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Review Article

KSHARA KALPANA ACCORDING TO RASATARANGINI: A TEXTUAL REVIEW

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ABSTRACT

Kshara (alkaline preparation) is widely used in various formulations as well as in various pharmaceutical procedures internally as well as externally. It also has therapeutic and surgical efficacy and shows results even when used in small doses. **Aim**: The present work aims to collect and summarize the information regarding *Kshara Kalpana* from Rasatarangini. **Material and methods**: Critical review of *Kshara* from Rasatarangini in various aspects such as its synonyms, properties, action on *Dosha*, *Kshara* prescribed in various formulations, percentage of *Kshara* in the formulation, other herbs used in the formulation, dose, indications, *Kshara* prescribed in various pharmaceutical procedures, and its practical application. **Results**: Rasatarangini describes 13 *Kshara* with *Vata-Kaphaghna* properties, *Swarjikakshara* having the most synonyms (16). They are vital in pharmaceutical processes, with usage varying from *Trikshara* (*Yavakshara*, *Swarjikakshara*, *Tankana*) at 16.6% each in *Parada Shodhana* to 25% *Tankana* in *Abhraka Satvapatana*. The text details 18 *Kshara*-containing formulations, such as *Gandhakadya Malahara* (0.43% *Tankana*) and *Shrisiddha Hinguleshwara* (50% *Tankana*). Additionally, 11 *Kshara Aamayika Prayogas* (practical applications) are noted, where *Ksharas* are combined with *Bhasmas*. Rasatarangini indicates these compounds for conditions like *Gulma* (abdominal lump) (11) and *Drushta Vrana* (infected wound) (7). Preparations use both traditional and modified methods, including *Nimbukamliya Kshara*. Typical doses are 2–12 *Gunja* (250 mg - 1.25 g), highlighting their significant role in Rasashastra. **Conclusion**: *Kshara* in Rasatarangini serves key therapeutic and pharmaceutical roles. This review gives to enrich existing knowledge and provide insights for researchers in this field of education and study.

INTRODUCTION

Rasashastra and Bhaishajya Kalpana, a branch of Ayurvedic pharmaceutics as per the National Commission for Indian System of Medicine (NCISM) it involves *Ayurvediya Aushadhi Nirmana Vigyana* (Ayurvedic Pharmaceutical Science) and *Ayurvediya Aushadhi Prayoga Vigyana* (Ayurvedic Therapeutics), comprising various pharmaceutical formulations, among which *Kshara Kalpana* is a distinct formulation.[1] *Kshara* is an alkaline extract derived from the ash of medicinal plants.[2] It is used for both therapeutic and surgical purposes in Ayurveda.

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Additionally, *Kshara* plays a significant role in Rasashastra. It is employed in various pharmaceutical procedures such as *Shodhana* (purification), *Marana* (incineration), and *Parada Samskara* (traditional mercury purification techniques) to enhance the potency and safety of metals, minerals, and other substances used in Ayurvedic formulations.

Rasatarangini is a 20th century C.E. book authored by Pranacharya Sadananda Sharma and edited by Pandit Kashinatha Shastri. This is the definitive text on Rasashastra, outlining every procedure for the preparation of Ayurvedic drugs. It is considered to be the last classical text of Rasashastra written in the modern period. Also, Rasatarangini is cited as an authoritative classical text and is recognized by the Drugs and Cosmetics Act[3] as well as by the NCISM textbooks.[1] It contains a total of 24 chapters, popularly called *Taranga*, among which the 13th and 14th *Taranga* describe the *Ksharatrika Vigyaniyama Adhyaya* and *Kshara Visheshadi*

Vigyaniyama Adhyaya in detail. These chapters include descriptions of *Kshara* along with its synonyms, properties, methods of preparation, indications, dosages, and therapeutic use. [4] The text also discusses *Kshara* throughout its entirety. In *Rasatarangini*, *Kshara* is classified into different groups based on the number of plant sources used, including *Kshara Dwaya* (two primary *Ksharas*), *Kshara Traya* (three primary *Ksharas*), *Kshara Panchaka* (five primary *Ksharas*), and *Kshara Ashtaka* (eight primary *Ksharas*)[5]. These groups can be directly used in formulations and pharmaceutical procedures.

Kshara is a potent substance extensively utilized for both pharmaceutical and therapeutic purposes in Ayurveda. Rasatarangini, a pivotal text in Rasashastra, comprehensively details these dual aspects of *Kshara*. The therapeutic value of *Kshara* is significantly influenced by its concentration within formulations. For these reasons, *Kshara Kalpana,* as described in Rasatarangini, merits a thorough review to highlight its profound role and practical applications.

MATERIALS AND METHODS

Rasatarangini (20th century C.E.), authored by Pranacharya Sadananda Sharma and edited by Pandit Kashinatha Shastri, with the commentary Prasadini by Ayurvedacharya Shree Haridatta Shastri, and its Hindi translation Rasavidyana by Ayurvedacharya Pandit Dharmananda Shastri (11th edition, 2012), was reviewed to compile references related to *Kshara*. In this review, an attempt has been made to describe formulations systematically by including the following aspects: synonyms, properties, action on *Dosha*, *Kshara* prescribed in various *Kalpa* (formulations), percentage of *Kshara* contained, other herbs used in the formulation, *Matra* (dose), indications, *Kshara* prescribed in various pharmaceutical procedures, and its *Amayika Prayoga* (practical application). *Kshara* is a potent drug so it is important to know its percentage in the formulation to estimate its therapeutic efficacy. The calculation of constituent percentages was consistently based on the initial weight of the raw ingredients prior to any pharmaceutical processing. Two different methodologies were employed for this purpose. In some formulations, the calculation included the total weight of all specified herbal, metallic, and mineral ingredients. In other instances, a more selective method was used, where the calculation was based exclusively on the solid constituents. This latter approach explicitly excluded all liquid and semi-solid ingredients such as decoctions (*Kwatha*), fresh juices (*Swarasa*), ghee (*Ghrita*), and honey (*Madhu*) as well as any ingredient for which a weight was not specified in the classical texts.

Method of calculation

Percentage of *Kshara* = 100 × weight of *Kshara* / weight of total ingredient (including *Kshara*).

E.g. In *Gandhaka Malahara* total weight of all ingredients minerals and herbal is 15 g, out of which 1.5 g is *Tankana Kshara*.

Formula for percentage of *Kshara* in *Gandhaka Rasayana* = $100 \times \frac{1.5 \text{ g}}{15 \text{ g}} = 10\ \%$.

RESULTS

After a review of *Rasatarangini*, a total of 10 *Ksharas* were identified, and their names and synonyms are mentioned in Table No. 1.

Table 1: Classical Names and Synonyms of *Kshara* as Mentioned in Rasataraṅgiṇī

S.N.	Name of *Kshara*	Total no. of Synonyms	Synonyms	Reference
1.	*Yavakshara*	12	*Yavaptya*, *Yavajo*, *Yavashukaja*, *Yaviya*, *Yavaaagraja*, *Yavavha*, *Yavanalaja*, *Yavashuka*, *Yavashuka*, *Shukaja*, *Yavashukaja*, *Yavya*	R.T. 13/1-2
2.	*Swarjika kshara*	16	*Swarjika*, *Swarji*, *Suvarchika*, *Swairjaka*, *Sarji*, *Sarjika*, *Suvarchika*, *Sukhurjika*, *Kapota*, *Sukhavarcha*, *Sukharjika*, *Rujaka*, *Swarjikakshara*, *Swarjikshara*, *Sauvarchal*, *Suvarchi*	R.T.13/42-44
3.	*Tankana*	14	*Tanka*, *Tanga*, *Dravaka*, *Tankanakshara*, *Rangakshara*, *Ranga*, *Rangada*, *Lohashodhana*, *Swarnashodhana*, *Saubhagya*, *Shitakshara*, *Shwetakshara*, *Tangaka*, *Kshararaja*	R.T.13/72-74
4.	*Navasadara*	07	*Navasara*, *Navyasara*, *Navasadara*, *Nrusadara*, *Nrusara*, *Narasara*, *Kittaksihara*	R.T. 14/1-2
5.	*Soraka*	04	*Sora*, *Suryakshara*, *Mrutakshara*, *Banhikshara*	R.T. 14/27
6.	*Apamarga kshara*	03	*Mayurakshara*, *Kharamanjarikakshara*, *Kinikshara*	R.T. 14/65
7.	*Tilakshara*	03	*Tilabhuti*, *Homadhanyabhuti*, *Pavitrakshara*	R.T. 14/80
8.	*Snuhikshara*	03	*Snukkshara*, *Vajrakshara*, *Sehundukakshara*	R.T. 14/91

9.	*Palasha kshara*	03	*Kinshukakshara*, *Parnakshara*, *Triparnakshara*	R.T. 14/99
10.	*Chincha kshara*	06	*Amlikakshara*, *Chinchabhuti*, *Chinchikabhasita*, *Chichabhasma*, *Amlabhasita*, *Tintidibhasita*	R.T. 14/107-108

Method of preparation of *Kshara*

A. General method of preparation of *Kshara*

1. Preparation of *Kshara* from *Kshara Vruksha* (Tree)[6]

The dried *Kashtha* (trunk) was ignited and allowed to burn completely in open air. The resulting ash was collected, and four times the amount of water was added. The contents were mashed thoroughly by hand and left undisturbed for 3 hrs. Then, the *Ksharajala* (supernatant liquid) was decanted using a rubber tube into another vessel. This was further filtered through a three-folded cotton cloth. The *Ksharajala* was then taken in a steel vessel and heated over an induction heater until the entire water portion evaporated and *Kshara* was obtained.

B. Specific method of preparation of *Kshara*

1. Preparation of *Yavakshara*[7]

Yava (*Hordeum vulgare* L.) *Panchanga* (whole plant) was ignited and allowed to burn completely to obtain ash. The collected ash was soaked in eight times the quantity of water and mashed thoroughly by hand. The mixture was kept undisturbed overnight. On the next day, the clear *Ksharajala* was carefully decanted using a rubber tube and filtered through cotton cloth seven times to ensure clarity. The filtered *Ksharajala* was then transferred into a stainless-steel vessel and subjected to heat on a gas stove until complete evaporation of the water content occurred. The obtained *Pandurabham* (Off-white) *Kshara* was collected.

2. Preparation of *Swarjikakshara*[8]

The plant *Ushatrapriya* (*Fagonia cretica* Linn.) was dried and then incinerated to yield ash. This ash was combined with eight times its quantity of water and manually mixed thoroughly. The mixture was kept undisturbed and when it got clear, *Ksharajala* was carefully drawn off using a rubber tube and transferred into a clean vessel. It was then passed through a seven-layered cotton cloth to obtain a purified filtrate. This filtrate was placed in a stainless-steel vessel and heated to all the water content had evaporated. Then, the resulting *Himkundendusankasha* (resembling or having the luster of snow, the *Kunda* flower, and the moon.) *Swarjikakshara* was collected.

***3. Nimbukamliya Yavakshara*[9]**

In a glass vessel, take twenty-four parts of *Yavakshara* and dissolve it in an equal quantity of cold water. In another glass vessel, take twenty parts of *Nimbukamla* (citric acid) and dissolve it in an equal quantity of water. Now, mix both these solutions in a glass vessel that has been coated (enameled). Place this vessel on a stove and heat it to evaporate the water content. Upon evaporation of the aqueous phase, a solid residue with a camphor-like appearance is deposited at the bottom of the vessel is referred to as *Nimbukamliya Yavakshara.*

***4. Nimbukamliya Sarjikakshara*[10]**

Take forty-one parts of *Sarjikakshara* and dissolve it in double the quantity of cold water. In another vessel, take twenty parts of *Nimbukamla* (citric acid) and dissolve it in an equal quantity of cold water (i.e., twenty parts). Now, mix both these solutions in a glass vessel and place it over a mild heat to evaporate the water content. Once the water evaporates, a white powder will remain at the bottom of the vessel. This is referred as *Nimbukamliya Sarjikakshara*.

***5. Tankanaamla*[11]**

Powder the *Tankana* (borax) and take half of its quantity. Dissolve this portion in hot water to make a solution and place it in a glass vessel on heat. Now, add *Lavanaamla* (Hydrochloric acid) drop by drop into this heated solution. When all the *Tankana* (borax) precipitates and settles at the bottom of the vessel, remove the vessel from the heat and allow it to cool. Once cooled, separate the liquid at the top and collect the *Tankana* that remains at the bottom. Now, take this *Tankanamla* again in a glass vessel, dissolve it in three times the amount of hot water, allow it to cool again, and separate the upper liquid. Finally, collect the *Tankanamla* that settles at the bottom of the vessel and dry it in sunlight, then store it in an airtight container

***6. Soraka Dravaka*[12]**

In a clean glass bottle, take one part of purified *Soraka* (Potassium nitrate) and add half a part of *Gandhaka Drava* (sulphur liquid). Connect the other end of the glass tube to the mouth (sulphur solution) using a pipette or dropper. Now, fit a glass tube to the mouth of this glass bottle, with the other end placed into another glass bottle or container placed in cold water (serving as a condenser setup). Place the first glass bottle (containing the mixture) on a tripod stand above a spirit lamp (*Sura Pradeep*) and gently heat it with a low flame. As the contents begin to vaporize, the vapors travel through the slanted tube and condense into the second bottle as a clear, water-like liquid. Carefully collect this condensed liquid, which is a transparent, colourless, acidic substance known as *Soraka Dravaka.*

Table 2: Details of properties, action on *Dosha*, dose and indications of different *Kshara* mentioned in Rasatarangini

S. No.	Name of *Kshara*	Properties	Action on *Dosha*	Dose	Indications	Reference
1.	*Yavakshara*	*Laghu*, *Snigdha*, *Dipana*, *Pachana*	*Vata - Kaphaghna*	3-10 *Gunja* (Internal)	*Shula Anaha Udara Adhamana*, *Kanthamaya*, *Amlapitta*, *Hrudya*, *Mutrakrucha, Prameha*	R.T. 13/6-9
2.	*Swarjikakshara*	*Tikshna*, *Katu*, *Ushna*, *Pachana*	*Vataghna*	3-12 *Ratti* (Internal & External)	*Gulma*, *Adhmana*, *Krumi, Kasa, Shwasa*, *Vrana.*	R.T. 13/48-49
3.	*Tankana*	*Ruksha*, *Tikshna*, *Saraka*	*Vata-Kaphaghna*	-	*Kasa Shwasa*, *Visha*, *Adhmana*, *Vrana Mudhagarbha*	R.T. 13/79-81
4.	*Navasadara*	*Snigdha*, *Sukshma*, *Laghu*, *Pachaka*, *Saraka*, *Tikshana*, *Ushna*	*Kaphaghna*	2-8 *Gunja* (Internal & External)	*Mansajirna*, *Gulma*, *Adhmana*, *Vruchikavisha*, *Hridayamaya*, *Kswitra*, *Kushtha, Netrya, Pliha*	R.T. 14/5-7
5.	*Soraka*	*Sara*, *Tikshna*	-	2-10 *Gunja* (Internal)	*Vidagdhaajirna*, *Agnimandya*, *Ashmari*, *Mutrakrucha, Prameha, Pandu*	R.T. 14/36
6.	*Apamarga*	*Tikshna*	-	-	*Shwasa, Gulma*, *Shula Badhirya*	R.T. 14/66
7.	*Arka*	*Tikshna*	-	-	*Gulma*, *Pachna*, *Dipana*, *Kasa Shwasa, Pliha*	R.T. 14/75
8.	*Tilakshara*	*Tikshna*	-	-	*Ashmari*, *Pliha, Vrana*	R.T. 14/81
9.	*Snuhi*	*Tikshna*	-	-	*Udara*, *Gulma*, *Visuchika*, *Ajirna*, *Shula*, *Shwasa, Shotha*	R.T. 14/92-93
10.	*Palash*	-	-	-	*Gulma*, *Mrutrakruchha Yakrutavruddhi, Pliha*	R.T. 14/99
11.	*Chincha*	-	-	-	*Shula*, *Gulma Mutrakruchha*, *Ashmari.*	R.T. 14/109

(Not mentioned is marked as '-')

Table 3: Details of *Kshara* used in the different pharmaceutical procedures mentioned in Rasatarangini

S.No.	Drug	Process	*Kshara* used	Percentage of *Kshara*	Other ingredients	Reference
1	*Parada*	*Shodhana*	*Swarjikakshara*	16.6 %	*Guda, Trikatu, Yavani, Pancha Lavana, Chitraka, Triphala, Dhatura, Sarshapa*	R.T.5/32
			Yava Kshara	16.6 %		
			Tankana	16.6 %		
			Yavakshara	-	*Nagavalli Swarasa, Aadraka Swarasa*	R.T.5/34
			Sarjika Kshara	-		
			Tankana	-		
		Swedana Samskara	Not specified	-	*Amla Aushadha*	R.T.5/46
		Mardana	Not specified	-	-	R.T.5/54

		Samskara				
		Murchana Samskara	*Yavakshara*	-	*Pancha Lavana, Amla Aushadha*	R.T.5/61
			Sarjika Kshara	-		
		Utthapana Samskara	*Tankana*	33.3 %	*Lavana, Madhu*	R.T.5/64
			Yavakshara	-	*Hingu, Lavana Panchaka, Amla Aushadha*	R.T.5/70
			Sarjika Kshara	-		
		Niyamana Samskara	*Navasadara*	25 %	*Rasona, Bhrungaraja, Chincha, Musta*	R.T.5/89
		Dipana Samskara	*Tankana*	-	*Amla Dravya*	R.T.5/95
			Tankana	-	*Kasisa, Maricha, Spakika, Pancha Lavana, Chitraka, Raji*	R.T. 5/96
			Tankana	-		
			Sarjika Kshara	-	*Pancha Lavana, Maricha, Shobhajana, Asuri, Kasisa, Chitraka, Spatika, Shephalika*	R.T. 5/97
			Yavakshara	-		
2	*Abhraka*	*Satvapatana*	*Tankana*	25 %		
3	*Yashada*	*Jarana*	*Nimba Danda, Ashwatha Twak, Aapamarga*	-	-	R.T. 19/ 108-115

Table 4: Details of *Kshara* with percentage used in various formulations mentioned in Rasatarangini

S. No.	Formulations	*Kshara* used	Percentages of *Kshara*	Other ingredients	Indication	Reference
1.	*Gandhakadya Malahara*	*Tankana*	0.43%	*Sikthataila, Gandhaka, Girisindoora, Ghanasara*	*Pama*	R.T.8/63
3.	*Hingulaarmruta Malahara*	*Tankana*	0.96%	*Siktha Taila, Hingula, Mrudarshrunga, Kapura, Rasapuspa, Spatika, Girisindoora*	*Nadivrana, Bhagandara*	R.T.9/28
4.	*Shrisiddha Hinguleshwara*	*Tankana*	50%	*Hingula, Dhatura Swarasa*	*Jwara, Krumi, Jwaratisara*	R.T.9/58
5	*Shankha Dravaka* (1)	*Tankana*	36.6%	*Shankha, Pancha Lavana, Sphatika*	*Visuchika, Grahani, Gulma, Udara, Shula, Arsha, Krumi, Chardi, Mutrakrucha Pliha*	R.T.12/35
		Yavakshara	36.6%			
		Sarjikakshara	36.6%			
		Navasadara	36.6%			
	Shankha Dravaka (2)	*Yavakshara*	14.28%	*Spatika, Saidhava, Kasisa*	*Gulma, Udara, Shula, Agnimandya Pliha*	R.T.12/35
		Navasadara	14.28%			
		Surakshara	14.28%			
	Shankha Dravaka (3)	*Yavakshara*	15.38%	*Saidhava, Spatika, Kasisa*	-	R.T. 12/ 49
		Navasadara	15.38%			
		Surakshara	30.76%			
6.	*Tankanamruta Malahara*	*Tankana*	3.53%	*Siktha Taila, Pushpakasisa*	*Drushta Vrana*	R.T.13/99
		Swarjikakshara	7.07%			

		Ashwatha Twak Kshara	0.88%			
7.	*Tankanamlyasya Malahara*	*Tankana*	10%	*Siktha Taila*	*Drushta Vrana, Agnidagdha Vrana*	R.T.14/112
8.	*Tuthyakadya Malahara*	*Tankana*	22.2%	*Ghrita*, *Sarjarasa*, *Tuttha*, *Kaparda*	*Drushta Vrana,*	R.T.21/102
9.	*Sindhuradya Malahara*	*Tankana*	14.28%	*Siktha Taila Sindoora*	*Drushta Vrana*	R.T.21/156
10.	*Panchamruta Rasa*	*Tankana*	33.3%	*Vatsanabha, Parada, Gandhaka, Maricha, Tankana*	*Jwaratisara Shotha*, *Jalodara*, *Shirashula*, *Pinasa*, *Galagraha*, *Nasaroga*, *Kantharoga*	R.T.24/83
11.	*Ananda Bhairav Rasa*	*Tankana*	25%	*Gomutra, Vatsanabha*, *Pippali*, *Maricha*, *Hingula*	*Pravahika*, *Jwaratisara Puyameha*	R.T.24/93
12.	*Kaphaketu Rasa*	*Tankana*	25%	*Gomutra, Vatsanabha*, *Pippali*, *Shankha*, *Aadraka Swarasa*	*Pratishyaya*, *Kasa*, *Galagraha*, *Karnaroga*, *Shwasa*	R.T.24/106
13.	*Aagnitundi Rasa*	*Swarjikakshara Yavakshara Tankana*	7.6% 7.6% 7.6%	*Vatsanabha, Jiraka, Triphala, Ganghaka, Vidanga, Sauvarchal lavana, Samudra Lavana, Saidhava, Chitraka, Aajamoda, Kuchala,*	*Aagnimandya, Aatisara, Arsha, Prushtha Shoola*	R.T.24/210
14.	*Lakshmivilasa Rasa*	*Tankana*	24%	*Kuchala, Maricha, Lohabhasma, Gandhaka, Parada*	*Karshya, Vrushya*	R.T. 24/216
15.	*Ichhabhedi Rasa*	*Tankana*	12.5%	*Maricha, Parada, Gandhaka, Shunthi, Jayapala*	*Udara*	R.T.24/ 321
16.	*Jwarari Rasa*	*Tankana*	8.3%	*Hingula*, *Pippali, Shunthi, Maricha, Vishwabheshaja, Vatsanabha, Dhatri, Jayapala*	*Navajwara*	R.T.24/333
17.	*Aanjana Bhairava Rasa*	*Tankana*	16.6%	*Parada, Gandhaka, Pippali, Jayapala, Nimbu Swarasa*	*Netraroga*	R.T.24/336
18.	*Pralapantaka Rasa*	*Tankana*	30.18%	*Dhatturabeeja, Parada, Gandhaka, Trikatu, Nimbu Swarasa*	*Pralapa*	R.T.24/380

Table 5: Details of *Kshara* used in treatment (*Amayika Proyoga*) mentioned in Rasatarangini

S.No.	Drug	*Kshara* used	Other Ingredients	Indications	Reference
1.	*Abhraka*	*Kshara Ashtaka*	None	*Mutraghata, Ashamari, Mutrakrucha*	R.T.10/56
2.	*Haratala*	*Navasadara*	None	*Vruchhika Dansha*	R.T.11/73
3.	*Manahshila*	*Yavakshara*	*Manjishtha, Haridra*	*Tvakadosha*	R.T.11/123
4.	*Sphatika*	*Tankana*	None	*Vicharchika*	R.T.11/187
5.	*Dugdhapashana*	*Yavakshara*	None	*Sidhma*	R.T.11/234
6.	*Shankha*	*Yavakshara*	*Trikatu*	*Gulma*	R.T.12/24
7.	*Shukti*	*Trikshara*	*Trikatu, Saindhava, Sauvarchala, Madhu*	*Plihavrudhi*	R.T.12/76
8.	*Vanga*	*Tankana*	None	*Gulma*	R.T.18/49
9.	*Swarnamakshika*	*Yavakshara*	None	*Mutrakruchha*	R.T.21/32
10.	*Kasisa*	*Tankana*	*Kumari*	*Rajorodhbhava Ruja*	R.T.21/244
11.	*Kasisa*	*Swarjikakshara*	None	*Raktasanjanan*	R.T.21/250

DISCUSSION

Rasatarangini is considered the last classical work of Rasashastra written in the modern period, holds a unique position in Ayurvedic literature. Organized into 24 *Tarangas* and 3,651 verses, this covers pharmacy setup, terminology, detailed methods, and therapeutic applications, making it a practical handbook. While it maintains the traditional structure and terminology of classical Ayurvedic texts, it also incorporates modern scientific observations and methodologies to some extent, serving as a vital bridge between ancient and contemporary approaches in Ayurvedic pharmaceutics.

Within Rasatarangini, a total of 13 *Ksharas* are described across two specific chapters. The *Ksharatrika Vigyaniyama Adhyaya* details 3 classical *Ksharas*, known as *Ksharatrika*, along with their 3 modern forms, such as *Nimbukamliya Kshara*. Additionally, the *Kshara Visheshadi Vigyaniyama Adhyaya* contains a total of 7 *Ksharas,* namely *Navasadara, Soraka, Apamargakshara, Tilakshara, Snuhikshara, Palashkshara* and *Chinchakshara*. A systematic classification of these 13 *Ksharas* includes both mineral-origin and herbal-origin types. Among them, three are derived from minerals-*Tankana* (borax), *Navasadara* (ammonium chloride), and *Soraka* (potassium nitrate) while the remaining seven are identified as plant-based. Notably, *Sarjikshara* (sodium carbonate) is attributed with the highest number of synonyms, sixteen in total. Other herbal *Ksharas* such as *Apamargakshara* (*Achyranthes aspera*), *Tilakshara* (*Sesamum indicum*), *Snuhikshara* (*Euphorbia nerifolia*), and *Palashkshara* (*Butea monosperma*) each carry at least documented synonyms. These are all compiled in the Rasatarangini, although not all of them are used across the text. (Table no. 1) These synonyms serve various interpretative purposes or significance in classical literature. (Table no. 6)

Table 6: Significance of Synonyms of *Kṣhara* with example

S.No.	Significance	Example		Discerption
		Name	Synonym	
1.	Intenseness	*Soraka Kshara*	*Vanhikshara*	This name reflects its strong alkaline properties and its vigorous action in various chemical and therapeutic applications
2.	Pharmaceutical	*Tankana*	*Kshararaja*	Highlighting its dominant role across various formulations and procedures
3.	Process-related utility	*Tankana*	*Swarna Shodhana*	point to its role in gold purification
4.	Nature of the substance	*Tila Kshara*	*Pavitra Kshara*	reflects its sanctity or purification properties

Rasatarangini describes a general method for preparing *Kshara* from trees and also presents six specific methods, including three modified techniques that show an advanced understanding of chemical interactions. The preparation process is governed by key parameters, most notably the ash-to-water ratio and sedimentation time. The ash-to-water ratio is fundamental because it influences the concentration of the final alkaline extract. The prescribed ash-to-water ratio for preparing *Kshara* varies significantly across Ayurvedic texts. For instance, Rasatarangini specifies a 1:4 ratio for *Kshara* from a *Kshara Vruksha*[6] and for *Yavakshara*[7], but a 1:8 ratio for *Swarjikakshara*[8]. While the Sushruta Samhita[15] suggests a 1:6 ratio, both the Sharangadhara Samhita[13] and Ayurveda Prakasha[14] recommend a 1:4 ratio. Following this trend of variation, other texts like the Ayurveda Sara Samgraha[13] mention a 1:8 ratio, and some, such as Rasatantrasara evam Siddha Prayoga Samgraha[17], recommend ratios as high as 1:16. This principle is significant, as a lower ratio yields a more concentrated extract and a higher ratio result in a milder solution. A unique variation found in the Astanga Hridaya[14] prescribes using water or *Gomutra* (cow urine), with the ash, suggesting this enhances extraction or adds specific properties. Equally important is the sedimentation time, which allows soluble components to dissolve and impurities to settle. This period varies widely, from just three hours according to Rasatarangini[6], to overnight as mentioned in Sharangadhara Samhita[13], and even up to two or three days as per Ayurveda Sara Samgraha[16]. Several texts, including Sushruta Samhita[15], Bhaishajya Ratnavali[22] and Chakradatta[19], do not explicitly specify a duration, implying that the process should simply continue until the liquid becomes clear, as a longer period generally yields a purer result. The choice of vessel for *Kshara* preparation is a deliberate decision based on chemical inertness, heat transfer properties, and traditional availability. Iron vessels are the most frequently recommended, cited in numerous key texts including the Sushruta Samhita[15], Astanga Hridaya[18], Chakradatta[19], and both the Ayurvedic Formulary of India[15] and Ayurvedic Pharmacopoeia of India[16]. Earthen pots are also commonly mentioned, particularly in the Sharangadhara Samhita[13], Ayurveda Prakasha[14] and Rasatantrasara evam Siddha Prayoga Samgraha[17], reflecting traditional practices where their non-reactive nature and steady heating properties are valued. The mention of mud pots or steel vessels in the Ayurveda Sara Samgraha[16] suggests a more modern inclusion or a broader acceptance of newer materials. While the historical preference for iron and earthen vessels demonstrates a long-standing understanding of their non-reactive properties for preventing contamination, nowadays, most research scholars use stainless steel vessels for this purpose. The number of folds in the cloth used for filtration directly impacts the fineness of the process and the effective removal of particulate matter. While many classical texts do not specify this detail, some provide precise instructions. For instance, Rasatarangini[6] calls for a three-fold cloth, whereas the Ayurveda Sara Samgraha[16] recommends using a four-fold cloth. The absence of specific mentions in other texts might imply that the number of folds was a standard or implicit practice understood by all practitioners. Alternatively, it could suggest that the emphasis in those traditions was placed more on the number of times the liquid was filtered rather than the specific fold count of the cloth. Regardless, the principle stands that a higher number of folds creates a finer filter, resulting in a clearer and purer final liquid. Perhaps the most significant variation found across different Ayurvedic texts is the stringency of the filtration process. This factor, determined by the number of times the liquid is filtered, is a crucial determinant of the final purity of *Kshara*. Some sources, including the Astangahridaya[18], Chakradatta[19], and Bhaishajya Ratnavali[17], specify only a single filtration. In sharp contrast, other traditions emphasize a much more rigorous, multi-stage approach to achieve exceptional purity. Notably, the Sushruta Samhita[15] and the Rasatantrasara evam Siddha Prayoga Samgraha[17] recommend filtering the liquid 21 times, suggesting a high standard for achieving a specific potency or fineness. The Ayurveda Sara Samgraha[16] sits between these extremes, recommending seven filtration cycles. The Ayurvedic Pharmacopoeia of India[21] and the Ayurvedic Formulary of India[20] provide a more practical, outcome-based guideline: to filter the liquid two to three times, or simply until it becomes clear. This approach indicates that achieving visual clarity, rather than adhering to a fixed number, is the ultimate goal. This wide variation in methodology highlights the different levels of purity desired by various traditions and likely reflects the differing efficacy of the filtration materials they employed.

Table 7: Details of different methods of *Kshara* preparation mentioned in Rasatarangini

S.No.	Preparation Name	Dissolution Ratio	Sedimentation Duration	Fold of Cloth	Vessel	Filtration Method
1.	*Kshara* from *Kshara Vruksha* (Tree)	1:4 (Ash: water)	3 hours	Three-folded cotton cloth	-	-
2.	*Yavakshara*	1:4 (Ash: water)	Overnight	-	-	Filtered 7 times
3.	*Swarjikakshara*	1:8 (Ash: water)	Until clear	Seven-layered cotton cloth	-	-
4.	*Nimbukamliya Yavakshara*	(1:1) (*Yavakshara*: Water)	-	-	Glass vessel; Coated (enameled) glass vessel	-
5.	*Nimbukamliya Sarjikakshara*	*Sarjikakshara*: Water (1:2)	-	-	Glass vessel	-
6.	*Tankanaamla*	*Tankana*: hot water (for solution); *Tankanamla*: hot water (1:3 for purification)	-	-	Glass vessel	-
7.	*Soraka Dravaka*	-	-	-	Glass bottle (reaction); Glass bottle in cold water (condenser)	-

Preparations such as *Nimbukamliya Yavakshara* and *Swarjikakshara* utilize acid-base reactions to enhance therapeutic efficacy, possibly altering the pharmacokinetics and pharmacodynamics of the formulation. The incorporation of *Nimbukamla* (citric acid) in formulations reflects an insightful grasp of acid catalysis and pH modulation. Likewise, preparations like *Tankanaamla* and *Soraka Dravaka* showcase processes such as controlled precipitation and distillation, resonating with modern pharmaceutical techniques. These examples emphasize a systematic and refined approach to drug preparation and efficacy enhancement.

According to Rasatarangini, *Ksharas* possess distinct pharmacological attributes that define their therapeutic action. They are described as *Laghu* (light), *Snigdha* (unctuous), *Tikshna* (sharp), *Ushna* (hot), *Sukshma* (subtle), and *Saraka* (laxative). Additionally, they function as powerful digestive agents, with both *Dipana* (digestive stimulant) and *Pachana* (digestive) properties. This combination of qualities aligns *Ksharas* predominantly with the alleviation of *Vata* and *Kapha* doshas, making them well-suited for internal administration. The classical dosage varies depending on the specific *Kshara*, the patient's condition, and the formulation. The typical therapeutic range extends from a lower dose of 2 *Gunja* (250mg) for *Soraka*, to a higher dose of 12 *Gunja* (1.25 g) for *Swarjikakshara*.

According to the text Rasatarangini, *Kshara* holds a central role in the diverse pharmaceutical processes of Rasashastra. It is integral to crucial procedures such as *Parada Shodhana* (purification of mercury), *Parada Samskara* (special processing of mercury), and *Abhraka Satvapatana* (extraction of mica essence) (Table No. 3). *Kshara* plays a multifaceted and crucial role across various pharmaceutical procedures in Rasashastra, enhancing the efficacy and enabling the transformation of medicinal substances. In the process of *Shodhana* (purification), *Kshara's* strong alkaline properties are leveraged to detoxify and purify metals and minerals such as *Parada* (mercury), *Gandhaka* (sulphur), and *Tamra* (copper). During *Marana* (incineration), it facilitates the breakdown of metals into their *Bhasma* form and enhances the activity of the levigating liquid (*Bhavana Dravya*), as seen in the preparation of *Abhraka Bhasma*. For *Bhavana* and *Mardana* (levigation and trituration), alkaline water (*Ksharajala*) serves as an effective medium, improving the drug's overall potency and bioavailability. In fusion and melting processes, specific *Ksharas* like *Tankana* (borax) are used to reduce the melting point of substances, ensuring uniform fusion, a critical step in preparing compounds like *Rasa Sindura*. Furthermore, in *Kupipakva Rasayana* preparations, *Kshara* acts as a *Yogavahi* (catalytic agent), facilitating chemical

transformations that are not possible using only herbal ingredients. Finally, in the process of *Jarana*, *Kshara* aids in reducing the particle size of materials, preparing them for further processing and assimilation. Out of the total formulations documented in Rasatarangini, 18 formulations incorporate *Kshara*. Among these, *Tankana* emerges as the most frequently used, followed by *Yavakshara* and *Swarjikakshara*. The proportion of *Kshara* in these formulations spans from 0.43% to 50%. (Table No. 4)

Therapeutically, *Kshara*-based formulations described in Rasatarangini are primarily indicated for a range of conditions, with a significant focus on disorders involving obstruction, inflammation, and metabolic imbalance. Among these, *Gulma* (abdominal tumors or palpable masses) is the most frequently addressed condition, with a total of 11 formulations indicated for its management. This is followed by *Drushta Vrana* (infected or chronic wounds), for which 7 formulations are prescribed, highlighting *Kshara's* wound-cleansing and antimicrobial properties. Additionally, *Mutrakruchha* (dysuria or painful urination) and *Pliha* (splenic disorders) each have 6 formulations associated with their treatment, reflecting *Kshara's* efficacy in conditions involving the urinary and hepatosplenic systems. (Table no. 6) *Kshara's* probable mode of action is highly specific. In the treatment of *Gulma* (abdominal lump), which primarily involves *Vata, Kapha*, and *Ama*, *Kshara* utilizes its *Lekhana* (scraping) property to dissolve growths, while its *Pachana* (digestive) and *Bhedana* (breaking up) actions break down toxins and hardened masses. To prevent recurrence, it also works by clearing the bodily channels (*Sroto-Vishodhana*) and stimulating the digestive fire (*Agni Deepana*). When addressing *Drushta Vrana* (infected/chronic wounds), its role shifts to that of a powerful healing agent. Here, it performs *Shodhana* (cleansing) to debride dead tissue, acts as a *Krimighna* (antimicrobial) to fight infection, and uses a controlled *Dahana* (caustic) action to cauterize unhealthy tissue, which is then followed by *Ropana* (healing) and *Shoshana* (drying) actions to promote recovery. In the context of *Mutrakruchha* (Painful Urination), *Kshara's Mutrala* (diuretic) and *Ashmari Bhedana* (stone-breaking) properties are key. Its natural anti-inflammatory and alkalizing effects soothe the urinary tract, normalize pH, and clear *Kapha*-related obstructions. Finally, in managing *Pliha* (Splenic Disorders), its *Lekhana* (reducing) quality helps resolve organ enlargement. It also acts as a *Dipana-Pachana* (digestive and metabolic enhancer) and performs *Sroto-Vishodhana* (channel clearing) to pacify the doshas responsible for stagnation and restore proper function. Overall, *Kshara* demonstrates a broad spectrum of action, primarily targeting the digestive, renal, and hepatic systems, thereby supporting its role in managing disorders related to metabolism, elimination, and detoxification. (Table No. 10).

Table 10: *Kshara* having indications for various diseases

S.No.	System	Indication	No. of repeats
1.	Digestive system	*Udara Shula* (Abdominal pain)	04
		Adhamana (Abdominal distention)	04
		Kanthamaya (Throat Disorders)	02
		Amlapitta (Dyspepsia)	01
		Hrudamayan (Cardiac Disorder)	02
		Udara (Ascites)	03
		Anaha (Abdominal distention)	01
		Gulma (Abdominal lump)	11
		Krumi (worms)	03
		Atisara (Diarrhoea)	01
		Jwara (Fever)	02
		Ajirna (Indigation)	03
		Agnimandya (Weak digestion)	03
		Arsha (Hemorrhoid)	01
2.	Circulatory system	*Pandu* (Anemia)	01
3.	Auditory system	*Badhirya* (Deafness)	02
4.	Optic system	*Netraroga* (Eye diseases)	02
5.	Renal system	*Mutrakruchha* (Dysuria)	06

		Prameha (Urinary disorders)	02
		Ashmari (Calculus)	04
5.	Respiratory system	*Shwasa* (Dyspnea)	04
		Kasa (Cough)	04
6.	Integumentary system	*Switra* (Vitiligo)	01
		Pama (Scabies)	01
		Sidma	01
		Vicharchika (Eczema)	01
		Drushta Vrana (Infected wound)	07
7.	Hepatic system	*Yakrutavrudhi* (Hepatomegaly)	01
		Pliha (Spleen disease)	06
8.	Reproductive system	*Mudhagarbha* (non-viable pregnancy)	01
9.	Visual system	*Netraroga* (Eye diseases)	02
10.	Lymphatic system	*Shotha* (Edema)	02

CONCLUSION

The meticulous classification, synonyms, innovative processing techniques, and versatile therapeutic applications of *Ksharas* in Rasatarangini highlight the sophistication of Ayurvedic pharmaceutics. The text serves not only as a compendium of traditional formulations but also reflects a proto-scientific understanding of pharmaceutical chemistry. *Ksharas*, particularly mineral-derived ones like *Tankana*, remain crucial in Ayurvedic formulations for their role in both internal administration and complex pharmaceutical procedures, bridging ancient knowledge with modern relevance.

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