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TO STUDY THE PHYSICOCHEMICAL PROPERTIES OF ARKA PRATISAARANEYYA KSHARA.

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ABSTRACT

Kshara is an alkaline preparation used for multiple purposes mentioned for therapeutical purposes in Ayurveda. It is of various types according to the strength of preparation and according to different mode of administration. It is made up of different herbs and minerals. Different Acharyas has mentioned different drugs for the preparation of *Kshara*. In this study, physicochemical parameters are evaluated and analysed on *Arka* (one among the drug explained by Acharyas), which is used to prepare *Arka Pratisaaraneeya Kshara*.

Keywords: *Kshara*; *Arka Pratisaaraneeya Kshara*; physicochemical parameters.



Introduction

Health has always been on topmost priority for human beings since the beginning of civilization. For the purpose of healthy life, nature has gifted various resources to human beings to spend their decisive / vital life. Herbs, metals, minerals and animal products are among those resources. Uses of these resources in medical treatment are not new for this world. Ayurveda has shown various paths to use these resources in medical treatment since longtime year back. Rasa Shastra, the pharmaceutical branch of Ayurveda, has described use of these resources in a very planned and descriptive manner by formulating various medicines to treat human diseases¹. Kshara (alkaline substances), is one among them. Kshara is medicament obtained from ash of one or more plants, animal and mineral products². The process of preparation of Kshara involves the extraction of 'alkalies' from ash of dried plants. It is said that the diseases which are difficult to treat can be cured by Kshara therapy(alkaline therapy)³. Kshara therapy not only minimizes complication but also reduces recurrence of diseases. Kshara can reduce the chances of post-surgical infections due to its alkalinity. Kshara has the top most place in all surgical and parasurgical measures⁴. It can be used externally and internally according to the ailments of the body. In different text of Rasa Shastra number of Kshara are mentioned in different pharmaceutical processes to prepare formulations of metals and minerals. Further, the inherent character of Kshara i.e. alkalinity, not only responsible for the conversion of one metal / mineral into the medicine through the process of Shodhana⁵ (purification),

Sattvapatana⁵ (metal extracting), Marana⁶ (incineration of metals and minerals), and but also contradict the ill effects of poisonous drugs (schedule E-1) as antidote⁷. In this article, an effort has been made to compile and present the utilization of Kshara in the phramceutico-therapeutics of Ayurveda from the historical perspective, by referring important texts of Ayurveda in all aspects of its preparation, types, qualities, indications and uses.

Kshara is an alkaline substance prepared from herbs or minerals. It has property of Ksharana(destroying) the tissues where it is applied.¹ According to the strength by preparation, it is classified as *Mridu* (soft), *Madhyam* (moderate) and *Teekshna* (sharp). According to mode of administration, it is classified as *Paaniya* (oral) and *Pratisaaraneeya* (local application). *Paaniya Kshara* is indicated in *Gara visa, Gulma, Udara, Agnimaandya, Malasanga, Ajirna, Arocaka, Anaaha* etc.²*Pratisaaraneeya Kshaara* is indicated in *Arbuda, Bhagandara, Tilakaalaka, Nyachya, Vyanga, Arbuda, Nadi vrana* etc.³ Acharya Susruta has explained 24 drugs that can be used for Kshara preparation like *Apamarga, Arka, Palasha, Yava, Snuhi, Kadali* etc.⁴ Special mentioning of *Pippali Kshara* for the management of *Pleehodara* was done by *Yoga Ratnakara*.⁵ Regarding the preparation of *Apamarga Kshara*, all the authors have advised to burn the dried *Apamarga(Achyranthes aspera)* plant and dissolve the ash in water or *gomutra*(cow's urine). But the ratio in which the ash is mixed with the water is different according to different Acharyas. Acharya Sharangadhara has mentioned

the use of 4 times of water, whereas Acharya Susruta, Acharya Yadavji has mentioned the use of 6 times by volume of water.⁶This method of preparing *Apamarga Kshara* is adopted for the preparation of *Kshara* in this study. *Arka* for *Kshara* preparation is evaluated and analysed for physicochemical parameters as per Standardization procedure. Contraindications In diseases like *Jwara* (pyrexia), *Hrudroga* (cardiac disorder), *Shiroroga* (cranial diseases), *Panduroga* (anaemia), *Arochaka*, *Sarvangashopha* (anasarca), *Raktajagulma* (haemangiomas), and *Udararoga* (ascitis) *Kshara* is contraindicated. According to physical and mental state of the patient: *Kshara* is contra indicated in Children, phobic people, aged, menstruating women, pregnant women and physically weak.⁴ According to sites - Arteries, joints, vital parts, cartilages, veins, ligaments, throat, umbilicus, penis, insufficient musculature, nailbed, testis and all parts of the eye except eye lid.⁵ According to seasons - Summer, autumn and cloudy weather are contraindicated. *Kshara Karma* (application of *Pratisaraneeya teekshna Kshara*): It is a non-surgical procedure indicated for the management of Hemorrhoids. A medicine (alkaline in nature) derived from a combination of various herbs is applied to the pile mass with the help of a special slit proctoscope.⁶ It is a type of chemical cauterization. The *Kshara Karma* method of treating piles and details of preparation have been described in detail in the ancient text *Sushruta Samhita*⁷ and *Ashtanga Hridaya*⁸ and also the superiority of *Kshara* over sharp instruments has been mentioned in *Sushruta Samhita*.⁹ Dr. Ravi

Shankar Parvaje method of preparation of *Pratisaraneeya teekshna Kshara* is a modification of what is described in *Ashtanga Hridaya*. It is prepared as -10 Kg of *Achyranthes aspera* (*Apamarga*) is burnt to get 1 kg of ash. One Kg of ash is mixed with six times of water to form a solution, which is filtered using a sterile cloth. The filtrate is boiled slowly to reduce it to 2/3 of quantity, followed by addition of 100g of Oyster or Pearl (*shukthi*) shell powder. The solution is again boiled slowly. To this solution, 10g of powdered *Plumbago zeylanica* (*Chitraka*), *Gloriosa superba* (*Langali*), *Acorus calamus* (*Vacha*), and Coral (*Pravala*) are added to get semisolid, brownish-colored paste; this is collected and stored in dry glass bottle. As per the research conducted on the application of *Pratisaraneeya Kshara Karma* on *Ardra Arshas* with respect to histo pathological examination, the studies says the *Kshara* acts on Pile mass and cauterize it due to its corrosive nature and also acts on protein, protein coagulation occur in haemorrhoidal plexus, leads to disintegration of hemoglobin in to haem and globin. By this the death of tissue occurs and the haem part will slough out as in black color around 3 to 7 days. So there will be formation of complete obliteration of the haemorrhoidal plexus along with fibrosis takes place, this will prevent the recurrence.

Materials and Methods

Identification of *Arka* plant, collection, drying, burning and preparation of ash, and preparation of *Pratisaaraneeya Kshara* were done. Fresh, matured plant of *Arka* (*Calotropis procera*) was collected.

Preparation of Arka Pratisaaraneeya Kshara

Table 1: Ingredients for Kshara preparation.

S.No.	Sanskrit name	Botanical name (in italics)	Part used	Proportion
1	Arka	<i>Calotropis procera</i>	Panchanga	1 part
2	Shukti	Oyester Shell	Shell	1/10 part of Kshara
3	Chitraka	<i>Plumbago zeylanica</i>	Moola	1/10 part of Shukti

Method of Preparation:

Panchangas of Arka (*Calotropis procera*) plant was collected, dried up and burnt. The ash collected and was mixed with six times of water and filtered for 21 times. The filtrate is clean and clear like Gomutra Varna and it is kept on mild fire and reduced to 2/3rd. Then add red hot Shukti 1/10th part into the filtrate solution and continuously stirred well until it reduces to 1/3rd. This was further heated up by adding 1/10th part of Chitraka Kalka. After this thick solution was obtained which is known as Arka/Apamarga Pratisaaraneeya Kshara. It was stored in air tight container.

The prepared Arka Pratisaaraneeya Ksharawas kept in sterile air tight glass container with proper labeling.

Analytical study

The Kshara was prepared of desirable quality in terms of safety and efficacy. The Ksharawas standardard not only in terms of Ayurvedic classics but also from the modern instrumental method of analysis.

Methodology of Physicochemical standardization

Loss on drying at 105°C

10 g of sample was placed in tared evaporating dish. It was dried at 105°C for 5 hours in hot air oven and weighed. The drying was continued until difference between two successive weights was not more than 0.01 after cooling in desiccator. Percentage of moisture was calculated with reference to weight of the sample.

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.

Acid insoluble Ash

To the crucible containing total ash, add 25ml of dilute HCl and boil. 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.

Water soluble ash

The ash was boiled for 5 min with 25 ml of water; insoluble matter on an ashless filter paper was collected, washed with hot water, and ignite for 15 min at a temperature not exceeding 450°C. The weight was subtracted of the insoluble matter from the weight of the ash. And, the difference in weight was calculated for the water soluble ash with reference to the air-dried sample.

Determination of pH

Preparation of buffer solutions: Standard buffer solution: Dissolved one tablet of pH 4, 7 and 9.2 in 100 ml of distilled water

was done. Determination of pH: 0.4 g of sample was taken and make up to 40 ml with distilled water, 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.

Results

Table 2: Results of standardization parameters of Arka pratisaarneeya Kshara

Parameters	Results
	Results n = 3 %w/w
Loss on drying	25.57
Total ash	65.94±0.01
Acid insoluble ash	0.47±0.00
Water soluble ash	55.22±0.01
pH	14.0

Analysis of the parameters, this study shows loss on drying 25.57%w/w. Total ash value was 65.94±0.01%w/w with acid insoluble as 0.47±0.00 and water soluble ash 55.22±0.01 respectively. The PH of the solution was 14.0.

After reviewing the properties of the Kshara which are utilized in the Ayurvedic treatment, here accounting of the same in the light of modern sciences. Kshara are alkaline substances, which are of two kinds viz. natural and artificial. Natural are minerals and includes calcium, potassium, and sodium in different combinations. Artificial are those prepared by the ashes of certain plants

like Yava, Apamarga etc. Both these kinds are caustic, alkalis possessing the property of destroying the tissues by penetrating deep into them. The advantage of this property is utilized in the treatment of abnormal growth of the tissues like tumor, pile, masses of wounds. It destroys extra growth. Generally calcium or limestone or organic materials having calcium is utilized for the preparation of Kshara. A. R. Vasudev Murthy describes the chemical composition of Kshara in his Indian Tradition of Chemistry and Chemical Technology, as follows: the wood ashes contain potassium and sodium carbonates (K_2CO_3 and Na_2CO_3).

Limestone and sea shells contain calcium carbonate (CaCO_3). On heating strongly carbonate decomposes into calcium oxide (CaO), quick lime and Carbon dioxide (CO_2), which escapes into the air. Calcium oxide reacts with water vigorously and gives calcium hydroxide (CaOH), which is lime water indeed. Calcium hydroxide reacts with Potassium/Sodium carbonate and gives rise to Calcium carbonate which comes down as precipitate. Potassium hydroxide (KOH) remains in solution which may be concentrated by boiling to different extents. Herbal ashes generally contain sodium, potassium, carbonate, calcium oxide, magnesium and silica. 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 this process when so many substances come in contact of each other, some of them get decomposed and some new substances are being formed. For example the Ksharana strength is more dependent on the preparation of hydroxides than that of the carbonates. It means Kshara having more hydroxides are having more Ksharana Shakti, hence it is comparatively more 'Tikshna' so used externally only. Kshaodak (alkaline water) contains Sodium and Potassium hydroxides in traces hence prescribed internally and can be said as 'Paniya Kshara'. P

Conclusion

There are a lot of methods of managing haemorrhoids. Every established procedure does have its own limitations and the selection of proper procedure

has to be made. Ksharasutra therapy and Ksharakarma are very popular methods of management of haemorrhoids established under the strong foundation of Ayurvedic Samhitas. Ksharasutra therapy is usually used for 3rd and 4th degree haemorrhoids and with haemorrhoids containing external components. Kshara karma is mostly used for 1st and 2nd degree haemorrhoids and mainly internal haemorrhoids. Properly applied kshara causes disintegration of protein in haemorrhoidal plexus and due to its corrosive nature causes Ksharana of tissues. Kshara application induces aseptic fibrosis of the anal mucosa and increases its adherence to the anal wall. During the wound healing process it causes cicatrization and strengthens the anorectal ring. 8 The necrosed tissues slowly slough out. This must be the probable mode of action of Kshara in haemorrhoids

This simple method of preparation of Kshara and standardization parameters can serve as a guideline for other preparations of Arka Pratisaaraneeya Kshara.

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