



Research Article

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PHARMACEUTICAL STUDY OF DIFFERENT SAMPLES OF APAMARGA KSHARA

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ABSTRACT

Apamarga kshara is an alkali extracted from the water soluble ash of Apamarga Panchanga and has wide therapeutic uses. But, the typical processing technique is involved in the preparation of kshara differs according to various authors, by the ratio of water added to Ash, soaking time duration, folds of cloth and number of times of filtration, so pharmaceutical work carried out according to different references i.e. Ayurveda Sara Sangraha / sample A (1:8 Ash and water ratio and 72 hours soaking, filtered through 4 fold clothe for 7 times), Rasa Tarangini / sample B (1:4 ash : water and kept for 3 hrs and filtered through 3 folded cloths, till clear liquid is obtained), Sharangadhara Samhita / sample C (1:4 ash : water, 12 hours soaking and supernatant liquid is decanted), Ayurveda Prakash / sample D (1:4 ash : water, 24 hours soaking, single filtration through single fold cloth), Sushruta Samhita / sample E (1:6 ash : water, 12 hours soaking and filtered 21 times through single fold cloth). Sample A shows maximum percentage of yield than all other samples, So proportion of water, the time duration of soaking and number of filtration influence the percentage of yield.

Keywords: Apamarga kshara, Ayurveda Sara Sangraha, Rasa Tarangini, Sharangadhara Samhita, Ayurveda Prakash

INTRODUCTION

In Ayurveda the greatest emphasis is given to the complete knowledge of Aushadha (drugs) including identification, procurement, processing, preparation, storage and therapeutic application¹, under a separate branch of learning is called "Bhaishajya Kalpana".

The modus operandi which converts any raw material into therapeutically potent dosage form which is easily absorbable in the biological system by different processing techniques can be termed as pharmaceutical processing. GMP for pharmaceutical products requires the validation of critical processes as well as changes in the manufacturing process which may affect product quality. There are a lot of references about the procedures for preparation of Ayurvedic formulations. Some people are of the opinion that Ayurvedic classics describe different procedures for the same formulations and a detail of SOP is not described. This confusion is also prevailing among the various procedures adopted for the preparation of Kshara (Alkali). In the present study, preparation of Apamarga Kshara (Alkali preparation of plant Apamarga) has been carried out by various methods described in Ayurveda Sara Sangraha (Sample A) Rasa

Tarangini (Sample B), Sharangadhara Samhita (Sample C), Ayurveda Prakash (Sample D) and Sushruta Samhita (sample E). These methods vary from each other on the basis of ratio of water and ash, Duration of soaking of ash with water, and filtration pattern. Hence it is attempted to compare Apamarga Kshara prepared by various methods on the basis of percentage of yield and economy.

MATERIALS AND METHODS

The pharmaceutical study is divided into following sections

Method of data collection: The Apamarga Kshara is prepared with different references as per the Kshara nirmana vidhi (Alkaline preparation).

**Proforma for the preparation of the Kshara
Collection of Raw material**

Useful parts collected: Apamarga Panchanga (whole plant)
Month of collection: collected in month of March
Date of collection: Between 9/03/2016 to 19/03/2016
Place: Hassan, Karnataka

Table 1: Details of the Raw drug used

Common name ²	Latin name ³	Part used ³	Quantity in kg
Apamarga	<i>Achyranthus aspera</i> Linn.	Panchanga (whole plant)	25.5 kg (partially dried) 22.2 kg (After complete Drying)

Place of pre-processing of the drug like cleaning, drying is done at Dept. of Rasashastra and Bhaishajya Kalpana (RSBK) SDMCAH, Hassan.

Selection of Raw Materials

- The panchanga of the plant is procured
- Drug authentication is done and approved by the experts, Dept. of PG studies in Dravyaguna, SDMCAH, Hassan
- Properly cleaned for extraneous matter.

Drying of drug

Apamarga partially dried drug (25.5kg) is taken and chopped into small pieces then dried completely under the sunlight for 5 days (40 hours). Complete drying (weight of drug: 22.2kg) is tested by breaking the plant part (stem/root). When plant part broke widely producing 'katkat' sound without bending, this stage confirms the complete drying of the drug Apamarga – whole plant.

Burning of Apamarga panchanga

- Dried panchanga of Apamarga is about 22.2 kg is taken and arranged in a heap in a windless place, then it is ignited.
- The time required for burning - 2hrs, self-cooling – 5 hrs and ash obtained is 1431 g (3530 ml – Volumetrically).

Method of kshara preparation

Table 2: Method of preparation carried out as per different references

Sample	Author	Ash and water ratio	Time	Filtration of Ksharodaka	No. of folds of cloth
A	Ayurveda Sara Sangraha ⁴	1:8	48- 72 hours (2-3 days)	7 times	4 fold cloth
B	Rasa Tarangini ⁵	1:4	3 hours	Till clear liquid	3 fold cloth
C	Sharangadhara samhita ⁶	1:4	over night (12 hours)	Liquid decanted	Single fold
D	Ayurveda.Prakasha ⁷	1:4	24 hours	1 times	Single fold
E	Yadvaji.Trikamji ⁸ & Acharya Sushruta ⁹	1:6	Over night (12 hours)	21 times	Single fold

General method of Apamarga kshara preparation

- Completely dried Apamarga panchanga(whole plant) is taken and arranged in a heap in windless place, and then ignite
- Later, it is allowed for Swangasheeta (complete cooling on itself).
- The ash obtained is dissolved in a definite quantity of water (8, 6 or 4 parts) with 1 part (Ash), later it is macerated well and kept undisturbed for a specified time (72hours, 24 hours, 12 hours, & 3 hours).
- Then filtered till the specified number of times (1, 7, 21) through respectively folded cloth (4, 3, 1 fold). The liquid thus obtained is called Ksharodaka (alkaline liquid). It should have Gomutra Varna (colour of cow's urine).
- Then the Ksharodaka should be treated on fire in an iron vessel, on madhyamagni, while it is slowly stirred with a ladle, till it becomes semisolid. Later it is dried to obtain - Shweta Varna Kshara (white colour alkali) has to be preserved in air tight glass container¹⁰.

Table 3: Preparation of different samples of Apamarga kshara for study (A, B, C, D, E)

Sample	Ash taken in volume	Water added for soaking	Soaking time	Number of filtration and Cloth fold	Volume of Ksharodaka obtained after filtration
A	700 ml	5600 ml	72 hours	7 times, 4 fold	4210 ml
B	700 ml	2800 ml	3 hours	Clear liquid, (7 times) 3 fold	2450 ml
C	700 ml	2800 ml	12 hours	Liquid decanted, 1 fold	2210 ml
D	700 ml	2800 ml	24 hours	1 time, 1 fold	2470 ml
E	700 ml	4200 ml	12 hours	21 times, 1 fold	3260 ml

Table 4: Preparation of samples of Apamarga Ashes

Sl. No	Feature	Duration & Result	
1	Date (from drying till the obtaining of Kshara)	20/3/2016 – 2/4/2016	
2	Drugs Quantity	In partially dry state	25.5 Kg
		After complete drying	22.20 Kg
		After complete burning – (Grey coloured) Ash obtained	1431 g in weight, (3530 ml in volume)
3	Duration for Drying	Date of commencement	19/03/16
		Date of complete drying	24/03/16
4	Duration for Burning of drug	Starting Date & Time	25/03/16, 9:53 am
		Complete cooling (Swangasheeta)	25/03/16, 5:05 pm

OBSERVATIONS AND RESULTS

Research work is completed with accurate recording of observations. The findings of the work were noted down in each and every step of the experiment with the probable reasoning.

Table 5: During drying of drug

Days	Changes Observed
1 st Day (19/3/2016)	Dried, but presence of moisture can be noticed, Leaves are attached to stems, Thickness reduced slightly
2 nd Day (21/3/2016)	Drying started, leaves start separating from stem Colour – Changes to green to dark greenish colour
3 rd Day (22/3/2016)	Dried partially, crackling sound on breaking- absent but bends, Colour – dark greenish
4 th Day (23/3/2016)	Dried completely, crackling sound on breaking slightly +
5 th Day (24/3/2016)	Dried completely, with crackling sound on breaking Colour – greenish, Tandula – separated completely Leaves – separated.

Table 6: Filtration of different samples of Ksharodaka

Sl. no	Observation	Sample A	Sample B	Sample C	Sample D	Sample E
		Temperature				
1	Appearance of fumes	68 ^o C	45 ^o C	60 ^o C	42 ^o C	68 ^o C
2	Boiling started & smell of kshara	86 ^o C	68 ^o C	96 ^o C	62 ^o C	84 ^o
3	White froth – all over the surface	96 ^o C	85 ^o C	98 ^o C	78 ^o C	96 ^o C
4	Liquid reduced and became Brownish	100 ^o C	85 ^o C	98 ^o C	96 ^o C	98 ^o C
5	Liquid reduced in volume and became thick consistency	100 ^o C	86 ^o C	98 ^o C	98 ^o C	100 ^o C
6	Brownish colour froth with thick consistency	94 ^o C	92 ^o C	98 ^o C	95 ^o C	100 ^o C
7	Semisolid thick sluggish consistency with whitish brown in colour	88 ^o C	96 ^o C	96 ^o C	90 ^o C	94 ^o C
8	Light Brownish colour powder form with moisture, Started forming of white particles at the centre of iron vessel	85 ^o C	96 ^o C	96 ^o C	83 ^o C	85 ^o C
9	Complete water portion reduced-white colour powdery Kshara obtained	-	-	-	-	-
10	Total time required	2 hours 51 min	1 hour 31 min	1 hour 16 min	1 hour 27 min	2 hour 11 min
11	Kshara obtained	77.5g	60 g	58.5 g	63 g	66 g
12	Percentage of kshara obtained	27.78 %	21.42 %	20.89%	22.5%	23.57 %

Table 7: Boiling of Ksharodaka

Sl. no	Observation	Sample A	Sample B	Sample C	Sample D	Sample E
		Temperature				
1	Appearance of fumes	68 ^o C	45 ^o C	60 ^o C	42 ^o C	68 ^o C
2	Boiling started & smell of kshara	86 ^o C	68 ^o C	96 ^o C	62 ^o C	84 ^o
3	White froth – all over the surface	96 ^o C	85 ^o C	98 ^o C	78 ^o C	96 ^o C
4	Liquid reduced and became Brownish	100 ^o C	85 ^o C	98 ^o C	96 ^o C	98 ^o C
5	Liquid reduced in volume and became thick consistency	100 ^o C	86 ^o C	98 ^o C	98 ^o C	100 ^o C
6	Brownish colour froth with thick consistency	94 ^o C	92 ^o C	98 ^o C	95 ^o C	100 ^o C
7	Semisolid thick sluggish consistency with whitish brown in colour	88 ^o C	96 ^o C	96 ^o C	90 ^o C	94 ^o C
8	Light Brownish colour powder form with moisture, Started forming of white particles at the centre of iron vessel	85 ^o C	96 ^o C	96 ^o C	83 ^o C	85 ^o C
9	Complete water portion reduced-white colour powdery Kshara obtained	-	-	-	-	-
10	Total time required	2 hours 51 min	1 hour 31 min	1 hour 16 min	1 hour 27 min	2 hour 11 min
11	Kshara obtained	77.5g	60 g	58.5 g	63 g	66 g
12	Percentage of kshara obtained	27.78 %	21.42 %	20.89%	22.5%	23.57 %

Table 8: Final results of each sample

Sl. no	Sample	Ksharodaka Obtained After filtration	Kshara obtained	% of kshara	Residue left (wet)
1	A	4210 ml	77.5 g	27.7 %	375 g
2	B	2450 ml	60 g	21.42 %	301 g
3	C	2210 ml	58.5 g	20.89%	437 g
4	D	2470 ml	63 g	22.5%	278
5	E	3260 ml	66 g	23.57 %	289 g

DISCUSSION

Apamarga kshara is an alkali extracted from the water soluble ash of Apamarga Panchanga and has wide therapeutic uses. But, the typical processing technique is involved in the preparation of kshara differs according to various authors, by the ratio of water added to Ash, soaking time duration, folds of cloth and number of times of filtration, so pharmaceutical work is carried out to evaluate the difference in the preparation and discussion is divided into 3 sections – Discussion on preparation of Ash, preparation of Ksharodaka, and Evaporation of Ksharodaka

Preparation of Ash

After complete drying about 22.2 kg of dried sample of Apamarga obtained which indicate 12.94 % of loss during drying, this may be due to complete evaporation of moisture, drug is burnt in open air to get sufficient supply of air which helps to burn completely to form grey ashes and prevents the formation of carbon.

Preparation of Ksharodaka

The percentage of Ksharodaka lost during filtration is found highest in sample A and E but whereas it is least in sample D. Among the samples A and E the loss is comparatively little more in sample A than E. In sample A, this may be due to amount of Ksharodaka lost due to filtration through four folded cloth, where water molecules will remain absorbed in the cloth. Sample E, loss may be due to more number of filtration through single fold cloth. Whereas In sample B, C, and D although proportion of water taken for Ksharodaka nirmana is same, but the loss is highest in sample C, due to simple process of decantation where care is taken to avoid mixing of ash particles in the Ksharodaka and loss of Ksharodaka is least in sample D due to single filtration.

Although the of Ksharodaka was more in sample A and E but the total quantity of Ksharodaka obtained is highest in sample A and E, this is due to the ratio of water taken for soaking the Apamarga ash. But, when percentage of Ksharodaka obtained is calculated it found highest in sample D and least in sample A, which may be due to proportion of water taken (8 part; 5600 ml in sample A, and 4 parts; 2800 ml in sample D), and the Colour of Ksharodaka should be Gomutra Varna after filtration, which could be observed in sample A, B and E due to number of filtration (7 times, 7 times and 21 times respectively) carried out. But in sample C colour of Ksharodaka obtained is whitish grey this may be due to decantation process and one time filtration respectively. Hence sample A, B and E could be considered better than C and D.

Evaporation of Ksharodaka

During the boiling of Ksharodaka, white froth is observed in all samples which may be due to the beginning of separation of soapy alkaline salts present in Ksharodaka. At the same time,

even characteristics smell of kshara is appreciated, which complements the process of initiation of separation of alkaline material from Ksharodaka. This is found throughout the completion of the process of dehydration/evaporation of water part from Ksharodaka. Regarding the colour, GomutraVarna (cow urine colour) Ksharodaka started turning to dark Brownish colour due to concentration of alkaline material and also loss of water molecules. But at the end the colour of kshara obtained is off-white to white, conforming to the description of kshara lakshana mentioned in classics as "Sita Prabha" (white colour). The minimum temperature is recorded between 32^o C (initial) while maximum is 100^o C. Maximum temperature measured is 98^o C to 100^o C which could be possibly because; water boils at This temperature which is used in the preparation of Ksharodaka.

The total yield depends on the proportion of water taken to prepare Ksharodaka, this could be possibly due to extraction of / or dissolution of solutes (kshara components) from the solvent (water). Higher the volume of solvent greater will the quantity of extraction this acknowledges the highest yield of Apamarga kshara in sample A and least in sample C.

The cloth fold and number of filtration have also its influence on yield of Apamarga kshara- In sample A and E the % of yield obtained is highest to other three samples This may be due to the contact time between ash and water is 72 hours in sample A and 12 hours in sample E. During This period it is possible that the kshara components will be extracted to their maximum extent. Filtration through four fold and single fold (7 and 21 times) respectively, here more of carbon particles will get trapped in the cloth folds during the filtration that imparts Gomutra varna (cow urine colour) to final filtrate (Ksharodaka) and the clear alkaline salts (kshara) gets into the filtrate.

Whereas in sample D, B and C were prepared by taking same ratio of water to ash but still there is difference in yield of Ksharodaka and kshara, this may be due to higher contact time between ash and water would facilitate maximum exploitation of kshara substances in to the water in sample D but Sample B although the contact time between ash and water is 3 hours yield can be obtained because of the maceration process which is continuously done for 15 min. and again after 45 min and kept for soaking and sample C although the time duration of soaking is 12 hours, but due to less quantity of Ksharodaka, decantation and single filtration may be the reason to reduced in yield.

CONCLUSION

Sample A shows maximum percentage yield of Apamarga kshara then all other samples. 2nd best method to prepare Apamarga kshara could be suggested as sample E on the basis of its yield (66 g) but sample B although weighs 60g out performs sample E with respect to its economy. So the proportion of water, the time duration of soaking and number of filtration influence the percentage of yield

METHOD OF APAMARGA KSHARA PREPARATION

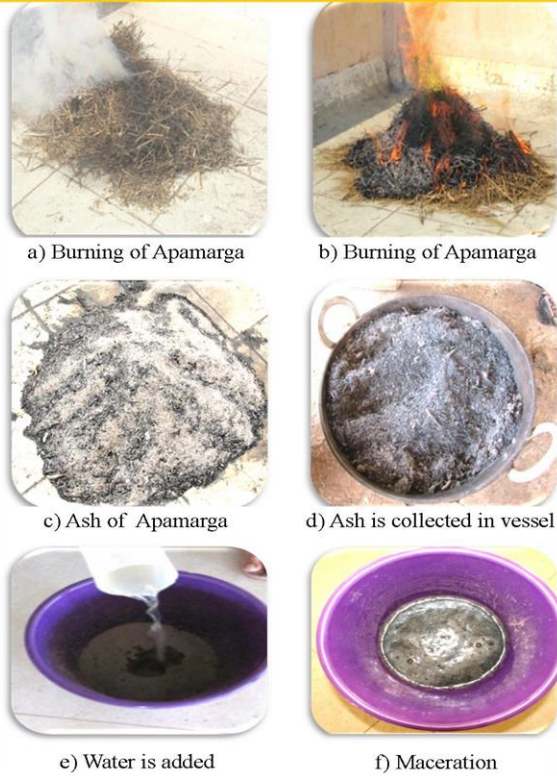


Figure 1: Burning of Apamarga, Ash collection and soaking of ash



Figure 2: Filtration and Boiling of Ksharodaka



Figure 3. Evaporation of Ksharodaka and kshara obtained



Figure 4: Different samples of Ksharodaka before and after filtration

REFERENCES

1. Angadi R. A. Textbook of Bhaishajya Kalpana vijyana. Varanasi. Chaukhamba Surbharati Prakashan. 1st. Edition 2011. p.1-3
2. Shodhala Nighantu commentary by Prof. Gyanendra pandey. Varanasi. Chaukhamba Krishnadas Academy, 1st Edition, y, 2009. p.8
3. Government of India, Ministry of Health and Family Welfare, Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy (AYUSH), New Delhi, The Ayurvedic Pharmacopoeia of India, part II (Formulations), Volume II, First Edition. p.159
4. Pathak Ramrakshak. Ayurveda Sarasamgraha, Allahabad, Shri Baidyanatha, Ayurveda Bhavan Ltd, Reprint 2002, pp.609
5. Shastri K. Rasa Tarangini. Delhi, Motilal Banarasidas. 11th Edition 1989. p.337
6. Sarangadhara Acharya. Sarangadhara Samhita. Shrivastavashailaja. Hindi commentary. Reprint. Varanasi, Chaukhamba Orientalia Academy. 2013, Madhymakandha, chapter 11/102-104, Jiwanprada. p.275
7. Mishra G.S. Ayurveda Prakasha. Reprint. Varanasi. Chaukhamba Bharati Academy. 2014; chapter 6/123-124, p.503
8. Acharya Y.T. Dravyagunavijnana. Bombay. Satyabhamabai Panduranga. 2003. p. 97-98
9. Shastri. A. Sushruta Samhita. Hindi commentary. Ayurveda TatvaSandipika. Varanasi. Chaukhamba Orientalia Sutrasthana. chapter 11/13-15. 4th Edition, Reprint. p. 35-36.
10. Hiremath. G. Shobha. Textbook of Bhaishajya Kalpana vijyana. 1st Edition. Bangalore. IBH Prakashan. 2000. p. 213

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