakki in kannada **[11]**.

It is a well-known ancient cereal crop which makes upto 12% of total cereal production and owns the fourth position after wheat, rice and maize. It is described under shukadhanyavarga and is used in a wide range medicine. The usage of Yava both as Pathya & Oushadha is established in ancient texts and modern research experiments **[12]**. Yava is famous shukadhanya (cereal) used in Indian systems of medicines viz., Ayurveda and used in different medicinal preparations as well as in dietary form for many santarpanajanyaroga like prameha (diabetes). Its origin is considered in Middle East, Domestication occurred in Mesopotamia some 10,000 years ago.

All medicines, whether synthetic or of plant origin, should fulfill the basic requirements of being safe and effective. Standardization is way of achieving it with the help of standards of characteristics, constant parameters, and definite qualitative and quantitative values **[13]**. In this work an attempt is made to prepare and analyse Yavakshara.

MATERIALS AND METHODS

Standard methodology of kshara preparation was followed in this work. Collection of raw drugs and preparation of yavakshara was the first phase of the work which is detailed under pharmaceutical work. In the second phase the prepared kshara were analysed for their physico-chemical characters which is explained under analytical work.

I . Pharmaceutical work:

Panchanga (Five parts of a plant) namely leaves, root, stem, flowers and fruits of Yava plant (*Hordeum vulgare*) were collected and were authenticated from dept of Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda &

Hospital Hassan. Preparation of kshara from dried panchanga of yava plant was carried at department of Rasashastra and Bhaishajyakalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital Hassan. The general method of preparation of kshara was followed for preparation of Yavakshara.

Whole plant of Yava was collected from agricultural land of Arsikere taluk of Hassan district in Karnataka state. After due authentification from experts whole plant was dried in sun light. From dried mass of drug, 10 kg of drug was taken and completely burnt in to ashes. After self-cooling, the ash was collected and weighed. The ash was then dissolved in 6 times quantity of water v/v. Mixture is stirred well and kept undisturbed overnight. Next morning, supernatant fluid is decanted and filtered for 21 times. After filtration, the clear liquid (ksharodaka) was collected in a clean wide mouthed iron vessel. It was then boiled and stirred constantly to get dry powder. The white coloured kshara was obtained.

II Analytical Work:

The analytical work was carried out at Sri Dharmasthala Manjunatheshwara Center for Research in Ayurveda and Allied Sciences, Udupi. The procedure specified in protocol for testing Ayurveda drugs published by CCRAS was followed for analytical work **[14]**.

The details of procedures carried out are as follows:

1. Powder microscopy: The drug was powdered and sieved through 80 sized mesh. A pinch of the sample was mounted on a microscopic slide with a drop of glycerin-water. Characters were observed using using Zeiss AXIO trinocular microscope attached with Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the pre-calibrated scale-bars using Zeiss Axio Vision software.
2. Total Ash: 2 g of sample was incinerated in a tared platinum crucible at temperature not exceeding 450˚C until carbon free ash is obtained. Percentage of ash was calculated with reference to weight of the sample.
3. Acid insoluble Ash: To the crucible containing total ash, add 25ml of dilute HCl. Collect the insoluble matter on ashless filter paper (Whatmann 41) and wash with hot water until the filtrate is neutral. Transfer the filter paper containing the insoluble matter to the original crucible, dry on a hot plate and ignite to constant weight. Allow the residue to cool in suitable desiccator for 30 mins and weigh without delay.

Calculate the content of acid insoluble ash with reference to the air dried drug.

4. Water soluble ash: Boil the ash for 5 min with 25 ml of water; collect insoluble matter on an ashless filter paper, wash with hot water, and ignite for 15 min at a temperature not exceeding 450˚C. Subtract the weight of the insoluble matter from the weight of the ash; the difference in weight represents the water soluble ash with reference to the air-dried sample.
5. Determination of pH:Taken 1 g of sample. 10 ml of distilled water was added, stirred well and filtered. The filtrate was used for the experiment. Instrument was switched on. 30 minutes time was given for warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30°C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. Introduced the pH 9.2 solution and checked the pH reading without adjusting the knob. Then the sample solution was introduced and reading was noted. Repeated the test four times and the average reading were taken as result

OBSERVATION AND RESULTS

The data collected at different steps like collection of raw drug, authentication, pharmaceutical and analytical works are given **Table 1 To 5 and Figure 1**.

Table 1: Physico-chemical characters of drug

Parameter	Observed value	Value as per API [11]
Total ash	3.15	Not more than 8.5 %
Acid insoluble ash	0.18	Not more than 4%
Water soluble ash	0.93	Not less than 8%

Table 2: Organoleptic characters of Yava ash & Ksharodaka

Parameters	Yava ash	Ksharodaka
Colour	Whitish grey	Greyish black
Odour	Characteristic	Characteristic
Taste	Salty	Salty
Appearance	Powder	Viscous Liquid

Table 3: Pharmaceutical data of Yavakshara

Weight of fresh Yavapanchanga collected	13.500 kg
Weight of dried Yavapanchanga	10.200
Loss in weight after drying	3300
Percentage of loss after drying	24.44%
Number of days required for drying	8 days
Total weight of ash obtained after burning the dried panchanga	550 gms
Loss in weight	9350 gms
Percentage of ash when compared with dried panchanga	5.5%
Percentage of ash when compared with fresh panchanga	4.08%
Weight of kshara obtained	25 gms
Percentage of kshara when compared with ash	5.4 %
Percentage of kshara when compared with fresh panchanga	0.35%
Number of days required for kshara preparation after complete drying of drug	6 days

Table 4: Physico-chemical parameters of Yavakshara

pH	10.35
Total ash	88.26
Acid insoluble ash	2.64
Water soluble ash	79.62

Table 5: Ash obtained and final quantity of Kshara obtained:

Sl	Name of drug	Quantity of raw drug taken	Ash obtained	Kshara obtained
1	Yava	10 kg	550 gm	25gm

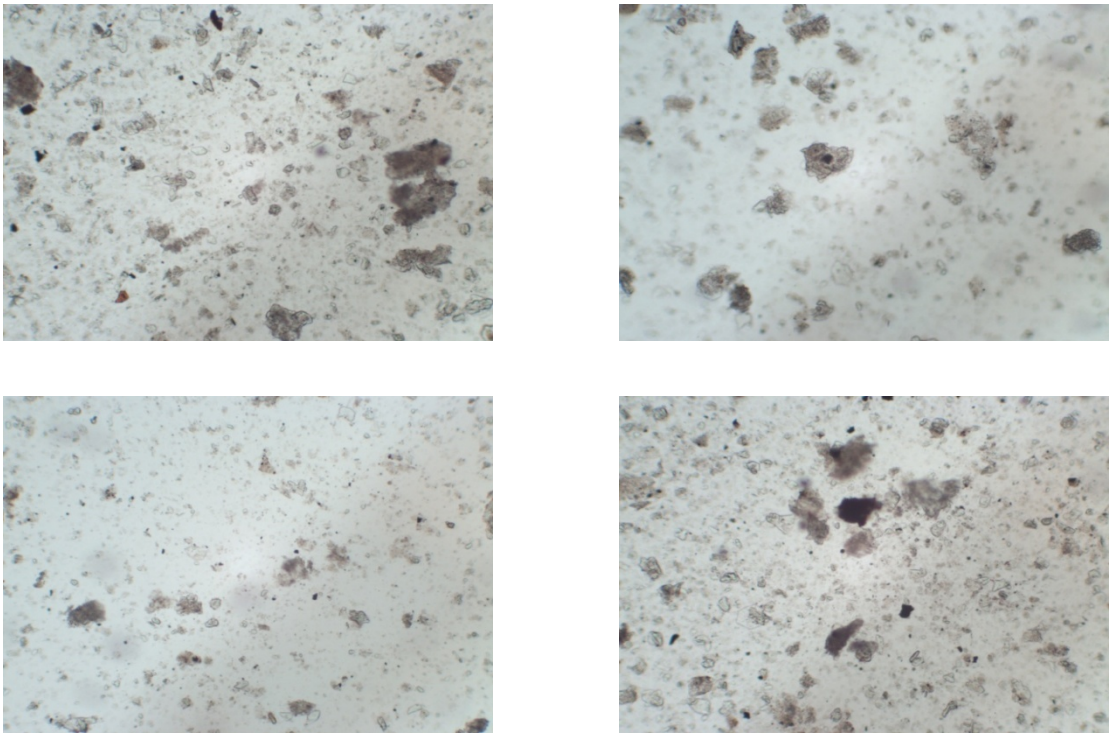

Figure 1: Powder microscopy of Yavakshara

DISCUSSION

Physicochemical characters of the study drug were within the pharmacopeial limits for ash value and acid insoluble ash. The water-soluble extractive however did not match with the standards **(Table 1)**. Variation in the percentage of water-soluble extractive value can be attributed to place and time of collection. Moreover, whole plant of yava was used for the analysis in the present study. Considering the observations out of three qualified for identity purity and strength, it can be deemed supportive in assurance of quality of raw drug used in the preparation. Loss of 3.300 kg of weight **(Table 3)** after drying indicates that almost 24.4% moisture was present in the drug. Weight of ash obtained in the present study was only 5.5% **(Table 3)** which may reflect in the cost of the final product. Yava ash was in powder form and whitish grey after complete burning **(Table 2)**. This may be due to complete burning of drug without leaving behind unburnt traces. The odour was characteristics and the taste of ash was salty, may be due to alkalinity.

The pH of the kshara was 10.35 in this work **(Table 4)**. Earlier studies have recorded a pH in between 10.2 to 10.5 **[15]**. This observation suggests that the final product fulfils the requirement of having alkaline pH. The acidity or alkalinity of a product has a profound influence on the decomposition of drug. If it is very acidic or less alkaline there will be more decomposition of the drug. When the pH is low, the product readily gets oxidized. This indicates that pH of Yavakshara may influence positively on the stability and shelf life of finished product. It is also reported that the anhydrous nature of the final product is reason for higher stability of any kshara **[16]**.

Total ash in the final product of Yavakshara indicates that there were almost 88.26% of constituents rather of alkaline nature **(Table 4)**. The procedure of heating the kshara at a temperature of 450˚c until carbon free material is obtained removes possible organic materials present in the product. Earlier studies on yavakshara have shown a total ash ranging from 96.75 to 97.5 at different experiments **[15]**.

Acid insoluble ash is a usual test carried out to evaluate the percentage of insoluble inorganic content of the sample in dilute acid. As all the substances taken orally pass through a phase of digestion in hydrochloric acid this test has a therapeutic significance. Kshara is prepared by dissolving this ash in water and after filtering dried by the heat, in this process, an insoluble substance like silica is being separated by the filtration and soluble substances like potassium and sodium remain in the solution. In the final product of Yavakshara however there was only 2.64% of acid insoluble ash **(Table 4)**.

Water soluble ash indicates the percentage of solubility of contents of the sample soluble in water. In the present work it was 79.62% indicating almost all contents of final product were soluble in water **(Table 4)**. The method of preparation of kshara involves dehumidification of waters soluble phytoconstituents after repeated filtration. So naturally the final product should result in more water soluble ash.

Microscopic studies of final product showed crystal mass, brown content and uneven shaped crystals **(Figure 1)**. The plates of microscopic studies can be used for further references as standard monograph.

CONCLUSION

This work on preliminary pharmaceutical and analytical studies on Yavakshara could generate preliminary standards of study drug. The raw material selected for the study were of genuine quality and were comparable with API standards. The pH of

the final product supports its alkaline nature and justifies its inclusion under ksharashtaka; a group of eight alkaline herbs. Microscopic studies of final product could be used for future references as a standard monograph.

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Conflict of interest: None

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