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Research Article

Kshara for Therapeutic Applications

Concept of Kshara and Its Sources in Ayurveda- A Critical Review

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Abstract: *'Kshara'* is related to *'Paka'* (preparation) and '*vidhi'* (application). Because of its superiority among the sharper and auxiliary instruments, caustic alkali performs excision, incision, and scarification, alleviating three *doshas* and being used for specific functions. Among the para-surgical measures, all three- *Agni* (cauterization), *Kshara* (caustic alkali), and *Jalauka* (leeches) are important. Still, *kshara* is the chief because operations excision, incision, etc., cannot be performed by *Agni* and *Jalauka*. It is also applied for specific purposes, such as in *Arsha* caused by *Pitta*. This article will be essential in containing from the smallest to deepest knowledge of *Akshara*, which is available in classics & articles in scattered forms. This study intends to gather all information related to *Kshara* and elaborate on their properties as mentioned in classics, especially in *Sushruta Samhita* and *Rasashashtra.* The method followed here thoroughly analyzes *Sushruta Samhita*, its commentaries, and various research articles that surfed online. It is found that *Sushruta Samhita* explains full information regarding *Kshara*, types, indications, and contraindications.In contrast, certain *dravya*, which are not explained as *Kshara* but possess *Kshara* properties, are also discussed. The research provides thorough literature & critical review of *Kshara,* its sources, and their properties which can benefit many diseases in terms of application in different forms. In this study, the aim is to gather information about *Kshara* mentioned in classics and articles. This study aims to collect information about *Kshara* from traditional and scholarly sources.

Keywords-*Kshara,* Caustic, *Ksharasutra, Jalauka, Sushruta Samhita, Mridukshara, Ksharodaka*

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1. INTRODUCTION

Ayurveda has known since the beginning that some clinical conditions necessitate surgical intervention (*Shastrapranidhana*) for a complete or improved treatment. *Kshara* has been extensively detailed in the *Samhita* era. *Charaka Samhita, primarily a Kayachikitsa (Internal Medicine) book,* defines *kshara* and mentions that disorders such as *Gulma, Arsha, Bhagandar,* and *Ashmari* may require surgical procedures[1]. *Sushruta,* the father of surgery, explored the numerous surgical approaches and their relevance in therapeutics in great detail in *Sutrashtana.* The notion of *Anushastra,* or para-surgical methods, is a unique contribution of *Sushruta* and *Ayurveda* in surgery[2, 3]. *Bhavaprakasha* has defined *Kshara* as akin to *Agni* and capable of eradicating *Gulma* (Chlorosis) and *Shoola* (Pain). In both *Ashtanga Sangraha*[4] and *Ashtanga Hruday*, *Vagbhata* has mentioned *Kshara. Harita Samhita*, *Sharangdhar Samhita,* and Yograntnakar[5] *reference Kshara. Kshara* is recorded in the *Rasarnava Grantha*[6] of the 10th century AD and the *RasaratnaSamucchay*[7] of the 13th century, which are important *Rasashastra* writings. *Kshara* is a *Dravya (*material) capable of *(Ksharana)* scraping, *(Kshanan)* corroding, or *(Kshanan)* cutting through it. *Kshara* is a material that removes the vitiated *doshas (Vata, Pitta, and Kapha*). If a molecule of 'OH' exists in any substance, we can refer to that *Dravya* as *Kshara Dravya*[8]. Many anorectal ailments, such as *Arsha* (hemorrhoids), *Bhagandar* (fistula-in-ano), and *Nadivrana (sinus),* are treated with *kshara* derived from various plants in *Ayurveda*. *Kshara* application and modified *kshara* application in the form of *ksharasutra,* has become a regular practice in *Ayurvedic* surgical parlance in treating anorectal illnesses. It's a unique medication in which a barber's thread is coated with *kshara* (a caustic material) and is used to cause cutting and healing on both mechanical and chemical levels. *Sushruta* does not mention *Ksharasutra* for the treatment of *Bhagandar*. Still, he mentions a medicated thread for treating the Sinus (Nadivrana). [9] In their pioneering study, Prof. Deshpande and Sharma produced a modified *ksharasutra* based on these hints. This *ksharasutra* has grown so popular that it now accounts for over 90% of all Ayurvedic surgical interventions. This *ksharasutra's* effectiveness and benefits are now thoroughly proven. However, it has several frequent issues, such as discomfort, burning sensations, and itching, which should be addressed immediately. Although *Sushruta* provides a complete list of plants that are a source of *kshara,* in which *Apamarga* (*Achyranthes Aspera*) is most commonly utilized in *ksharasutra production,* Because various *kshara* source plants exert diverse pharmacological behavior, Depending on the patient's *Prakriti* (constitution) and *dosha* participation in clinical situations, different *kshara* plants should be prescribed for specific patients. Furthermore, plant availability and cost vary according to location and season, and rationalization may be achieved by examining several plant sources for *kshara.* It is, therefore, rational to conduct a structured study program to investigate the viability and practicality of employing other *kshara* in the construction of *ksharasutra.* The main purpose is to consolidate information regarding plants identified by *Sushruta* as *Kshara* source plants, focusing on their potential significance in clinical problems treated by *Ksharasutra*[11]. This study intended to gather all information related to *Kshara* and elaborate on their properties as mentioned in classics, especially in *Sushruta Samhita* and *Rasashashtra.* The method followed here thoroughly analyzes *Sushruta Samhita*, its commentaries, and various research articles that surfed online.

1.1. Need of study

This article will contain the smallest to deepest knowledge of *kshara*, which is available in classics and scattered forms.

2. ETYMOLOGY OF KSHARA

The word "*Kshara*" comes from two origins, "*Chhana*" and "*Chhar*," which together indicate "*Sanan*" or "Destroyer" due to its capacity to eliminate harmful elements from the body. *Kshara*, also called *Kach*, means *Sanchhalana*, i.e., movement By-*Amarkosh.* Synonyms of *Kshara-Himsaa, Ksharana, Spandana.*[12]

2.1. Historical Review of Kshara

The earliest literary works to provide a high standard of living for humans on our planet are the *Vedas*. For health-related issues, Vedic books mentioned a variety of medicinal plants, organic substances, tools, and methodologies; nevertheless, there is no description of *Kshara* in Vedic literature. *Kshara* uses available in *Upanishads*, but information needs to be provided on its preparation, characteristics, or other relevant details. The Puranas categorized as *Paneeya* and *Pratisaraniya*, and it is used to treat certain pathological disorders. *Kshara* is grouped into eight significant categories of therapy techniques, according to *Acharya Harita*. The numerous tenets of *Kshara's Sutra Sthana, Vimana Sthana, and Chikitsa Sthana* were elucidated by *Acharya Charaka* and Kshara's "*Shastra Pranidhaana*." The definition of *Ksharanaa*, according to *Sushruta Samhita*'s commentator *Acharya Dalhana*, is "mobilization and removal of malformed flesh, diseased skin, fluids, poisons, and loculi, together with vitiated *Doshas* of that location." *Dalhana* detailed how to employ *Kshara* in *Ashmar*i (calculi), *Switra* (leucoderma), *Gulma* (tumor), *Mutraghat* (dysuria), and *Visha* (poison), among other conditions. Additionally, *Kshara* was used to make therapeutic ghee and *Kasisadi Taila* to treat *Arsha*[13]. *Acharya Charak* referred to 18 plant components that can be used for therapeutic purposes, with *Kshara* being one among them. Two varieties of *Kshara* preparations were reported, such as *Bahi Parimarjan* (utilized outside- *kshara jala*- alkaline water) & *Antah-Parimarjan,* which is produced using the *Antahdhoom* process from burnt drugs[14].Only *Sushruta* explained *Kshara*'s therapeutic procedures in the *Bruhatrayee* and *Laghutrayee Samhita***.** *Kshara* was described as *Anushastra*, *Upyantra*, and *Agropaharaniya Upakrama* by *Acharya Sushruta*. Depending on the techniques of manufacture, 3 types of *kshara* were described: *Mridu* (mild piercing activity), *Madhyam* (moderate penetrating action), and *Tiksna* (quick penetrating action).To make *Tikshna Kshara*, however, powdered medications such as *Chitraka* (Plumbago zeylinica), *Danti* (Bliospermum montanum), and *Vacha* (Acorus calamus) were added.[15] The way that *Kshara* is prepared has been explained by *Acharya Chakrapani*. Acharya Yadavji has described separate chapters of *Kshara Kalpana*. *Katu*, which has a strong flavor, and *Lavana Rasas* (salty taste), includes a unique preparation process.[16] *Chakradatta* in *Arsha chikitsa* has also described the method of preparation of *Kshara Sutra* and its application.[17]The *Sharangdhar Samhita* mentions the quality requirements for *kshara* and describes several preparation techniques and tools[18]. *Lavana kshara* as a distinct chapter or monograph has been added to the

Ayurvedic Formulary of India, where *Kshara* is classified as alkaline[19]. The list of machinery, equipment, and minimum production facilities necessary for the production of *Kshara* listed in the Drugs & Cosmetic Rule of 1945 are outlined[20].

2.2. Definition and Characteristics

'Kshara' is so-called as it moves down or produces injury. *'Ksaranat'* by carrying down (disintegrates) the vitiated skin, muscles, etc.; others take it as causing *doshas* to move; *'ksananat'*- is by producing injury in skin, muscle, etc., interpreted as decreasing or evacuating. Because it is made from various source plants, *Kshara* balances the three *doshas*. Due to its white color, it is predominant in *Soma* (watery principle). Despite that, its potency for burning, digestion, and of suppuration, tearing, etc., is not antagonist due to the predominance of igneous drugs; it is hot, sharp, intense, digestive, dissolving, cleansing, healing, drying, checking, sliming; destroys worms, *ama, Kapha*, skin diseases, poisons, and fat and also causes virility by excessive use. As *Akshara* contains a combination of various drugs, it alleviates three *doshas* and, as such, is useful in *Paittika Arsha* too.

Types of Kshara

Classification of *kshara* according to *Sushruta*

1. For external applications- *Pratisarniya kshara*
2. For ingestion and internal use- *Paniya kshara*

The indications and precautions for each form *of kshara* are different.[21] The *ksharasutra* application is a modified form of *Pratisaraniya kshara.*

2.3. KSHARA VARGA

Table 1: Kshara Dwaya (2 alkali)[22]	
1.	Yavakshara
2.	Sajjikshara

Table 2: Kshara Traya (3alkalies)[22]	
1.	Yavakshara
2.	Sajjikshara
3.	Tankan

Table 3A: Kshara Panchaka (5 alkalies)[22]	
1.	Yavakshara
2.	Sajjikshara
3.	Mushka
4.	Palash
5.	Tila

Table 3B: Kshara panchaka (5 alkalies)[23]	
1.	Yavakshara
2.	Sajjikshara
3.	Palasha
4.	Tila
5.	Apamarga

Table 4A: Kshara Sashtaka (6 Alkalies) –A	
1.	Tila
2.	Palasha
3.	Vacha
4.	Apamarga
5.	Kutaja
6.	Mushka

Table 4B: Kshara Sashtaka (6 Alkalies)[24]	
1.	Tila
2.	Apamarga
3.	Kutaja
4.	Mushka
5.	Dhava
6.	Langli

Table 5A: Kshara Saptaka (7 Alkalies)[24,25]	
1.	Yavakshara

2.	Sajjikshara
3.	Tilakshara
4.	Palash kshara
5.	Apamarga kshara
6.	Shigru kshara
7.	Mushka kshara

Table 5B: Kshara Saptaka (7 alkalies)	
1.	Yavakshara
2.	Sajjikshara
3.	Palasha
4.	Amamarga
5.	Tagara
6.	Suvarchika
7.	Gaurya

Table 6A: Kshara Ashtaka (8 alkalies)[22]	
1.	Yava
2.	Sajji
3.	Palasha
4.	Amamarga
5.	Chincha
6.	Arka
7.	Tila Nala
8.	Kadali

Table 6B: Kshara Ashtaka (8 alkalies) [26]	
1.	Yava
2.	Sajji
3.	Palasha
4.	Apamarga
5.	Arka
6.	Tila
7.	Mushka
8.	Tankan

Table 7: Kshara Dashaka (10 alkalies)[24]	
1.	Shigru
2.	Moolaka
3.	Palash
4.	Chitraka
5.	Ardraka
6.	Nimba
7.	Ikshu
8.	Apamarga
9.	Mochaka
10.	Chukrika

2.4. Classification of Kshara [27]

Based on their origin

1. ***Vanaspatij Kshara(****i.e* plant origin) – *Arka , Snuhi Apamarga,*etc.
2. ***Jangam Kshara (***i.e., animal Origin) - *Shankha* (conch shell), *Kapardik* (cowries), *Navsadar* (NH_4Cl), *Shukti* (pearl oyster)
3. ***Khanij Kshara*** *(*i.e., mineral origin) – *Suryakshara* (Potassium nitrate), *Tankana* (borax)

A. According to availability

1. ***Natural*** *- Ex. Tankana, Shankha (conch shell)*
2. ***Artificially prepared*** *- Ex. Navsadar (NH_4Cl), Tankan (borax)*

B. According to Consistency

1. ***Shushka* (Dry)** - Ex. *Navsadar*
2. ***Ardra* (Wet)** - Ex. Paste of *Navsadar* or any paste of *kshara*
3. ***Drava form* (Liquid)** - Eg. *Ksharodak, Churnodak* (lime water)

C. According to the mode of application-

1. *Paniya Kshara / Antah Parimarjan*
2. *Pratisarniya Kshara / Bahi* Parimarjan

D. According to Potency

1. *Mrudu Kshara*
2. *Madhyam Kshara*
3. *Tikshna Kshara]*

Table 8: Sushruta Samhita's List Of Kshara's Source Plants[28]

S. No	Name	Botanical Name	Family
A.	MUSHKA	*Elaeodendron glaucoma*	Celastraceae
B.	KUTAJA	*Holarrhena antidysentrica.*	Apocynaceae
C.	PALASH	*Butea monosperma*	Fabaceae
D.	ASHWAKARNA	*Dipterocarpus turbinatus*	Dipterocarpaceae
E.	PARIBHADRAK	*Erythrina variegata*	Fabaceae
F.	VIBHITAKI	*Terminalia belerica.*	Combretaceae
G.	ARAGVADH	*Cassia fistula*	Caesalpinioideae
H.	TILWAKA	*Symplocos racemose*	Symplocaceae
I.	ARKA	*Calotropis procera.*	Asclepiadaceae
J.	SNUHI	*Euphoria nerifolia*	Euphorbiaceae
K.	APAMARG	*Achyranthes aspera*	Amaranthaceae
L.	PATLA	*Stereospermum suaveolens*	Bignoniaceae
M.	NAKTAMAL	*Pongamia pinnata*	Fabaceae
N.	VRUSHA	*Adathoda vasica*	Acanthaceae
0.	KADLI	*Musa Sapientum*	Musaceae
P.	CHITRAK	*Plumbago zeylanica*	Plumbaginaceae
Q.	PUTIKA	*Holoptelia integrifolia*	Ulmaceae
R.	ASPHOTA	*Hemidesmus indicus*	Asclepiadaceae
S.	ASHWAMARAK	*Nerium indicum*	Apocynaceae
T.	SAPTACHHADA	*Alstonia scholaris*	Apocynaceae
U.	AGNIMANTHA	*Premna mucronate*	Verbenaceae
V.	GUNJA	*Abrus precatorius*	Fabaceae
W.	KOSHATAKI	*Luffa acutangular*	Cucurbetaceae

Table 9: Properties of Plants according to Dosha[28]

Vatahara	*Kadli*
Pittahara	*Aragvadha, Krutvedhan, Kutaja*
Kaphahara	*Palash, Karanj, Snuhi, Agnimanth, Apamarg, Putika, Ashwakarna, Tilvak, Vasa Nimba, Arka Vibhitaki, Karavira, Chitraka, Saptachada, Krishnamushkak*
Tridoshahara	*Patala, Gunja, Sariva,*

3. INDICATIONS & CONTRAINDICATIONS

Table 10: Indications of *Kshara*

Pratisarniya Kshara	***Paniya Kshara***
Diseases- *Kushta* (leprosy), *Vyang*, *Dadru* (fungal infection), *Mandala, Kitibha* (psoriasis), *Kilas, Tilkalaka* (moles), *Nyaccha* (mole), *Charmakeel* (wart), *Dushtavrana* (sinus), *Mashaka* are examples of skin illnesses. Ano rectal diseases like *Bhagandar* (fistula), *Arsha* (piles), *and Arbuda* (tumor) Oral diseases like *Upajivha, Adhijivha, Upakush* (Gum boil), *Dantavaidarbh* (looseness of the teeth), 3 types of *Rohini*. *Krimi* **(**worms), and *visha.*	Diseases- GIT conditions like *Udara rog* (Ascitis), *Agnisanga* (lack of digestion), *Arochak* (tastelessness), *Gulma* (Chlorosis), *Ajirna, Anaha, Arsha* (piles) UTI commonly- *Mutra Sharkara* (small urinary stones), Renal stones Other conditions like *Abhyantarik Vidradhi* (abscess of internal organs), *Garavisha* (slow poison), *Krumi* (worms), *Visha* (poison)

Table 11: Contraindications of *Kshara*[29]

S.No.	*Pratisarniya kshara*	*Paniya Kshara*
Diseases	*Sarvanga Shotha* (Whole body swelling), *Udaragataroga-Jalodara* (Ascitis), *Raktapitta* High-grade fever, *Trishna, Vaginal prolapse* (excessive thirst), *Murcha* (fainting), *Atisara* Post *Vamana* (induced Emesis), *Virechan (*induced diarrhea).	*Brahma* (dizziness), *Mada* (jaggedness), *Murcha* (fainting), *Timir Roga* (darkness of the eyes), jwara
Condition of Patient	*Atidurbala* (extremely weak), *Balak*(children), *Ativruddha* (Very old aged), *Bhiru* (fearful people), Pregnant and Menstruating women, and Infertile males.	*Rakta-Pitta prakruti* *Ati Durbala , Balak , Vruddha*
Site	*Marmasthana, sira, dhamni, sandhi,snayu, Nabhi, alpa mansasthana, medhra,vrishana and netra* except eyelids ,both *kshara* should not be used.	
Consequences	If used in excessive amountamounts over a long period can lead to *atidagdha lakshanas*.	When *Paniya Kshara* is used in more amounts or for an extended period, it can cause falling of hair, greying of hair, Sterility, loss of vision, and cutting-like agony in the heart. It also leads to azoospermia or oligospermia.

4. *KSHARA* PROPERTIES ACCORDING TO DIFFERENT ACHARYA[30-33]

- ***Charaka*** *- Tikshna, ushna, laghu, ruksha, kledi, Pakta, dahaka, vidaraka, deepaniya, chhedaniya*
- ***Sushrut****- Na ati tikshna, Na ati mrudu, Shwet, shlakshna, picchila, Avishyandi, shiva, shighra prabhavkari*
- ***Vagbhata*** *- Na ati tikshna, Na ati mrudu, Shukla, shikhri, picchila, Sukhanirvapa, shiva, shighra prabhavkari*
- ***Rasatarangini****- Tikshna, ushna, dahak, pachak, mutrala, kriminashak, Vran Shodhak and ropak*

4.1. KSHARA DOSHA & DAGDHA LAKSHANA[34-36]

- ***Sushrut -*** *Atimrudu, Atiushna, Ati tikshna, Atipichhil, Atishwet, Prasaranshil, Sandra, Apakva*
- ***Vagabhata -*** *Atimrudu, Atiushna, Ati tikshna, Atipichhil Ati Sheet, Visarpi , Atighana, Hinapaak, Hina Aushadha, Ati Tanu*
- ***Samyaka Dagdha Lakshana***-When the *Kshara* is implemented correctly, the illnesses are treated, the patient is at peace, and the ailments disappear.
- ***Heena Dagdha Lakshana***- If *Kshara* treatment is insufficient, discomfort, irritability, heaviness, and illness exacerbation appear.
- ***Atidagdha Lakshana***- Extreme *Kshara* use might result in burning, inflammation, crimson discoloration, discharges, bodily aches, weariness, dehydration, dizziness, and death.

4.2. DOSE OF *KSHARA*[37]

4.2.1. Paniya Kshara

- *Uttama matra* dosage is 1 *pala* (48 ml)
- 3 *karsha* 36 ml *Madhyama matra*
- 1/2 *pala* 24 ml *Heena matra,*
- Vaidyas, on the other hand, should determine the dosage under *Dashavidha Pariksha.*

4.2.2. Pratisarniya kshara- Nakhotasedha Matra (Sushruta), For Internal use-250mg-1gm

Table 12: Properties of Plants Mentioned in Sushruta Samhita[19]

Name	Synonyms	Rasa, Guna, Virya, Vipak	Practical uses	Chemical constituents	Parts used	Formulations
Araghvadha[38]	*Rajavriksha, Dandafala*	*Rasa - Madhura Guna-Guru Vipak-Madhura Virya-sheeta Doshaghnta-Pittahar*	*Kushtaghna, Yakritduttejak, Raktashodhak, Sransamana, Mriduvirechak, Anuloman. Koshtshuddhikar, Ruchivardhaka, kandughna, Hrudya, Sothahara, Mutrajanana, Dahaprashman, Amapachak, Sanshodhaka, Jwarahara, Shoolprashaman*	Bioflavonoids, tri-flavonoids, Beta-sitosterol, Aspartic acid, Glucosides, fistucacidin	Fruit pulp, flower, stem, leaf	*Mahamarichyadi tail, Aragwadadi kwatha, Aragwadhadi tail, Aragwadharishta*
Karanj	*Udakriya, Lajapushpaka, Guchhapushpaka, Ghrutpurna*	*Rasa-Katu Guna- Laghu, teekshan Virya- Ushna*	*Kustaghna, Arshoghna, Cures Krimi, Shleepada, Urustambha.*	Mucilage, Tannins, flavonoids, glycosides,	*Panchanga*	*Karanja Taila, Mahamanjishthadi kashaya, Somraji taila.*[39]

		Vipak-Katu Doshaghnta-Kaphavataghna		saponin, fatty oil, steroids Pongapin.		
Tilvak[40]	*Bruhadpatra, Lodhra*	*Rasa-Kashaya Guna-Laghu Virya-sheeta Vipak-Katu Doshaghnta-Kapha,pittahara*	*Shothahara, jwarahara,*	Loturine,Symposides, glycosides	Stembark, flower	*Lodhrasava, Dashmoolarista,Irimedadi taila, Pushyanug churna,Mahaneel taila,Kushthadi lepa*
Apamarga[41]	*Shikhari, Kharmanjiri, adhashalya, Mayurak, Aghata, Pratyakpushpa*	*Rasa-Katu tikta Guna-Teekshna Virya-Ushna Vipaka-Katu Doshaghnta-Kaphavataha r*	*Shothahara, vedanasthapana, twakshoshahara, Vranashodhaniya*	Saponin A, 10-Tricosanone, 10-Octacosanone ,4 Tritriacontanone	*Panchanga especially leaves, seeds, alkaline powder*	*Kalyanak avaleha, Jiwantyadi churna, Panchagavya ghruta, Apamarga kshara*
Snuhi[42]	*Sehunda, Sudha, Snuk, Kantalo, Thuhar, Vajradruma,Kaikali*	*Rasa-Katu Guna-Teekshna Virya-Ushna Vipaka-Katu*	*Deepana, Shoolahara, Amahara, Shothahara, medahara, virechaniya*	Gum, triterpenes, betaine, hentricontane, achyranthes, and oleanolic acid are present in seeds	Latex, stem, roots, leaf	*Chitrakadi taila, Avilottadi bhasma, Vajraksara, Abhaya lavan*
Chirbilwa	*Putik, Udakirya, Prakirya,Markati, Shadgranthika, Karanji*	*Rasa-Tikta, kashaya Guna-Laghu ruksha Virya-Ushna Vipaka-Katu*	*Krumighna, Virechaniya, Shothahara*	Holoptelin A, B, B-sitosterol, fatty acid esters, Hexaconasol	Bark	*Piyushvalli rasa, Putikasava, Chilbilwadi Kashaya, Indukantha kashay*
Bibhitak	*Baheda, Kasrshfala, Kalidrum, Bhootvas*	*Rasa-Kashaya Guna-Ruksha Virya-Ushna Vipaka-Madhura Doshaghnta-Kaphapittaghna*	*Jwarhara, Kasahara, Virechanopag, Bhedaniya, Krumihara,Vaiswaryanashana*	Sitosterol, Galic acid, Chebugalic acid, Oxalic acid, Fructose, protein, Galactose	Seed, seed kernels, fruit rind	*Navakarshik churna, Arogyavardhini vati*
Karvira	*Aswamarka, Haymara, Chandtaka, Pratihara*	*Rasa-Tikta, Kashaya, Katu Guna-Laghu, ruksha, Teekshna Virya-Ushna Vipaka-Katu Doshaghnta-Kaphavataharа*	*Akshikampahara, Chakshushya, Jwarahara, Vranaropaka,Kushta-kanduhar*	Neriodorein, B-sitosterol, Karabin, Digitoxigenin,Rutin, oleandroside, Nerium	Root, rootbark	*Manikya rasa, Chitrakadi taila, Bruhata marichyadi taila*
Arka	*Gauri, Aka, Madar*	*Rasa-Katu, Tikta Guna-Laghu, ruksha,Teekshna Virya-Ushna Vipaka-Katu Doshaghnta-Kaphavataharа*	*Kushthagna, Kandughna, Vrana ropaka*	Alpha amyrin, B-amyrin, B-sitosterol, Uscharin, calactin, calotoxin, cardiac glycosides, calotropin	*Patra, Moola, Ksheera*	*Kasisadya taila, Krishnadi lepa, Arkadi lepa, Gajahastadi lepa, Arkadi dhupana*[43]
Gunja	*Kakachincha, Angarvalli,*	*Rasa-Tikta, kashaya*	*Balya, Vatahara, Vrishya, Krumighna, Kandughna*	Alkaloids, Steroids, Protein,	Seed, fruit, leaf	*Bhallatadi taila, Kasisbadhha rasa,*

	Kakavallari, Kakananti, Bahuvirya, Bahufala, Shikhandi, Sheetpaki	*Guna-Ruksha,Laghu , Teekshna Virya-Ushna Vipaka-Katu Doshaghnta-* Seed- *Kaphavataha ra,* Leaf- *Tridoshahara*		amino acids, Triterpenoids		*Mahamayur ghruta, Gunjagarbha rasa, Sarvangasundar rasa, Mehahar rasa*[44]
Kadali	*Dirghapatra, Swaduphala,Palashika, Amrit, Hastibusa, Hastivishanika, Rambha, Anshumatphala*	*Rasa-Madura, Guna- Guru, Snigdha Veerya-Sheeta Vipak-Madhura Doshaghnata-Vatapittaghna and aggravates Kapha*	*Shishira, krumihara, Ruchya, Shoolashamak*	Sugar, starch, Sitoindoside IV, Uronic acid, vitamin B, C	Flower, stem, fruit	*Kshara taila, Balamritam, Vasanta kusumakar ras*[45]
Krutavedhana	*Jalini, Koshataki, Ridangaphala, Ribbed luffa, Rajimataphala, Peetapushpika*	*Rasa-Madura Guna-Ruksha Laghu, Teekshna. Veerya-Sheeta Vipak- Katu Doshaghnata-Aggrevate Kaphavata and Pittaghna*	*Krumihara, kushtahara, pramehahara, vamaka, virechaniya, Vibandahara, mutravirechaniya*	Oleanolic acid, Cucurbitacin B,E, Triterpene saponins	Fruit, Leaf	*Mahamanjishthadi Kashaya, Patolmooladi kashaya*[46]
Kutaja	*Kalinga, Indravriksha, Sangrahi, Girimallika, Chakrasakhi, Sakra, Mallikapushpa*	*Rasa- Katu, Kashaya Guna-Ruksha Veerya-Sheeta Vipak- Katu Doshaghnata – Pitta rakta kaphaghna*	*Arshoghna, trishnahara, jwaratisarahara,Raktapittahara,*	Concessidine, holarrhine, kurchicine, Holadiene, isoricinoleic acid, B-amyrin, etc	Root, Moolatwak	*Kutaja ghana vati, Kutajavaleha, Kutajarishta*[47]
Ashwakarna	*Maricha patrak, deerghaparna, deerghavruksha, kushika taru, Aranya, Garjana*	*Rasa- katu, Tikta Guna-Laghu, Snigdha Veerya-Ushna Vipak- Katu Doshaghnata-Kaphavatagh na.*	*Udardaprasmana, Kandughna, Pramehaghna, Kushtagna, Vrana, bradhnaroga*	Dipterocarpus, oleoresin, betulonic acid	Oil, Bark powder, Fruit	--
Nimba	*Neem, Puyari, Sutikta, Arista, Malaka, Neta, kakafala, Puyari, Varatikta*	*Rasa-Tikta Guna- Laghu Veerya-Sheeta Vipak-Katu Doshaghnata-Kaphapittagh*	*Krimighna, kushtagna, Jwarhara, Sothahara*	Nimbidin, Sodium nimbidate, Azadirachtin, gedunin, gallic acid, epicatechin, catechin, cyclic	*Panchanga* (especially root bark, stem oil, and leaf)	*Nimbadi churna, Nimbarishta, nimba taila, Panchaguna taila, Jatyadi ghruta, Kasisadi ghruta, Arshoghna vati*[48]

		na		trisulphide, cyclic tetrasulphide, polysaccharides G1A, G1B		
Sariva	*Sariba, Sweta sariva, Magali beru, Makali beru, Sphota, Sugandhimula*	*Ras- Madhur Guna- Guru, Snigdha Veerya- Sheeta Vipak- Madhur Doshaghnata- Tridoshaghna*	*Jwarahara, Stanyshodhana, Dahaprashmaniya, Purisha sangrahaniya, Tridoshara, Kustahara, Amahara, shukrala, Pradarnuta*	B- sitosterol, Hemidesmin-1,2, Rutin, Hemidseminine, Hyperoside	Root	*Sariva churna, Pipplayadi ghutra, Manjisthadi taila, Jivantyadi taila, Mahatikta ghutra, kshara agada, Anu taila, Chandanadi taila* [49]
Saptaparna (Saptachhada)	*Vishaltwaka, Shalmalipatraka, Gucchapushpaka, Saptacchada, Sharad Madaganda, Chatraparn*	*Rasa- Kashaya Gunas- Snigdha Veerya- Ushna Vipaka- Katu Doshaghnata- Kaphavatagh na*	*Varanashodhan, Varanaropan, and Kwatha are used in the treatment of wounds, Kushtgna, jwarhara, Gulma,visarpahar*	Glucoside triterpenes, echitamidine, echitenine, picrinine, botalin, ursolic acid, β - sitosterol ,Amyring acetate	Stem Bark, leaves, fruits, Flower, root (Panchanga)	*Saptachhadadi kwatha, Saptachhadadi taila, Saptaparnasatvadi vati,* AYUSH 64 in combating Malaria[50]
Chitraka	*Dvipika, Vyala, Shikhi, Vaishanara, Vali, Kola, Hutashana, and Vahni*	*Rasa- Katu Guna- Laghu, Ruksha, Veerya- Ushna Vipak- Katu Doshaghnata- Kaphavatagh na*	*Deepaniya, pachaniya, Jwaragna, sothahara, raktapittaprakopak, kushthagna, kandughna*	Plumbagin, Chitranone, zeylinone, isozeylinone, elliptinone, droserone, chitranone, Plumbagic acid, 4-naphthoquinone	*Moola*	*Chitrakadi vati, Chitrakarasayana, Yogaraj guggulu vati, Panchatikta guggulu Chitrakadi Churna, AjamodadiChurna , Agnitundivati, Abhayarista, Panchatiktaguggulughrita, Vyosadigugguluvati*[51]

Table 13: Pratisaraniya Mridu *Kshara* Preparation Method

Sushrut samhita[52]	**Ashtang sangraha**[53]	**Rasatarangini**[54]
The dried plants are burned to form ash	Dried plants are burned separately to form ash, and lime is added during burning; afterward, it is removed.	The dried plant is burned into ash
Then 6 times water is mixed with the ash	In equal quantity, ash is taken, i.e., 1 part. Then 4 parts of water & 4 parts of cow urine are added to it	4 times water is added to the ash
Mixed well together	Mixed well and strained through a cloth	Mixed well and soaked for 3 hours
By a cloth, it is strained 21 times	In a big vessel, it is heated	Strained through 3-layer cloth
The desired liquid is then heated	*Shankha, Shukti, and heated lime are added* to the above liquid.	Till the white-colored kshara is obtained, the clear liquid is heated continuously on a low flame.
The liquid then turns red in color, sharp & gluey it is strained in a cloth	Heated continuously until white *Kshara* is formed	
Heating is done again, and the strained mixture, i.e., white *Kshara,* is collected.		

Ayurved Prakash[55]	**Ayurvedsaar Sangraha**[56]	**Rashrudayatantra**[57]
Burn the dried plant into ash	dried plants are burned to ash	Ash is formed from the dried plant by burning.
Add 4 times the water	8 times water is added to the ash	8 times water is added to the ash

Soak overnight	It is mixed well. I soaked it for 3 days	It's soaked overnight
Strain top clear liquid with a thick cloth	The top liquid is strained, and the clear liquid collected is strained with 4 layered cloth for 7 times	Strained through a cloth
Heat continue up till dry *Kshara* is formed	The liquid is then heated.	Heat the collected liquid.
	When it becomes thick, then dried in a broad vessel	The mixture then becomes thick; dry it on Sun.
	Dry to form pure white color *Kshara* which is granular.	

To prepare *Madhyam Kshara*- Heat *Mrudu Ksharodaka* with lime (Red hot), *Shankha Nabhi,* and *Shukthi*. Pound it together to form a paste and heat it until *Madhyam Kshara* is produced and turns into a greyish powder.

For Preparation of *Tikshna Kshara*- To *Madhyam Ksharodak*, add *Danti, Chitraka, Langli*, *Vidalavan, Hinga, Vekhand, Ativisha, Swarnashiri, Putikaranj, Sajjikshar* (sodium carbonate) powder and mix them.

Fig 1: Preparation of *Apamarga Kshara*[58]

5. PREPERATION OF PANIYA *KSHARA*[59]

All herbs *(tila, Taal makhana*, root & bark of *Palash*) make *paniya kshara. Palash, Sarso Panchang, yavnaal and mooli.)* Therefore, it should be taken in equal quantities and burned to obtain ash.

1. Now dissolved in four to six times animal urine (Cow, buffalo, horse urine)
2. Filter it 21 times, then add *kooth, saindhav Lavan, mulethi, sonth,* and *vaividang* to the filtrate. Each dravya should be taken 10 gms and 100 gms for Ajvain.
3. *Samudra Lavan* is cooked in an iron pot over low heat until it reaches the desired consistency to make it semi-solid (in the form of *avaleha*)
4. In this *Avalaeha*, add a sufficient amount of *Dadhi, sura, ghrita, dhanyamla, ushnodaka*, or *kulthi kwath as Anupama.*

6. UTILISATION OF *KSHARA (KSHARA* PRAYOGA)

7. Table-14 A UTILISATION OF *KSHARA (KSHARA* PRAYOGA)

	External application		Internal application
1.	Ksharsutra	1.	Vati (Tablet)
2.	Kshara anjana	2.	Gutika
3.	Kshara Pichu	3.	Kshara avaleha
4.	Kshar Varti	4.	Kshara ghrita
5.	Kshara gandusha	5.	Kshara taila
6.	Kshara basti		
7.	Pratisarniya Kshar		
8.	Kshara plota		

Table-14 B UTILISATION OF *KSHARA (KSHARA* PRAYOGA)

Sushruta[60]	***Vagabhata***[61]
After Incision scraping and scrubbing of the diseased area, *Akshara* is applied with a rod till counting of 100 is done, and then *the share* can be removed.	For Kshara application in disease, the exudative fluid must be removed by a small cut, then scrape the surface. Finally, an iron rod dipped in kshara is applied over the diseased part for 100matra kala & other areas are protected by covering them with Cotton cloth.

8. KSHARA SUTRA PREPARATION METHOD[62]

Requirements

1. Linen thread no 20
2. Snuhi ksheera
3. Apamarga kshara
4. Haridra

First, linen thread, no 20, is tied in a frame, then freshly collected *Snuhi kshetra* is coated and dried in sunlight. The next day *Snuhi kshetra* coating is again done in the thread and dried. Similarly, one coating per day is done for 11 days. On the 12th day, after complete drying of the thread, *Apamarga kshar*a is coated one coating per day for 7 days, i.e., from the 12th to the 18th day. 19th day, *Snuhi kshet*ra + *Haridra churna* coating is done and is dried in sunlight. A similar coating is done for 3 days, i.e., the 19th to the 21st. After complete drying, the final thread is kept in a test tube. This is known as *Aparmarga kshara sutra*. For twenty years, the formulations of *Kshara*, especially *Ksharasutra*, have been commonly and prudently practiced in *Bhagandar & Nadivrana* worldwide in Ayurveda and contemporary surgical eras having a remarkable positive outcome. Ksharasutra is also efficacious in *Dushtavran* (infected wound). Still, *Sutraform* is complicated for topical application owing to the number of thread sizes required and the potency of the ingredients.

In contrast, the direct application of *Kshara* (*Avachuranan*, i.e., dusting) is difficult due to the highly infuriating character of the *Kshara*. So in such cases, *Ksharplota* would be beneficial. *Ksharaplota* is formed from *Snuhiksheera, Apamargakshara*, and *Haridra* coatings; these herbs have *Vrana Shodhan* and *Vrana Ropan* qualities. The release of medications in the *Ksharaplota* formulation is maintained (delayed), allowing harmful tissue to be removed gradually. The effectiveness of the components is high because of the enormous surface area of *Plota*, which promotes tissue granulation and epithelialization to achieve a typical healing response.

8.1. Preparation of Ksharaplota

The double-layered circular hardwood ring has a 23 cm diameter round gauze piece attached inside. This gauze is woven so tightly that the coating may be applied consistently. On the first day, *Sunhikshira* 50 ml was administered gently using a cotton swab over the gauze covering the entire circle. After drying for a day, the wet-coated gauze with rings was placed inside the cabinet. On the second day, dried gauze was applied with *Snuhikshira* 50 ml again, then *Apamargakshara* 20 g using a cotton swab, and allowed to dry for a day in a cabinet. Dried gauze was covered with *Snuhikshira* (50 ml), followed on the third day by *Haridra* powder (20g), and allowed to dry for a day in a cabinet. The gauze was coated with a single layer of *Snuhikshira*, *Apamargakshara*, and *Haridra* powder and then cut into 6cm x 6cm pieces. Stored in sealed pack polythene packets and kept under ultraviolet light for sterilization.[63,64]

8.2. Properties of Ksharplota

Bhedaniya, lekhaniya, Daraniya, Dahaniya, Vilayaniya,Vranakleda shoshaniya, Vranashodhaniya, ropaniya

8.3. Physico-Chemical Characteristics of Ksharaplota[65]

- Colour-Yellowish-brownish
- Odor-aromatic
- Taste-Intense alkaline
- pH-Alkaline
- Shape-Circular

9. KHANIJ KSHARA- (Mineral Alkali)[66]

1. *Sudha* (Lime)- *Shilakshar, Churna, and Churnak* are other names. It is obtained by burning Lime stone, *Shankha, Shukti, or Shambhuk* in the open air. *Sudha* is commonly consumed as lime water, which combines water with lime in a 1:20 ratio. Lime water has the following properties: When administered internally and externally, it is antihelmintic and antidiarrheal. Therefore, hyperacidity, abdominal discomfort, *Grahani*, and indigestion in youngsters are all treated with this herb. In addition, sulphuric Acid's toxic effects are neutralized by it.
2. *Sorakhar* (Potassium Nitrate)- *Suryakshar, Vanhikshar, Mrutkshar*, and *Sora* are all variations of *Suryakshar. Suryakshar* is said to be comparable to *Shwet Shilajatu* or *Karpur Shilajatu*. It is a diuretic, antipyretic, expectorant, anti-inflammatory, and appetite stimulant. Kidney stones, dysuria, diabetes, upset stomach, and anemia are among the conditions for which it is prescribed. In addition, it is used to treat burns because it has a cooling effect.
3. *Navsadar* (Ammonium Chloride/NH4Cl)- *Ishtika Lavan* is known as *Chullikalavan, Kittakshar, Nrusaaar, and Navsaar*. It has an alkaline and harsh flavor to it. It's ushna, sharp, fine, light, stimulant, digestive, *Tridoshahara,* eliminates splenomegaly, burns *Kapha dosha*, and treats eye ailments.
4. *Tankan* (Borax/Na2B4O7 10 H2O)- Bitter flavor, sharp, dry, laxative, hot, dissolves Kapha, wound cleaner, increases menstrual blood flow, helps in the discharge of a dead fetus, cough, asthma, abdominal distension, and vegetable and mineral toxicity are all cases when this herb is used.
5. *Kankshi* (Alum/K2SO4, Al2(SO4)324H2O) - *Phitkari, Shubhra, Sphatika, and Sphuti* are some other names for it and is water soluble but alcohol insoluble. Astringent, bitter, and spicy taste, hot, oily, and tasty
6. *Papad Kshara* (Borak)- It is white, light in weight, and readily breakable. It has diuretic, laxative, *vatanulomak*, anti-acid, liquefier, and anti-inflammatory properties. They are used to treat jaundice, piles, abdominal distension, and discomfort in the abdomen.

10. DISCUSSION

Our *Acharyas* have mentioned various aspects regarding the methods of *Akshara* preparation, in which *Rasatarangini* has

mentioned a 1:4 ratio for ash and water, soaked for 3 hours, and advised filtration once. *Vagbhata, Sharangdhara*, and *Yogaratnakar* mentioned a 1:4 ratio of ash and water and kept the mixture stable overnight but didn't explain filtration. *Sushruta* has explained a 1:6 ratio of ash and water and 21 times filtration. *Ayurved Prakash* mentioned 1:4, *and Ayurved Sara Sangraha* mentioned a 1:8 ratio and kept it stable for 2-3 days with filtration 7 times[67]. Coming over to practical applications of *kshara*, various studies have been conducted. *Apamarga Kshara* contains sodium, potassium, carbonate, calcium oxide, magnesium, and silica. The strength of *Ksharana (*alkalinity) depends more on the development of hydroxides than carbonates. That indicates that *Kshara* has a greater capacity to generate alkaline conditions since it contains more hydroxides [68]. In bleeding internal hemorrhoids, *Apamarga shar*e qualities such as *Stambhan* (astringent/styptic), *Pachan* (digestion), and *Dahan* (cauterizing), resulting in hemostasis due to the early cessation of bleeding. When applying *Kshara*, the mucosa burns and peels to the wall, causing the bleeding to cease, which has been proven in a clinical study [69]. On internal administration, when *amla* is dominant, *kshara* is considered acidic and similar to *agni.* It improves digestion, reducing symptoms of *Amlapitta* such as indigestion, heartburn, acid eructation, nausea, and vomiting. In light of this, the *kshara* formulations of *Chincha* (tamarind) and *Kadali* (plantain) are referenced in classical books under *phalavarga*, and *Akshara* made from tamarind bark and plantain leaves is recommended for the treatment of *gulma, jeera*, *manage, amla pitta, sadhana*, and other ailments is proved in a clinical trial[70].In *Ayurveda* traditional writings, warts and *Charmakila* are divided into distinct categories based on dosha dominance. Several forms of warts were treated with *Apamarga Ksharodaka* (AK), an aqueous solution of *Apamarga* (Achyranthes aspera) *Kshara.* To one research, these warts took at least 2-6 days to drop off, leaving tiny scars. There were no recorded adverse effects in any of these patients[71].On looking over to *the Vibhitaki kshara sutra*, a study proved that patients experienced less pain and burning sensation during the cutting and healing of *Bhagandar*. Even though it's widely practiced, it is proven cost-effective and easily available [72] after the trials. *Kandughna Karma* is well-known in *Kshara*. In a study of *Udumbar kshara sutra*, *Haridra*'s antimicrobial activity prevents infection due to *Tikta Rasa,* displaying *Vrana Shodhana* and *Ropana*'s properties. *Udumbar & Haridra* performs *Tikta Rasa's Vrana Shodhana*; *kashaya rasa* manifests *Sandhana Karma* as a result of *Ropan Karma*. The anti-microbial and anti-bacterial effect of *Udumbar* Flavonoids and Tannins greatly reduced discharge. *Kshar* used on a wound improves circulation, which therefore improves healing[73]. As slough delays healing when *kshara* is used in the form of *varti* in case of wounds, nadi vrana or bhagandar leads to desloughing, which in turn successively followed by healing.[74]*Apamarga Teekshna Pratisaraniya Kshara* in *Kshataja Ostha Roga* or *Jalarbudha (*Oral mucocele*)* enters deep tissues by its *Ushna, Teekshna, Anu, and Sukhanirvapya Guna*, do *Vilayana of Kapha, Anulomana of Vata,* and *Pachana* of *Mamsa* and *Medas,* which leads to *Bhedana, Chhedana,* and *Ropana* of Mucocoele.[75]All types of *Kshara sutra* have good results in wound healing and prevent infection due to its alkaline pH (pH-10.3) that works as antibacterial at site application. Post-operative pain was lowest with *Udumber kshara sutra* Ligation in 2nd-grade hemorrhoids with good wound healing compared to another *kshara sutra* of *Guggulu Snuhi*[76]. Here are some previous works done in different types of Kshara showing tremendous results in the respective diseases.

11. CONCLUSION

Almost all plants can create *kshara* that is pharmacologically comparable to *Apamarga kshara,* as seen in the above collection. However, each plant has unique advantages regarding location, pharmaceutical processing capabilities, drug-patient interaction, and user compatibility. Certain other *dravya*, too, possess the qualities of *kshara* and are very potent. *Kshara,* if taken in full advantage, can truly be a miracle medication that is much required today. Hence this article contains an exhaustive knowledge of *Kshara* with its resources one can need to review.

12. AUTHOR'S CONTRIBUTION STATEMENT

Selection of the Topic with its contents is chosen and implemented by Dr. Shreya Soni and Dr. Sandeep Kumar Upadhyay. Implementation and analysis from different articles on the internet for proper content creation are performed by Dr. Shreya Soni. Dr. Amar Kadav. Complete Work is carried out under the guidance of Dr. Sheetal Asutkar.

13. CONFLICT OF INTEREST

Conflict of interest declared none.

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