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COMPARATIVE PHARMACEUTICO-ANALYTICAL STUDY OF *SARJIKA KSHARA* PREPARED BY THREE DIFFERENT METHODS

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ABSTRACT

Purpose: To prepare and compare the yield of *Sarjika kshara* prepared by three different methods for developing their preliminary profile.

Methods: *Sarjika kshara* was prepared by processing the ash of *Dhanvayasa* (Fagonia cretica Linn.) *Panchanga* by three different methods viz. *Rasatarangini* 13/45-47, Rasatarangini 14/59-61 and Shushruta Samhita Sutrasthana 11/13. The dried *Dhanvayasa* was burnt to ash and sieved for uniformity of particles. The ash was mixed with mentioned quantity of potable water and kept undisturbed for mentioned duration, then supernatant liquid was decanted with the help of pipe and filtered with cotton cloth. This clear *Ksharajala* was measured and given mild heat till completely evaporated liquid. The white coloured *Sarjika Kshara* was obtained from bottom of vessel by scrapping. The prepared *Kshara* was analyzed for organoleptic, physico-chemical and phytochemical parameters as per Ayurvedic Pharmacopoeia of India.

Result: Maximum yield i.e. 33 g *Sarjika Kshara* was obtained from 240 g *Dhanvayasa* Ash by the method of *Rasatarangini* 13/45-47 (8 times of water) where as 22 g *Sarjika Kshara* was obtained by the method of *Rasatarangini* 14/59-61 (4 times of water) and 26 g *Sarjika Kshara* was obtained by the method of Shushruta Samhita Sutrasthana 11/13 (6 times of water) . Organoleptic, physico-chemical and phytochemical parameters show minimal difference in all the three samples. pH ranges from 10.15- 10.20 in all the three samples.

Conclusion: In present study an attempt was done to prepare *Sarjika kshara* by processing the ash of *Dhanvayasa* plant by three different methods and comparison was done. Maximum yield i.e. 33 g *Sarjika Kshara* was obtained from 240 g *Dhanvayasa* Ash by the method of *Rasatarangini* 13/45-47 (8 times of water). This illustrates that by following specific method of preparation of *Sarjika Kshara* as mentioned in Rasatarangini i.e. with 8 times of water maximum yield can be obtained. This study can be used as a base for preparing *Sarjika Kshara* on large scale production.

Keywords: *Kshara, Sarjika Kshara, Dhanvayasa, Rasatarangini.*

INTRODUCTION: *Kshara* is prepared out by the dried plant ashes by a special process known as *Kshara Kalpana*. *Kshara* are alkaline substances obtained from the ash of drugs.[1] The substance is called *Kshara*, because it causes *Ksharana* to *mamsa* etc. *dhatus*.[2] *Kshara* is also included as an ingredient in many

formulations. Due to its *Guna-Karma*, it has gained more importance in pharmaceutics and also had specific therapeutic value. Varieties and method of preparation of *Kshara* are described by different Acharyas and different opinions exist regarding proportion of ash and water, time for soaking, cloth folding and numbers of filtration in the preparation of *Kshara*. *Sarjika Kshara* is prepared by processing the ash of *Dhanvayasa panchanga*[3]. Dhanvayasa i.e Fagonia Cretica Linn. belongs to family Zygophyllacea. Saponins I & II[4] , Alkaloids (Harmine), Aminoacids (Alanine, glycine, leucine, arginine, isoleucine, Lysine, Phenylalamine, proline, tyrosine and valine), Terpenoids of oleanane group are the Chemical Constituents of *Dhanvayasa*. [5]Sarjika *Kshara* is widely used in many formulations as main ingredients for therapeutic purposes but market availability of this product may be adulterated or chemically prepared. So in present study *Sarjika Kshara* was prepared by following three different methods i.e Specific method for preparation of *Sarjika Kshara* in Rasatarangini[6] General method for preparation of *Sarjika Kshara* in Rasatarangini[7] and General method for preparation of *Sarjika Kshara* in Sushruta Samhita[8]. Their yield and analytical parameters were compared to develop preliminary analytical profile of *Sarjika Kshara*. This study will help to overcome the difficulties and will establish quality standard for the preparation of *Sarjika Kshara*.

AIMS AND OBJECTIVES:

- To develop the preliminary pharmaceutical profile of *Sarjika Kshara* prepared by three different methods.
- To compare the yield of *Sarjika Kshara* prepared by three different methods.
- To develop preliminary analytical profile of *Sarjika Kshara.*

MATERIALS AND METHODS:

In present study *Sarjika Kshara* was prepared by using three different methods explained in classics.

- **Procurement of *Dhanvayasa Panchanga*:** *Dhanvayasa panchanga* was procured from Sundar Ayurved Pharmacy J.S. Ayurved Mahavidyalaya, Nadiad and was identified and authenticated by the drug selection committee and Pharmacognostical study.

Table No. 1- Showing INGREDIENTS for *Sarjika Kshara*

Sr. No.	Ingredients
1	Dry *Dhanvayasa Panchanga*
2	*Dhanvayasa Panchanga* Ash
3	R.O Water

- Principle: The whole process of preparation of *Sarjika Kshara* works on the following principls: Burning: in which dry *Dhanvayasa* was burnt to ash, Dissolution: in which ash was mixed with required ratio of R.O water, Decantation: *Kshara Jala* was decanted,Filtration: *Kshara Jala* was filtered with Cloth,

Heating and Evaporation: *Kshara Jala* was heated and liquid portion was evaporated till preparation of *Sarjika Kshara*.

Table - 2: Showing Methods of preparation of *Sarjika Kshara*

Sr.no.	Method	Reference	Sample	Ratio of ash and water	Duration of soaking	Filtration pattern
1	I	**R.T.13/ 45-47**	**A**	**1:8**	**3 hrs**	**Filtered 7 times with cloth**
2	II	**R.T.14/ 59-61**	**B**	**1:4**	**3 hrs**	**Filtered with 3 folded cloth**
3	III	**Su.su. 11/13**	**C**	**1:6**	**Over night**	**Filtered 21 times with cloth**

R.T.= *Rasatarangini*, Su.Su= *Sushruta Samhita Sutrasthana*,

- **Method of Preparation:** *Sarjika Kshara* was prepared as per classical references as mentioned in table no. 1.

The Whole process of preparation of *Sarjika Kshara* was divided into three phases –

1. **Preparation of Ash:** Dried *Dhanvayasa* was burnt completely by placing it in a big iron pan. After the self-cooling, smoky white ash was collected.

2. **Preparation of *Kshara Jala*:** Ash was collected in a steel vessel and Eight times /four times and six times of water was added to it respectively. The contents were mashed thoroughly with hands and left undisturbed for 3 hours. After that, the clear supernatant liquid was decanted with the help of pipe and filtered through cloth for 7 times, with three layered cotton cloth and with cloth for 21 times respectively.

3. **Preparation of *Kshara*:** All the three filtrates of *Ksharajala* were individually subjected to heat to evaporate the water content and *Kshara* is obtained from the vessel by scrapping. After weight, stored in suitable air tight container.

OBSERVATIONS AND RESULT:

Table - 3: Showing data of ash preparation

Sr.No.	Observations	Results
1	Wt. of dried *Dhanvayasa* (kg)	10
2	Wt. of ash obtained (g)	720g
3	Vol. of ash obtained (ml)	1500
4	**%** of ash obtained from dried *Dhanvayasa*(w/w)	7.2%

The prepared 720 g /1500 ml ash was divided into 3 equal parts for preparation of three different samples of *Sarjika Kshara* by following three different methods.

Table - 4: Showing data of *Kshara Jala* preparation

Sr.No.	Parameters	Sample		
		A	B	C
1	Weight of Ash taken (g)	240	240	240
2	Volume of Ash taken (ml)	500	500	500
3	Volume of R.O water taken (ml)	4000	2000	3000
4	*Kshara Jala* obtained after filtration (ml)	3400	1400	2200
5	*Kshara Jala* obtained (%v/v)	85	70	73.33
6	*Kshara Jala* loss (%v/v)	15	30	26.66
7	Time required for preparation of *Kshara Jala(h)*	3	3	12

Table 5: Showing data of *Sarjika Kshara* obtained in three different samples

Sr.No.	Parameters	Sample		
		A	B	C
1	Volume of *Kshara Jala* taken (ml)	3400	1400	2200
2	*Kshara* obtained (g)	33	22	26
3	*Kshara* obtained (in comparison to dry *Dhanvayasa* ash) (%w/w)	13.75	9.16	10.83

ANALYTICAL STUDY:

- *Dhanvayasa* powder, *Dhanvayasa* Ash, *Sarjika Kshara jala* and prepared *Sarjika Kshara* was analysed for various Organoleptic, Physico-Chemical and Phytochemical Parameters as per reference of Ayurvedic Pharmacopeia of India[9]

Table 6: Showing Organoleptic parameters of *Dry Dhanvayasa, Dhanvayasa Ash, Kshara Jala* and *Sarjika Kshara*

Sr. No	Parameters	*Dry Dhanvayasa*	*Dhanvayasa Ash*	*Kshara Jala*	*Sarjika Kshara*
1	Colour	Light green	Smoky white	Yellowish	White
2	Taste	Bitter & Astringent	Salty	Salty	Salty
3	Touch	Rough	Rough	Smooth	Rough

Table 7: Showing the Physico-chemical parameters of Dry *Dhanvayasa* Powder

Sr.No.	Physico-chemical parameters	Results
1	Loss on drying at 105 ^{0}C(%)	6.30
2	Ash value (%w/w)	5.48
3	Acid insoluble ash(%w/w)	0.78
4	Water Soluble Extractive value	10.32
5	Alcohol Soluble Extractive value	7.6

Table 8: Showing the Physico-chemical parameters of *Dhanvayasa* Ash

Sr.No.	Physico-chemical parameters	Results
1	pH value (10% aqueous solution)	9.8
2	Loss on drying at 105 ^{0}C(%)	2.35
3	Ash value (%w/w)	96.24
4	Acid insoluble ash(%w/w)	33

5	Water Soluble Extractive value (%w/w)	30.2
6	Alcohol Soluble Extractive value (%w/w)	4.6

Table 9: Showing the Physico-chemical parameters for *Sarjika Kshara Jala*

Sr.No.	**Physico-chemical parameters**	**Results**		
		Sample A	**Sample B**	**Sample C**
1	pH value (10% aqueous solution)	9.14	10.4	9.10
2	Specific gravity	1.0049	1.0023	1.0015

Table 10: Showing the Physico-chemical parameters for *Sarjika Kshara*

Sr.No.	**Physico-chemical parameters**	**Results**		
		Sample A	Sample B	Sample C
1	pH value(10% aqueous solution)	10.18	10.20	10.15
2	Loss on drying at 105 ^{0}C (%)	1	1.5	1.8
3	Ash value(%w/w)	95	96	94.5
4	Acid insoluble ash(%w/w)	1.02	1.06	1.08
5	Water Soluble Extractive value(%w/w)	91.2	88	90
6	Alcohol Soluble Extractive value(%w/w)	25.6	27	26.4

Table 11: Showing the Qualitative Phytochemical Parameters for *Sarjika Kshara*

Sr.No.	**Phyto-chemical parameters**	**Results**			
		***Dhanvayasa* Powder**	***Dhanvayasa* Ash**	***Sarjika Ksharajala***	***Sarjika Kshara***
1	**Alkaloid**	Present	Absent	Absent	Absent
2	**Carbohydrates**	Present	**Present**	**Present**	**Present**
3	**Glycosides**	Present	Absent	Absent	Absent
4	**Amino acids**	Present	Absent	Absent	Absent
5	**Proteins**	Present	Absent	Absent	Absent
6	**Tannin**	Present	Absent	Absent	Absent
7	**Flavanoids**	Present	Absent	Absent	Absent
8	**Saponin**	Present	Absent	Absent	Absent
9	**Steroids**	Present	Absent	Absent	Absent
10	**Starch**	**Absent**	Absent	Absent	Absent

DISCUSSION: Dry *Dhanvayasa* was burnt in a vessel to prevent contamination during burning. *Dhanvayasa* was added little by little into the fire for proper burning to obtain smoky white ash. R.O. water was taken to avoid inorganic salts. Stainless steel vessel was used to prevent possible chemical reactions.Ash was macerated well in water for proper mixing and allowed to settle down for 3 hrs and overnight respectively. *Kshara Jala* was decanted without disturbing the vessel. A clean cotton cloth was tied on both ends of pipe before decanting the *Kshara Jala* to obtain clear *Kshara Jala*. Proper filtration was done 7 times with three folded cloth and 21 times respectively. Initially *Kshara Jala* was yellowish coloured clear liquid. Colour of *Kshara Jala* was changed from yellowish to brown gradually as the temperature raised. Vapors and crackling sound were increased proportionally with temperature. *Kshara* was started sticking to the vessel and bumping was observed.

At this stage mild heat was given to prevent the burning of *Kshara*. It was stirred carefully to prevent bumping. Finally, white coloured *Kshara* was obtained by scrapping. 33 g, 22g and 26 g yield were obtained in sample A, Sample B and Sample C respectively.

In all three samples, pH value and Specific gravity of *Kshara Jala* ranges from 9.10-10.4 and 1.0015- 1.0049 respectively. LOD ranges from 1- 1.8 % at 105^0C, Ash value(%w/w) ranges from 94.5 – 96 % and pH value ranges from (10% aqueous solution) 10.15- 10.20, W.S.E ranges from 88-91.2 in the prepared *Sarjika Kshara.* Sodium and Potassium ions were found in Sarjika Kshara.

CONCLUSION: On the basis of yield, maximum extraction obtained in sample-A (8 times water) i.e 33g than in sample-B (4 times water) i.e 22 g and sample C (6 times water) i.e 26 g respectively. This illustrates that by following specific method of preparation of *Sarjika Kshara* as mentioned in Rasatarangini i.e with 8 times of water maximum yield can be obtained. It may be due to increased saturation level of the solvent. (Water)

These observed Parameters can be considered as standard for further studies and used in large scale production of *Sarjika Kshara*.

PREPARATION OF *SARJIKA KSHARA* BY THREE DIFFERENT METHODS

		
Fig. 1- DRY DHANVAYASA	**Fig. 2- DRY DHANVAYASA *BURNT TO ASH***	**Fig. 3- *DHANVAYASA* ASH**
		
Fig. 4- ASH+WATER	**Fig. 5- KEPT FOR 3/3/12 hrs**	**Fig. 6- DECANTATION & FILTERATION OF *KSHARAJALA***

Fig. 7- *KSHARAJALA*

Fig. 8- EVAPORATION OF *KSHARAJALA*

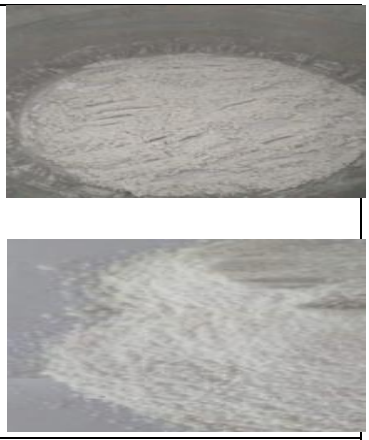

Fig. 9-*SARJIKA KSHARA*

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