PRELIMINARY PHYSICO-CHEMICAL PROFILE OF *CHINCHA KSHARA*

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Abstract: ***Introduction:*** *Kshara* (alkali) is a unique kind of Ayurvedic dosage form, known for its hot, piercing and scraping nature. *Chincha kshara* is one such *kshara* preparation, prepared from the plant *Tamarindus indica* Linn., and is indicated in *Agnimandya* (poor digestive power), *Shula* (abdominal pain), *Gulma* (abdominal lump), *Mutrakrucchra* (*dysuria*), and *Ashmari* (renal calculi) etc. The study was aimed for the preparation of three batches of *Chincha Kshara* and their preliminary physico-chemical analyses. **Materials and methods:** The preparation of *Chincha Kshara* was done by burning the wood of *Tamarindus indica* Linn. and dissolving the ash in potable water followed by filtration of dissolved ash to obtain clear fitrate, which later was concentrated by heating to get the *Kshara*. The drug was analysed for physico-chemical parameters including elemental analysis by Energy Dispersive X- ray Analsis (EDAX). ***Results:*** There was 0.63% of yield of *Kshara* with respect to wood and 17.36% with respect to ash used. In physicochemical analysis, there was an average of 3.23% of loss on drying, 75.13% of total ash, and 0.39% of acid insoluble ash and an average pH was 10.2 showing it as strong alkaline. The elemental analysis revealed that it mainly contains oxygen, sodium, and magnesium. ***Conclusion:*** *Chincha Kshara* is an inorganic compund containing more of oxygen, sodium, magnesium and chorine with the lesser amount of silicon, sulphur, potassium and calcium.The yield *Kshara* with respect to the wood used is very minimal, even lesser than one percent and with respect to ash is less than twenty percent.

Key words: Alkali, *Chincha*, EDAX analysis, *Kshara*, Magnesium, Sodium, Tamarind

INTRODUCTION

Kshara (Alkali) is a unique kind of Ayurvedic dosage form, known for its hot, piercing and scraping nature. *Kshara lepa* (application of alkalies) and ligature with *Kshara sutra* (thread smeared with alkali) in haemorrhoids, fistula in ano and sinuses are one of the most acredited therapeutic procudures in Ayurveda. *Kshara* is prepared by concentration of water soluble contents of ash. There are various plants mentioned in Ayurveda, which are considered to be rich in *Kshara* property. Certain alkaline substances are grouped together and named after the number of alkalis like *Ksharadvaya, Ksharatraya, Kshara chatushka, Kshara panchaka, Kshara shatka* and *Ksharasthtaka* etc. which include two, three, four, five, six and eight alkaline substances respectively. *Chincha* (*Tamarindus indica* Linn.) is one of the drugs which are included in the group *Ksharasthtaka* (eight alkalis).[1] *Chincha kshara* is an independent medicine, and is also used as an ingredient in formulations such as *Shankha Vati*,[2] *Mahashankha Vati*,[3] *Agni sandeepano Rasa*,[4] *Gudapippali*,[5] *Bhruhat Gudapippali*,[6] and *Shankha dravaka rasa* [7] etc. *Rasashastra* text '*Rasa Tarangini'* advocates *Kashtha* (wood) as the usable part for the preparation of *Kshara*.[8] *Chincha kshara* subsides *Agnimandhya* effectively and is indicated in *Shula, Gulma, Mutrakrucchra*, and *Ashmari*. Various kinds of therapeutic administrations have also been mentioned in texts. In *Visuchika, Shula, Agnimandhya, Ajeerna, Gulma; Chincha Kshara* is to be taken along with purified *Tankana* (borax), and *Shankha bhasma*

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(calx of counch shell). In *Grahani ruja*, *Aruchi* (*distaste*), *Udara Shula* (Abdominal pain), *Adhmana* (distention of abdomen), *Vishtabdajeerna* (indigestion associated with constipation); it should be taken along with *Pancha lavana*, and *Trikatu* (dry ginger, long pepper and black pepper). In *Aruchi*, it should be mixed along with *Draksha* (*Vitis vinifera Linn.*), and sugar and it should be licked. In *Agnimandhya*, *Vatajeerna*, it is to be taken with *Trikatu*. In *Balatisara*, it should be taken with *Maricha* (*Piper nigrum*) *churna* and *Shankha bhasma*.[9]

MATERIALS AND METHODS

Materials

The dried stem of *Tamarindus indica* Linn. was collected from Udupi, Karnataka (India). Potable water was used for dissolving the ash of the wood. Equipments used include heating device (gas burner with L.P.G. cylinder -14.5 kg capacity), stainless steel vessel, cotton cloth, weighing balance, measuring jar and stirrer.

Method

The general method of preparation of *kshara* as mentioned in the *Rasashastra* text '*Rasa Tarangini*'[10] was adopted in this study with slight modification. Dried *Chincha* wood was taken and burnt completely into ashes. Then volumetrically four parts of potable water was added into it (It was found that 440g. of *Chincha* ash was required to completely fill a vessel of one litre capasity). It was stirred well and kept for one *Yama* (3 h). After that, it was filtered through three folded cotton cloth for three times so as to get a clear filtrate. The residue was taken and same process was repeated for seven times using fresh potable water and all filtrates were collected in a vessel. It was heated continuously till the watery part completely evaporated. After the evaporation of watery part, the solid part which remained at the bottom was *Kshara*. It was collected and preserved in an air tight container. There were totally three of batches of *Chincha Kshara* prepared and they were named as CK 1, CK 2 and CK 3 respectively.

In physico-chemical evaluation, moisture content (loss on drying), ash values viz., total ash, acid insoluble ash and pH were determined.[11] All the three batches of *Chincha Kshara* were analysed for the physico-chemical parameters. Energy Dispersive X-ray analysis (EDX, also as EDS or EDAX analysis) of *Chincha Kshara* was carried out at SAIF, IIT, Bombay for identifying the elemental composition. The EDX analysis system works as an integrated feature of a scanning electron microscope (SEM). [12] This analysis was done only for the sample from the first batch of *Chincha Kshara* i.e. CK 1.

OBSERVATIONS AND RESULTS:

The details of pharmaceutical study of *Chincha kshara* has been depicted in the Table 1 and that of physico-chemical study in the table 2. The elemental analysis by EDAX has been depicted in the Table 3. The photographic and graphical representations of *Chincha Kshara* as found in EDAX analysis are shown in Fig.1and 2 respectively.

DISCUSSION

For the preparation of *Chincha Kshara*, *Kashtha* (wood) was used as per reference of the general method of preparation of *Kshara* according

Table 1. Details of preparation of *Chincha Kshara* in three batches

Batch	CK 1	CK 2	CK 3	Average
Wt. of dry *Chincha Kastha* (kg)	30	30	30	**30**
Wt. of *Chincha* Ash (g)	1132	1098	1082	**1104**
Volume of *Chincha* ash (ml)*	2569	2492	2456	**2505.66**
Water added (4 times v/v) (*l*)	10.28	9.97	9.82	**10.02**
No. of filtrations	3	3	3	**3**
Flame Temperature (^{0}C)	300 – 350	300 – 350	300 – 350	**300 – 350**
Repetition of the process	7 times	7 times	7 times	**7 times**
Total water added for 7 times repeated process (*l*)	71.93	69.78	68.77	**70.16**
Total *Kshara jala* obtained (*l*)	64.40	63.30	61.70	**63.13**
Total time taken for heating (h:min)	18 : 24	18 : 15	18 : 9	**18 : 24**
Total *Kshara* obtained (g)	198	190	187	**191.67**
% of yield wrt. *Kashtha*	0.66	0.63	0.62	**0.63**
% of yield wrt. Ash	17.49	17.30	17.28	**17.36**

***440g of *Chincha* ash was found to be 1 *l* in volume.**

Analysis of *Chincha Kshara:*

Table 2. Physico-chemical analyses of three batches of *Chincha Kshara*

Batch	Parameters			
	Loss on drying (%)	Total ash (%)	Acid insoluble ash (%)	pH
CK 1	3.64	**72.65**	**0.21**	**10.1**
CK 2	3.47	**74.23**	**0.33**	**10.1**
CK 3	2.58	**78.52**	**0.64**	**10.4**
Average	**3.23**	**75.13**	**0.39**	**10.2**

Table 3. Results of EDAX analysis of Chincha Kshara (CK 1)

Element	Weight%	Atomic%
O K	49.81	63.66
Na K	12.65	11.25
Mg K	11.73	9.87
Si K	2.39	1.74
S K	4.10	2.61
Cl K	14.99	8.65
K K	1.00	0.52
Ca K	3.33	1.70
Totals	100.00	100.00

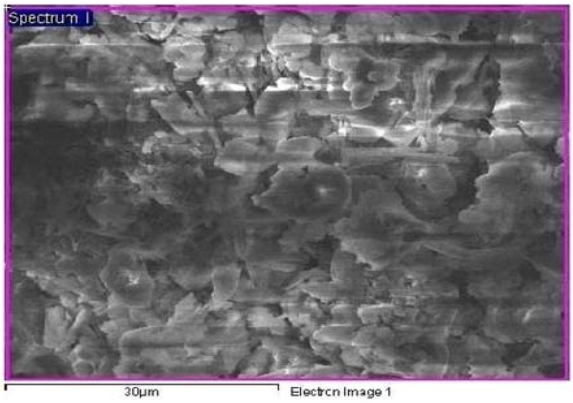

Fig. 1. EDAX analysis – Photographic representation of *Chincha Kshara*

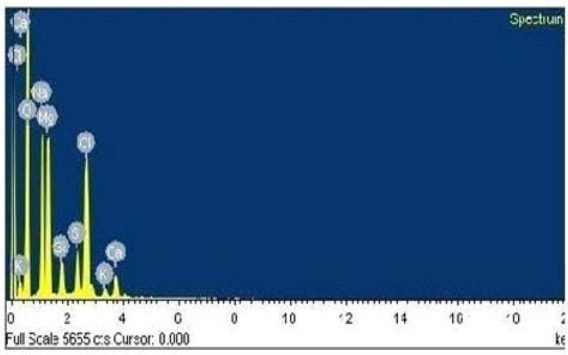

Fig. 2. EDAX analysis – Graph representation of *Chincha Kshara*

to latest authoritative classic of *Rasashastra* '*Rasa Tarangini'*, which considers the *Chincha* as one of the plants in *Ksharastaka* (eight *kshara* plants). In the preparation of *Kshara*, though the use of residue ash for the further preparation of *Ksharajala* is not classically advised, based on the recent authors and experts' opinion, and to get better yield out of the raw material used, the residue ash was used again for the preparation of *Ksharajala* and totally seven times *Ksharajala* was collected from the same ash. A contemporary author has advised to use the residue ash for further preparation of *Ksharajala* and advised to add all the filtrates together and evaporate the watery part to obtain the *Kshara*.[13] In the pilot studies, though more than seven times of *Ksharajala* out of single mass of ash has given *Kshara*, the yield was very minimal in subsequent processes and based on that, seven times *Kshara jala* extraction out of single mass of ash was done for the *Chincha Kshara* for all the three batches. For the preparation of *Ksharajala*, volumetrically four times potable water was added to ash as the bulk of the ash was more and in a previous study, a better yield was found when water was used volumetrically.[14] It was found that approximately 440g of *Chincha* ash makes 1*l* by volume. The residue ash obtained after first filtration was again used for *Ksharajala* by adding 4 times of water to it again. Classically also, there is a gross variation prescribed in the quantity of water to be added for the preparation of *Kshara* like four times as per *Sharangadhara* and *Rasa Tarangini* while six times as per *Sushruta* and *Yadavji Trikamji*. The idea behind the quantity would be that sufficient amount of water to extract the best quantity of *Kshara* out of the ash.

There was an average of 3.23% of loss on drying, 75.13% of total ash, and 0.39% of acid insoluble ash in *Chincha Kshara*. Since the ash itself was taken for the preparation of *Kshara*,

ther is presence of high amount of inorganic contents in it, which was indicated by the high amount of total ash. The elements like sulphur and chlorine which was found in *Chincha Kshara* must have sublimated during the process of determination of total ash. Hence total ash was not totally hundred percent, though *Kshara* itself is water soulbuble content of ash itself. The final product was completely alkaline with an average pH of 10.2. The first batch of *Chincha Kshara* CK1 was analysed with EDAX. The result showed that *Chincha Kshara* predominantly contained oxygen, sodium, magnesium and chlorine with the lesser amount of silicon, sulphur, potassium and calcium. It is to be noted at this juncture that among *Kshara dwaya*, *Yavakshara* is considered to be potassium carbonate and *Sarja kshara* is considered to be Sodium carbonate [15] or Sodium bi carbonate [16] where as sodium (12.65%) is rich in *Chincha Kshara* while potassium (1%) in lesser quantity.

CONCLUSION

Kshara prepared out of *Chincha Kashtha* (Tamarind wood) gives about 0.63% of yield with respect to wood and 17.36% with respect to ash used. The yield of *kshara* with respect to the wood used is very minimal, even lesser than one percent and with respect to ash, it is less than twenty percent. *Chincha kshara* is highly alakaline in nature with the pH more than 10. It is an inorganic compund containing more of oxygen, sodium, magnesium and chorine with the lesser amount of silicon, sulphur, potassium and calcium.

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