


Research Article
PREPARATION AND PHYSICOCHEMICAL EVALUATION OF MRIDU APAMARGA KSHARA
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ABSTRACT

Ksharakalpna is one of the unique pharmaceutical preparation forms described in Ayurveda. *Kshara* is ashes of herbal drugs and is alkaline in nature. A detailed description of *Kshara Kalpana* preparation methods, types, properties and applications of different *Kshara* are available in Ayurvedic classics. *Kshara* is the substance having *Ksharana* and *Kshanan* properties. Various plants are mentioned as suitable for the preparation of *Kshara* viz., *Apamarga*, *Arka* (*Calotropis gigantea* Linn.), *Mulaka* (*Raphanus sativus* Linn.), *Snuhi* (*Euphorbia nerifolia* Linn.) etc. Among these *Apamarga*, *Arka* are the most common drugs used for the preparation of *Kshara*. In the present study whole plant of *Apamarga* (*Achyranthes aspera* Linn.) was used for the preparation of *Kshara*. Different opinions are there about the amount of water to be used, number of filtrations etc., while preparing the *Kshara*. Generally *Apamarga kshara* is prepared by decantation process in a single wash. In order to obtain increased yield and to reduce the loss during straining, in the present study it was prepared by the capillary action and three times washing. This method gave 49% more yield of *Apamarga kshara* and is far more when compared to traditional methods. Physicochemical evaluation of the prepared *Kshara* complied with the pharmacopial standards.

KEYWORDS: *Apamarga kshara*, *Kshara Kalpana*, *Achyranthes aspera*.

INTRODUCTION

Kshara is a alkaline substance extracted from herbs or minerals, having *Ksharana* (corrosive) and *Kshana* (killing) property; removes vitiated debris of skin, flesh (*Dusta Tvagmasadi*) etc., detoxifies the *Dosha* (bodily humour), *Dhatu* (tissues) and *Mala* (excreta).^[1] *Ksharas* are very effective to treat the disease such as skin diseases, *Bhagandra* (fistula in ano), *Nadivrana* (sinus), *Arbuda* (cancer), *Arsha* (Piles), *Dustavrana* (chronic or non healing ulcers), *Charmakila* (wart), *Tilakalaka* (melanomas), external abscess, disease of mouth etc. According to the Ayurvedic formulary of India, *Kshara* is an alkaline substance obtained from the ash of drugs.^[2] Common drugs described for *Kshara* preparation are *Apamarga*, *Arka*, *Palasha*, *Yava*, *Snuhi*, *Tila*, *Mulaka* etc. *Apamarga* is the most common drug used for *Kshara* preparation. Generally *kshara* of plant drug is prepared by burning the whole plant in to white ash, dissolving the ash in specified quantity of water, filtering the *Ksharajala* and finally evaporating the liquid part to obtain the water soluble part of the ash which is called as *Kshara*. In Sharangadhara Samhita different methods and utensils are described for the

preparation of *Kshara*.^[3] In Yogaratnakara, *Kshara* along with the powder of *Piper longum* (*Pippali*) is mentioned in the treatment of *Pleehodara* (splenomegaly).^[4] In Rasatarangani detail description of *Apamarga* (*Achyranthus aspera*) *Kshara*, *Arka* (*Calotropis gigantea*) *Kshara*, *Tila* (*Sesamum indicum* L.) *Kshara*, *Snuhi* (*Euphorbia nerifolia* L.) *Kshara*, *Palasha* (*Butea monosperma*) *Kshara*, *Chincha* (*Tamarindus indica* L.) *Kshara* are mentioned.^[5] Under Drugs & Cosmetic Rule 1945, the list of machinery, equipment and minimum manufacturing premise required for the manufacturer of *Kshara* are described.^[6]

Regarding the preparation of *Apamarga kshara*, all the authors have advised to burn the dried *apamarga* plant and dissolve the ash in water. According to *Acharya sharangadhara*, four times of water is to be used in the preparation of *kshara*. While *Acharya Yadavji* mentioned similar procedure but he has advised to take six times of water, keeping the plant drug soaked in it overnight and later same has to be filtered for 21 times.^[7] In the present study

the procedure was altered and washing was done for three times to obtain the increased yield.

MATERIALS AND METHOD

Preparation of *Apamarga kshara* includes various steps like collection and authentication of the plant, drying, preparation of ash and finally preparation of *Kshara*. Fresh matured *Apamarga panchanga* (whole plant of *Achyranthes aspera* L.), belongs to the family Amaranthaceae, has been collected during the month of September. Authentication of *Apamarga* was done by the experts of Dravyaguna on the basis of its pharmacognostical characters (Authentication no: RUBL211605) as well as through various physicochemical parameters which complied with the standards mentioned in Ayurveda Pharmacopoeia of India (Table no1). Sample was then dried completely in sunlight for one month.

Preparation of *Apamarga kshara*

Apamarga kshara was prepared according to the classical method. Entire process can be divided into three phases viz., 1. Preparation of ash, 2. Preparation of *Ksharajala* and 3. Preparation of *Mridu apamarga kshara*.

For the purpose of preparation of ash, total seven kilograms of matured *Apamarga Panchanga* was collected and dried completely under sunlight for a period of 30 days. After removal of physical impurities; 1.640kg of dried *Panchanga* (whole plant) was burnt completely by placing it in a big iron pan in open air. Then the ash was kept in furnace for 1 hour in 550^oc to get white ash. Various observations of preparation of ash are described in below given in table No 2. For the preparation of *Ksharajala* white ash (243g) was taken in a stainless steel vessel. Instead of adding 6 times of water (i.e. 1.5litres) at a time and filtering the supernatant liquid it was decided to do three successive filtrations for better yield. Out of 1.5 litre RO water, one litre of water was added to the white ash for first wash. Then the mixture of ash and water was rubbed with hands for proper mixing and left undisturbed for overnight. Next day the clean supernatant liquid was decanted and filtered through cotton wick and a filter paper. The filtering process was repeated for two more times and the filtrate was kept separately in a stainless steel vessel. To the residual ash again 300ml RO water was added (out of the remaining 500ml) rubbed properly and kept undisturbed overnight, followed by the collection of second filtrate. Remaining amount of water (200ml) was added to residual ash and the same method was followed for the third time to collect the third filtrate.

All the three filtrates (of *Ksharajala*) were separately subjected to heat over the gas stove to evaporate the water content and to obtain *Kshara*.

During preparation of ash *Apamarga panchanga* burned quickly and easily as it was completely dried. The powder of ash obtained was whitish with a characteristic taste. After addition of water, *Ksharajala* taste was found salty and transparent without having any colour. On heating colour of the liquid was changed from yellowish to whitish gradually as temperature rose. *Kshara* started sticking to the vessel in final stage and bumping was observed. It was stirred continuously to prevent bumping and sticking at final stage. Finally white coloured *Kshara* deposited as flakes at the bottom of the vessel was collected and was ground in to a fine powder. It was then kept in tightly closed container to protect from light and moisture.

Analytical Study

Any medicine which is used for the cure of diseases must have high quality, and hence it is necessary to check the quality of the finished products and to prove the safety of the drugs on the basis of scientific evidence. It has become now essential to develop reliable and specific quality control methods using both classical and modern instrumental method of analysis. Since the quality of final product depends on the raw material selected, standardization should not be limited to the final product alone. Quality assurance of raw material and process standardization is also equally important. Hence both the raw drug and prepared sample were analyzed for various parameters like loss on drying, particle size, potassium content, iron content, sodium content etc.

RESULT

Total yield of *Kshara* obtained by this method was 49.38% w/w with respect to the ash of *Apamarga*. Details of the pharmaceuticals of *Apamarga kshara* as well as its analytical reports are depicted in table numbers 2, 3, 4.

DISCUSSION

There are many procedures of preparation of *Apamarga kshara* as described in our literature. These methods are different from each other regarding ratio of water and *Apamarga* ash, container, straining, soaking duration etc. In the present study the soaking duration was less and the decantation and straining was modified by a cotton wick and Whatman filter paper, instead of 21 times straining of *Ksharjal* through a cotton cloth. Again in Ayurvedic classical texts, there is no reference about repetitive washing of the waste sedimentation. Further washing of the waste part is beneficial for enhancing the total yield of *Apamarga kshara*. The final product obtained was found pure white in color, as the *Apamarga* ash was completely burnt in the furnace for 1 hour at 550^oc. The carbon part was

completely burnt during this procedure. Repeated washing instead of adding 6 times water at once helped in obtaining maximum yield of *Kshara*. Analysis of the *Apamarga kshara* revealed that all the values complied with that of the standards mentioned in API. The pH value of the prepared *kshara* was 10.72 which explain the alkaline nature of the product.

CONCLUSION

Previous research works done by Hasmukh et al, reported the yield of *Apamarga kshara* as 35%.^[8]

Research work done by Dr. Vivek kumar et al reported that 18% yield of *Apamarga kshara* respective to the weight of the ash.^[9] In the present study the yield observed was 49% respective to the weight of the ash. This shows that successive washing can enhance the yield of *Apamarga kshara*. Hence it can be concluded that the above modified method can be adopted in the preparation of *Kshara*. The various analytical values obtained in the study can serve as standard parameters for a genuine sample of *Apamarga kshara* prepared by this method.

Table 1: Physico-chemical analysis of *Apamarga* (whole plant)

S. No	Test parameters	Limits	Results
1.	Foreign matter	Not more than 2%	1.24%
2.	Ash value	Not more than 17%	10.163%
3.	Acid insoluble ash	Not more than 5%	0.728%
4.	Water soluble ash	--	5.114%
5.	Water soluble extractive	Not less than 12%	15.276%
6.	Alcohol soluble extractive	Not less than 2%	4.976%
7.	Loss on drying	--	5.597%

Table 2: Observations and results obtained during preparation of *Apamarga* ash

1.	Weight of fresh <i>Apamarga Panchanga</i>	7kg
2.	Weight of dried <i>Apamarga Panchanga</i>	1kg 640gm
3.	Loss of weight after drying	5.36kg
4.	Percentage of weight loss after drying <i>Apamarga Panchanga</i>	76.57%
5.	Quantity of <i>Apamarga</i> ash obtained	243 gm
6.	Percentage of Ash from dried <i>Panchanga</i>	14.817%
7.	Percentage of Ash from fresh <i>Panchanga</i>	3.47%

Table 3: Observations and results obtained during preparation of *Apamarga kshara*

	First wash	Second wash	Third wash	Total Three washes
Quantity of water added	1L	300ml	200ml	1.500ml(6 times)
<i>Apamarga Kshara</i> obtained	82g	33g	5g	120g
Percentage of <i>Apamarga kshara</i> with respect to wet <i>Apamarga</i> plant	1.17%	0.47%	0.071%	1.71%
Percentage of <i>Apamarga kshara</i> with respect to dry <i>Apamarga</i> plant	5%	2.01%	0.30%	7.3%
<i>Apamarga kshara</i> with respect to Ash of burnt <i>Apamarga</i>	33.74%	13.58%	2.057%	49.38%

Table 4: Physico-chemical analysis of Apamargakshara

S. no	Test parameters	Limits	Results
1.	Presence of Na & K	Present	Present
2.	Particle size#100	Not less than 80%	88.43%w/w
3.	Loss on drying	Not more than 4%	3.18%w/w
4.	Acid insoluble ash	Not more than 1%	0.94%w/w
5.	pH value		10.72
6.	Potassium content (K)	Not less than 29%	37.98%w/w
7.	Sodium content (Na)	Not less than 4%	4.25%w/w
8.	Iron content(Fe)	Not less than 1.2%	1.22%w/w



Fig:1 Wet Apamarga panchanga



Fig2:Apamargash

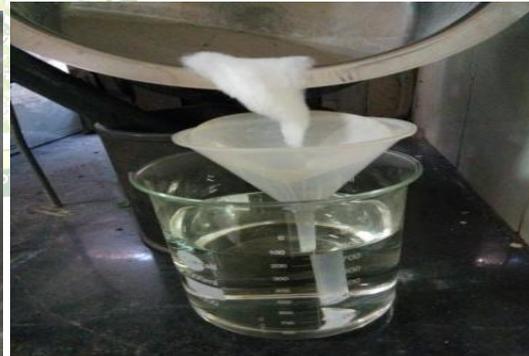


Fig:3 Preparation of Ksharajala and filtration



Fig 4: Evaporation of Ksharajala/filtrate



Fig 5: Final yield (Apamarga kshara)

ACKNOWLEDGEMENTS

The authors are grateful to Prof. Sanjeev Sharma Director NIA, Prof. K. Shankar rao, Head, Prof. Parimi Suresh, Department of Rasashastra, NIA, for

their encouragements and co-operation in carrying out this work.

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Cite this article as:

B.Pushpalatha, Sujata Kadam, K.Bharathi, K.S Sakhitha. Preparation and Physicochemical Evaluation of Mridu Apamarga Kshara. International Journal of Ayurveda and Pharma Research. 2019;7(4):16-20.

Source of support: Nil, Conflict of interest: None Declared

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