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Research Article

### NEED OF AYURVEDIC ALKALIZER (ANTAH-PARIMARJANA KSHARA) IN PRESENT TIME: AN EXPERIMENTAL STUDY

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#### ABSTRACT

*Ayurveda*, the science of life covers a wide range of subjects and issues of living beings in relation to total approaches of individual development and health care. Different *Ayurvedic* literature preaches wide and in depth knowledge of ideal living including promotive, preventive and curative aspect of health sciences. It is observed that in modern time many of diseases are arises due to human body's internal environment become acidic because of major dietetic change with modern civilization. This results in the origin of many new diseases. This problem is seriously discussed by acharyas in ancient time and concept of antah-parimarjana kshara is described for the neutralization of acids to prevent its consequences.

**Keywords:** Antah-parimarjana kshara, Alkalizer, Ksharatantravid, Ksharodaka, Ayurveda Samhita.

#### INTRODUCTION

Acid-base balance in the body is very important for positive health. In the beginning of creation, life evolved in ocean environment, and even today human body's internal environment remains in alkaline ranges of 7.35-7.45<sup>1</sup>. Our enzymatic, immunological and repairing mechanism functions their best in an alkaline environment.

The pH and net acid load in the human diet, has been considerable change from the hunter-gather civilization to the present<sup>2</sup>. Gradually with the agricultural revolution and even more recently with marked industrial revolution, there has been decrease in potassium (K) content compared to sodium (Na) found in the diet<sup>3</sup>. The ratio of potassium to sodium content in the diet has been reversed as K/Na ratio, previously was 10 to 1 where as in the modern (western) diet ratio of K/Na is 1 to 3<sup>4</sup>.

Today's the diet of humans is poor in magnesium and potassium as well as fiber and rich in saturated fat, simple sugar, sodium, and chloride as compared to the pre-agricultural period<sup>5</sup>. These resultants of dietetic changes induce metabolic acidosis<sup>6</sup>. This type of diet is mismatched to the genetically determined nutritional requirements<sup>7</sup>. The acidic condition in human body leads to several adverse effects on cell metabolism; including impaired energy production, fluid accumulation (edema) and increases in free

radical production. Consequently it leads to a series of health problems including loss of bone mineral, loss of muscle mass, a reduction in growth hormone and the development of kidney stone<sup>8</sup>.

All the three major *samhitas* have elaborately discussed about the use of *kshara* in diet and medicine. The use of *kshara* is described for both external and internal procedures in the treatment. In ancient India use of *kshara* was prevails as a secondary science supporting medical/surgical schools. *Caraka-samhita* has narrated that in ancient India there were especially skilled professionals known as ksharatantravid<sup>9</sup> (expert of external and internal application of *kshara*). These skilled professional have expertise knowledge in preparations and administrations of *kshara both* internally and externally. Different type of preparations of *kshara* has been explained in classical text to use as combined or single recipes<sup>10</sup> in different diseases both externally and internally<sup>11</sup>.

#### MATERIALS AND METHODS

For validation of principles of *Antah-parimarjana Kshara* available in *Ayurved samhitas* on the modern scientific parameter after review of literatures, present experimental works is grossly divided into 4 parts.

**PART 1:- Collection and authentication of crude *kshara* drugs:-** Following plant originated substances are used for preparation of *kshara*

1. *Kadali (Musa paradisiaca)* - Whole Banana plants (except flower, fruit and rhizome), collected from BHU Campus, Varanasi.
2. *Narikale (Cocos nucifera)* - Husk of fruit of Coconut (exocarp and mesocarp) taken, collected from Nariyal Bajar Dalmandi, Varanasi.
3. *Til nal (Sesamum indicum)*- Whole white variety of sesam plant (except root, flower and fruit) taken, collected from a farmer of Varanasi district.
4. *Palasha (Butea monosperma)* - Leafs, flowers, stem, and root bark of red variety of palasha are taken, collected from the forest of Vindhyanchal mountain region of Mirzapur district, Uttar Pradesh.

These plant materials are collected and authenticated by consulting the senior teachers of *Dravyaguna* department, faculty of Ayurveda, IMS, BHU, Varanasi.

#### Following traditionally prepared (*kshara*) plant ashes are collected from Assam

*Kadali (Musa paradisiaca)*- Whole Banana plants (except flower, fruit and rhizome) ash was collected from Nalbari district of Assam.

*Mati kalay* (may be *Vinga mungo*) – Whole harvested black gram plant (except root, flower and seeds) ash and prepared *ksharodaka* were collected from the tribes of Kokrajhar district of Assam.

*Sarson or sarshpa (Brassica juncea)* – Whole harvested yellow variety of Mustard plant (except root, flower and seeds) ash and *ksharodaka* were collected from the tribes Kokrajhar district of Assam.

#### PART 2:- Preparation of antah-parimarjana *kshara*:-

After proper collection of above plant materials are dried for preparation of plant ashes, the plant materials are burnt out as soon as possible to avoid further contamination and degradation by insects, fungus etc. Plant ashes are prepared as per guidelines of *Ayurved samhitas*.

- ✓ Each and every plant materials are burn separately in a windless place i.e. by using the tin drum.
- ✓ When the fire is extinguished the dried plant material are burn putting in less quantity continuously in slow rate for proper combustion of previous bolus, till total material of a single plant burned.
- ✓ These burned materials are allowed for self cooling on room temperature.
- ✓ Then ash are removed from drum and stored in earthen pot with air tight lid.
- ✓ Ashes are mixed with six time distilled water in glass conical flask and allowed to settle down for about 1-2 hours.
- ✓ Finally the supernatant fluid is collected in a separates glass container.
- ✓ The collected fluid are filtered drop by drop through a Whatman's Filter Paper into a clean glass bottle, this filtrate are *ksharodaka* (i.e. *Paniya Kshara* =Alkaline water) used as *antah-parimarjana* and after measuring this was stored in air tight bottle for further assessment. (unboiled *ksharodaka*)
- ✓ In second opinion (described by Dalhan), this *ksharodak* was reduced through boiled at mild heat up to 3/4<sup>th</sup> volume of initial volume (Boiled *ksharodaka* = Sterilized alkaline water), then the final solution was stored in air tight glass container.

- ✓ The residual ashes are again mixed with four times of water and the same procedure is repeated at least 2-4 times in order to take away all the alkaline material from ashes.
- ✓ Ultimately the ashes remained as a neutral residue which should be thrown.
- ✓ The collected fluid is then filtered drop by drop through a double Whatman's Filter Paper into a clean glass bottle.
- ✓ This filtrate was measured and boiled at mild heat (about 40-70 degree centigrade) with slowly stirring by glass rod for preparation of **powder of *Kshara*** for *antah-parimarjana* formulation.
- ✓ This *Kshara* powder was measured and stored in air tight glass container after self cooling at room temperature.
- ✓ This above procedure was applied for all plant material separately and resultant *ksharodaka* and *kshara* powder of each and every plant material stored in separate air tight glass container.
- ✓ Same procedure was also applied for obtained traditionally prepared plant ash samples from Assam.

#### PART 3:- PHYSICAL PROPERTIES OF *KSHARA* AND *KSHARODAKA*.

##### A: Orgenoleptic study of different samples of *kshara* and *ksharodaka*

*Rupa* (Color), *Rasa* (Taste), *Gandha* (Odour), *Sparsha* (Touch) - Manual assessment by 3 – 4 healthy persons.

##### B: pH Measurement of different samples of *Ksharodak*.

The pH of *Ksharodaka* was measured by “Systronics pH System 361” After calibration through the provided Buffer solutions. Measurement was done in the following ways –

- ✓ First of all calibrated pH meter glass electrode and temperature electrode are washed by distilled water and swiped by tissue paper for removing extra water from electrodes.
- ✓ That pH meter was kept in turned on mode.
- ✓ Sample solution (*Ksharodaka*) was taken to test pH at about 25°C by putting electrodes in the solution.
- ✓ After putting electrodes (both temperature and pH electrode) in the solution, pH of solution recorded.
- ✓ This method was used for all the first filtered solution (*Ksharodaka*) and required prepared solution of *Kshara*.

##### C: Specific gravity of different samples of *Ksharodak*

Specific gravity of *Ksharodaka* was measured with the help of specific gravity bottle (Pycnometer).

#### PART 4:- XRF (X-ray florescence spectrometer) STUDY OF DIFFERENT SAMPLES OF *KSHARA*

This study was conducted with the help of Department of Chemical Engineering, IIT, BHU, Varanasi. This study was mainly done for the analysis of Inorganic composition of *Kshara* powder (except hydrogen, carbon, nitrogen, oxygen). This was done in following ways –

- ✓ Every *kshara* powder was prepared from boiling of its corresponding *Ksharodaka*, round pellet was prepared then inserted in XRF machine for analysis of inorganic composition of each and every *kshara* samples.
- ✓ Composition of samples data was collected from XRF result display through print device.

**OBSERVATION AND RESULTS****A: Orgenoleptic properties of different samples of *kshara* powder****PHYSICAL PROPERTIES OF *KSHARA* AND *KSHARODAKA*:-****Table 1: Orgenoleptic properties of different samples of *kshara* powder**

Sr. No.	Name of <i>kshara</i>	Rupa (Colour)	Rasa (Taste)	Gandha (Odour)	Sparsha (Touch)
1.	<i>Assam kadali k.</i>	Chocolate brown	Specific taste with salty-pungent predominance.	Mild specific odour with no clear-cut differentiability	Dry powder having feathery sensation and finger feels smoothness.
2.	<i>BHU kadali k.</i>	Dirty white	Specific taste with predominance of pungent -bitterness.	Mild specific odour with no clear-cut differentiability	Dry powder having feathery sensation and finger feels smoothness.
3.	<i>Tilnal k.</i>	Creamy white	Specific taste with salty-bitterness predominance	Mild specific odour with no clear-cut differentiability	Dry powder having gritty sensation and finger feels smoothness.
4.	<i>Narikale k.</i>	Pure white	Specific taste with predominance of salty bitterness	Mild specific odor with no clear-cut differentiability	Dry powder having gritty sensation and finger feels smoothness.
5.	<i>Palasha k.</i>	Dark brown	Specific taste with salty-bitterness.	Mild specific odor with no clear-cut differentiability	Dry powder having feathery sensation and finger feels smoothness.
6.	<i>Matikalaya (Masha)k.</i>	Mica brown (light brown)	Specific taste with light salty pungent.	Mild specific odor with no clear-cut differentiability	Dry powder having gritty sensation and finger feels smoothness.

**Different *Kshara* powder samples****Fig.1** *Assam kadali kshara***Fig. 2** *BHU kadali***Fig. 3** *Tilnal kshara kshara*



Fig. 4 Matikalay kshara



Fig. 5 Palasha kshara



Fig. 6 Narikale kshara

Orgenoleptic properties of different samples of *ksharodaka*Table 2: Orgenoleptic properties of different samples of *ksharodaka*

Sr.No.	Name of <i>ksharodaka</i>	<i>Rupa</i> (Colour)	<i>Rasa</i> (Taste)	<i>Gandha</i> (Odour)	<i>Sparsha</i> (Touch)
1.	<i>Assam kadali ksharodaka</i>	Light straw colour	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess
2.	<i>BHU kadali ksharodaka</i>	Very light yellow	Specific taste with salt-pungent predominance	Mild specific odor with no clear-cut differentiability	Mild sliminess
3.	<i>Tilnal ksharodaka</i>	Very light yellowish white	Specific taste with pungent –salty predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess
4.	<i>Palasha ksharodaka</i>	Light brown	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess
5.	<i>Narikale ksharodaka</i>	Colourless saline water like with slight turbidity.	Specific taste with salty-pungent predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess
6.	<i>Matikalaya ksharodaka</i>	Blackish brown	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess
7.	<i>Sarson (Sarshapa) ksharodaka</i>	Light straw color (Pale yellow)	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild sliminess

Orgenoleptic properties of different samples of Boiled (Reduced to 3/4<sup>th</sup> volume) *ksharodaka*:-Table 3: Orgenoleptic properties of different samples of Boiled (Reduced to 3/4<sup>th</sup> volume) *ksharodaka*

Sr.N.	Name of Boiled <i>ksharodaka</i>	<i>Rupa</i> (Colour)	<i>Rasa</i> (Taste)	<i>Gandha</i> (Odour)	<i>Sparsha</i> (Touch)
1.	<i>Assam boiled kadali ksharodaka</i>	Straw colour (slight darker than un-boiled)	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild slimy
2.	<i>BHU boiled kadali ksharodaka</i>	Very light yellow (slight darker than un-boiled)	Specific taste with salt-pungent predominance	Mild specific odour with no clear-cut differentiability	Mild slimy
3.	<i>Boiled tilnal ksharodaka</i>	Very light yellow (slight darker than un-boiled)	Specific taste with pungent –bitter predominance	Mild specific odour with no clear-cut differentiability	Mild slimy
4.	<i>Boiled palasha ksharodaka</i>	Light brown (slight darker than un-boiled)	Specific taste with pungent predominance	Mild specific odour with no clear-cut differentiability	Mild slimy
5.	<i>Boiled Narikale ksharodaka</i>	Slight turbid white.	Specific taste with salty-pungent predominance	Mild specific odour with no clear-cut differentiability	Mild slimy

Different *ksharodaka* and boiled *ksharodaka* samples:-



**Fig. 7** From left to right- (i)Boiled tilnal *ksharodaka*,(ii)Tilnal *ksharodaka*, (iii) Assam kadali *ksharodaka*,(iv) Boiled assam kadali *ksharodaka*,(v) BHU kadali *ksharodaka*, (vi) Boiled BHU kadali *ksharodaka* (vii) Boiled narikale *ksharodaka*, (viii) Narikale *ksharodaka*,(ix) Palasha *ksharodaka*, (x) Boiled palasha *ksharodaka*.

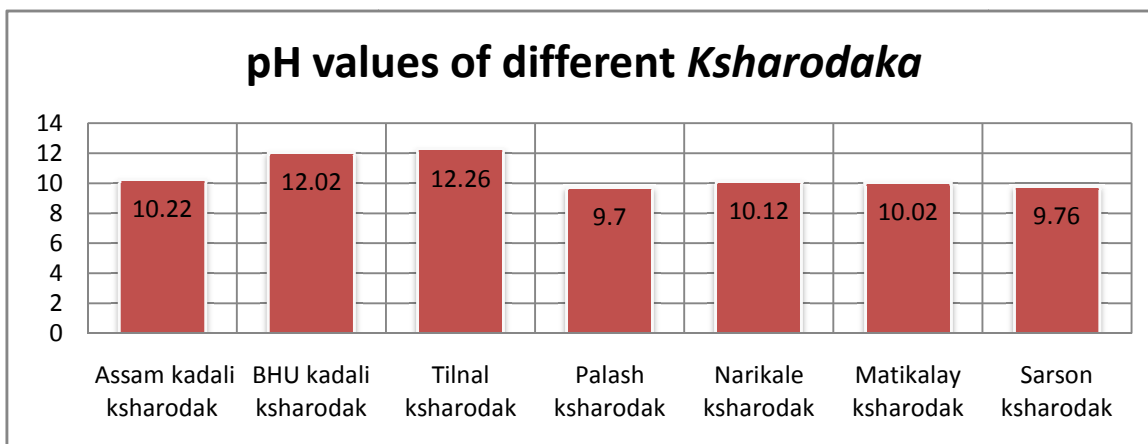


*Matikalay ksharodaka*

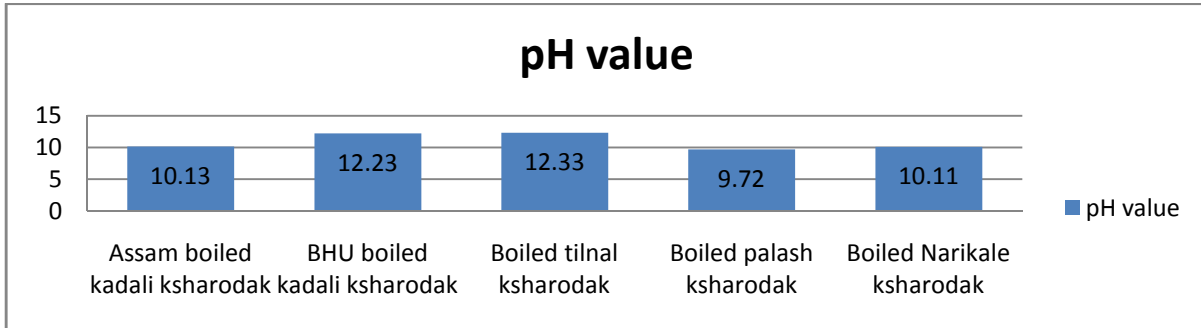
*Sarson ksharodaka*

**Fig.8** Traditionally prepared, **Fig. 9** lab prepared **Fig. 10** Traditionally prepared , **Fig. 11** lab prepared

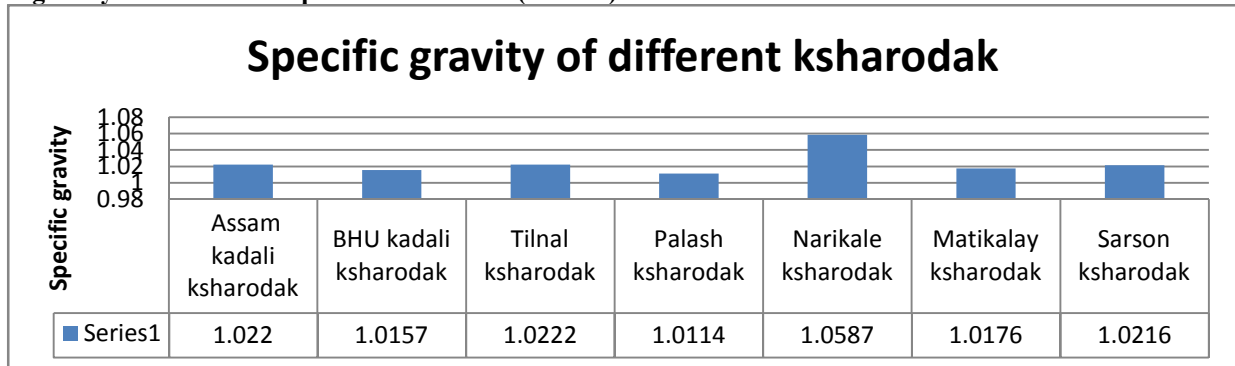
**B: pH values of different samples of *ksharodaka* (at 25 °c):-**  
Bar chart No.1



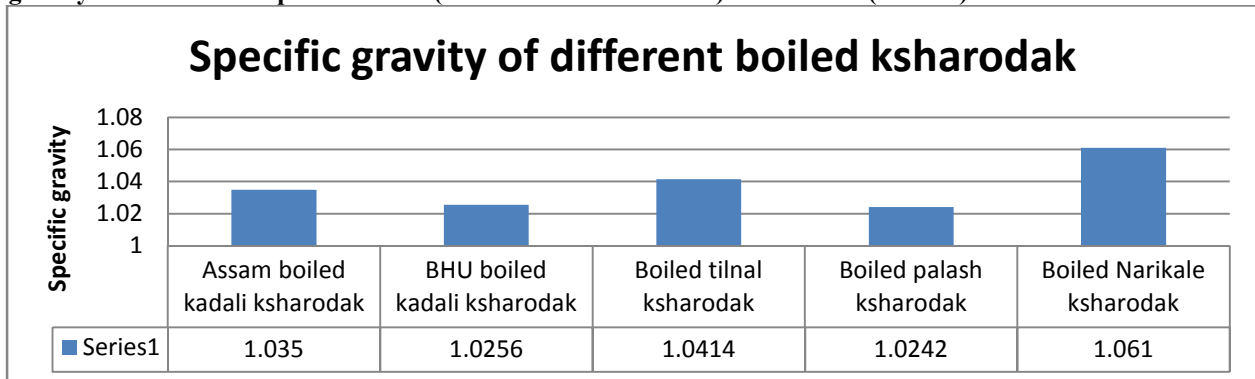
pH values of different samples of boiled (Reduced to 3/4<sup>th</sup> volume) *ksharodaka* (at 25 °c):-  
Bar chart No.2



C: Specific gravity of different samples of *ksharodaka* (at 25 °c):-Bar chart No.3



Specific gravity of different samples of boiled (Reduced to 3/4<sup>th</sup> volume) *ksharodaka* (at 25 °c):-Bar chart No.4



Potassium and sodium comparison of different *kshara*:- Bar chart No.5

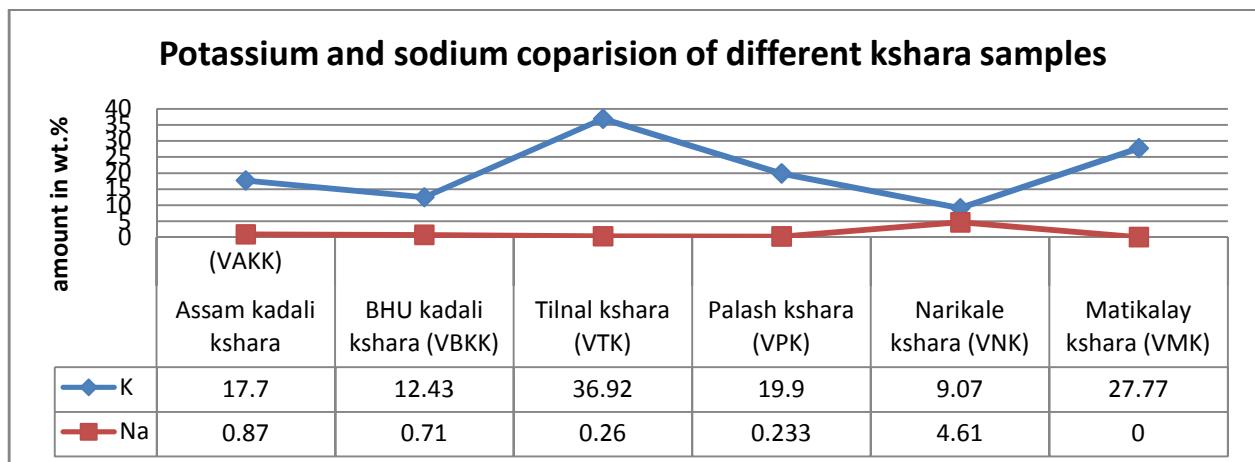


Table 4: XRF STUDY OF DIFFERENT SAMPLES OF KSHARA

Sr.N.	Elements	Assam kadali kshara (VAKK)	BHU kadali kshara (VBKK)	Tilnal kshara (VTK)	Palasha kshara (VPK)	Narikale kshara (VNK)	Matikalay kshara (VMK)
1	K	17.7	12.43	36.92	19.9	9.07	27.77
2	Na	0.87	0.71	0.26	0.233	4.61	0
3	Ca	0.057	0.085	0	0.099	0.042	0.09
4	Mg	0	0.546	0	4.6	0	3.05
5	Px	2.13	0.463	0.383	0.755	1.02	0.478
6	Cu	0.134	0.121	0.25	0.154	0.155	0.198
7	Ag	0.407	0.092	1.22	0.33	0.203	0.381
8	Fe	0.184	0.576	0.054	0.056	0.0486	0.0317
9	Cl	59.1	75.36	30.92	12.45	77.09	15.76
10	Sx	9.51	2.44	24.51	56.05	1.81	44.34
11	Si	1.74	2.52	1.35	1.14	1.54	0.365
12	Cd	4.08	2.41	0	0	0	3.8
13	Br	0.049	0.435	0.922	2.63	0.804	0.338
14	Rb	1.25	0.407	2.06	1.09	0.811	2.16
15	Al	1.36	0.386	0	0	0.089	0
16	Ar	0.66	0.364	0.409	0	0.437	0.571
17	W	0.409	0.271	0.346	0.202	0.233	0.162
18	Ni	0.146	0.11	0.125	0.112	0.0636	0.095
19	Y	0	0.0157	0.072	0.0539	0.022	0.0537
20	Yb	0	0.089	0	0	0.051	0.076
21	Sr	0	0	0.022	0.0349	0	0
22	I	0	0	0	0	0	0.225
23	Mo	0	0	0	0.112	0	0
24	Cr	0	0.028	0	0	0	0
25	Zr	0	0.189	0	0	0	0
26	Nb	0	0.0167	0	0	0	0
27	Gd	0	0	0	0	0	0.062
28	Tm	0	0	0.086	0	0	0
29	Tn	0	0	0.078	0	0	0
30	Eu	0	0	0	0	0.037	0
31	Dy	0	0.1	0	0	0	0

## DISCUSSION

On the basis of above results and observations, the internal applicable (antah-parimarjana) kshara is used as Ayurvedic alkalizer. As we know that many diseases and its consequences are arise due to lack of dietary alkalizing minerals and further acid enhancing modern dietetic consumption enhance the body acidic stress leads production of free radicals, auto-immune disorders and micro-nutrient deficiency. For the prevention of these condition Kshara can be used, as kshara are rich source of potassium salts.

In today's societies the case of musculo-skeleton disorder like osteoporosis, osteomalacia and muscular dystrophy and weakness are growing very fast these are mainly due to increase body acidic environment, which also cross the body harmonizing limits. Other complication of free radical damage are increasing day by day, so it produces many oxidative changes like production of auto-immune disorder, endocrine hormonal disturbances (decreases level of growth hormone, thyroid hormone, insulin hormone etc) and even

production of cancer. Ultimately these problem have only one solution that is the way of body fluid alkalization which can be done by use of antah-parimarjana kshara. This is discussed from ancient time and also is in practice in some tribes of north-eastern subcontinent of India in present time. So all the above kshara having the pH near about 9-12, are also used in traditional diet in north-estern subcontinent of India with dietetic items like with vegetable and kadhi etc. Boiled ksharodaka are not having so much different property with unboiled ksharodaka means it may be the method of sterilization in ancient time i.e. boiling upto  $\frac{3}{4}$  th volume.

## CONCLUSION

Kshara can be used as Ayurvedic alkalizer to maintain acid-base homeostasis of the body in present time as all the ksharas are rich source of potassium salts which is the best alkalizer. All the ksharas shows similar properties as the properties of traditional kshara used in Assam. So it can be used in present modern societies to prevent all above described health condition.

## REFERENCES

1. Waugh A, Grant A. Anatomy and Physiology in Health and Illness. 10th edition. Philadelphia, Pa, USA: Churchill Livingstone Elsevier; 2007.
2. Strohle A, Hahn A, Sebastian A. Estimation of the diet-dependent net acid load in 229 worldwide historically studied hunter-gatherer societies. American Journal of Clinical Nutrition. 2010; 91(2):406–412.
3. Sebastian A, Frassetto LA, Sellmeyer DE, Merriam RL, Morris RC., Jr. Estimation of the net acid load of the diet of ancestral preagricultural Homo sapiens and their hominid ancestors. American Journal of Clinical Nutrition. 2002;76(6):1308–1316.
4. Frassetto L, Morris, Jr. R.C. RC, Jr., Sellmeyer DE, Todd K, Sebastian A. Diet, evolution and aging—the pathophysiologic effects of the post-agricultural inversion of the potassium-to-sodium and base-to-chloride ratios in the human diet. European Journal of Nutrition. 2001; 40(5):200–213.
5. Sebastian A, Frassetto LA, Sellmeyer DE, Merriam RL, Morris RC., Jr. Estimation of the net acid load of the diet of ancestral preagricultural Homo sapiens and their hominid ancestors. American Journal of Clinical Nutrition. 2002;76(6):1308–1316.
6. Schwalfenberg GK. The Alkaline Diet: Is There Evidence That an Alkaline pH Diet Benefits Health?
7. Journal of Environmental and Public Health. 2012; Article ID 727630:7 pages. doi:10.1155/2012/727630
8. Konner M, Boyd Eaton S. Paleolithic nutrition: twenty-five years later. Nutrition in Clinical Practice. 2010;25(6):594–602.
9. <http://www.betterbones.com/alkalinebalance/> (Last accessed 10-12-2013)
10. Kashi Nath Shastri and Gorakha Nath Chaturvedi, Vidyotini Hindi Commentary on Caraka Samhita, Chaukhambha Bharti Academy, Varanasi, Reprint-2004. Gulmachikitsa verse no. 63
11. K. R. Shrikantha Murthy, English translation of Astanga Hridaya, Krishanadas Academy, Varanasi, 2<sup>nd</sup> Edition -1997. Mutrakriccha chikitsa verse no. 14.

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