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PHARMACEUTICAL STANDARDIZATION OF *MULAKA KSHARA*: AN AYURVEDIC PREPARATION

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ABSTRACT

Background: *Kshara* is an alkali contain water soluble ash. Historical review Because of its corrosive nature (Ksharanat) it is known as Kshara (alkali). Kshara is not having rasa, this is manifested by the combination of many rasas and is dominated by Katu and Lavana rasas. *Mulaka Kshara* is a caustic alkaline preparation of the drug *Mulaka* (*Raphenus sativus* Linn.), indicated in diseases like *Mutrakrchra, Mutrashmari, Gulma* etc. There is wide range of description available about *Kshara* as told by *Acharya Sushruta* and many other authoritative classics. This alkaline preparation has many therapeutic usages and even has replaced many surgical procedures and proved to be effective in treating many disorders. The internal use of *Kshara* is advised in *Mutrashmari,* external application in *Arshas* (hemorrhoids) and in the form of *Kshara Sutra* in *Bhagandhara* (fistula in ano). The paper details the most practical way of preparing Mulaka Kshara for clinical use. **Aim:** To develop standard manufacturing procedure of *Mulaka Kshara* and to develop quality control parameter. **Materials and Methods:** Total three batches of *Mulaka Kshara* were prepared by using refrance of AFI. All the involved

procedures were followed as per guidelines. **Results:** Average 13.21 % yield was obtained from *Mulaka panchag*. **Conclusion:** *This* method is the most convenient and economic method of get maximum yield 13.21%.

INTRODUCTION

Ksharas are derivatives of plant drug ashes in the form of solutions, powder or crystals, all of which have the basic quality of being alkaline. Medinikosha says that "Kshara" is derived form the root of 'Kach' with the meaning of shine or fasten. Hemachandra explains Kshara as kacha, rasa, bhasma, druta and lavana. Ramayana considers Kshara in the sense of salt. *Acharya Sushruta* defines "*Tatraksharanatkshananadva Kshara*".[1] The drug which has the characteristics of *Kshanan* or *Ksharan,* literally means that which destroys fleshy mass either healthy or unhealthy as Kshara. Acharya *Charaka* says *"Chitwachitwaashyathksharahaksahartyadhaha"* i.e. *Kshara* is one, which scraps the abnormal tissue from its location and destroys it after dissolving it, because of if its corrosive nature. *Mulaka Kshara* has been explained in *Susruta Samhita Uttara Tantra*.[2] in the context of "*GulmaPrathishediyaadhyaya*" which is a powdered preparation of *Mulaka Bhasma and Jala*. The classification of *Kshara* can be done in various ways on the basis of;

- ✓ Admistration- *Paneeya and Prathisaraneeya*.[3]
- ✓ Concentration- *Mrudu, Madhyama orTeekshna*.[4]

As per preparation Kshara is a caustic material obtained from ashes after distillation and are alkaline in nature. *Kshara* derived from the combination of different kinds of drugs only is repository of all tastes with combination of *Katu* (pungent) and *Lavana* (salt) *Rasa* possess properties which are penetrating and hot in potency, besides performing the action of *Dahana, Pachana, Vidharana, Vilayana, Shodhana, Ropana, and Krimiamamedovishanashaka*. It is considered to be best among all the *Shastra* and *Anushashtras* (major & minor sharp instruments) and is fit to be used in place where sharp instruments can be used with difficulties like nasal polyp, malignant tumours etc. where treatment by *Shashtras* is not advised. The mentioning of *Kshara* is found only in post-Vedic literature. The Charka *Samhita* only refers to *Kshara*,[5] while the detailed description of its preparation, classification, indication and contraindications are available in *Sushruta Samhita*.[6] Success can even be obtained by its use even in disease which are difficult to cure and also because it can be used in form of drink.[7]

Mulaka (*Raphenus sativus* Linn.).[8,9] It is a fresh whole plant, an annual herb, cultivated throughout India. The fresh Mulaka is shown in figure 1. As per *Ayurvedic* classical literature available, it is evident that drug *Mulaka* is having much significant importance, being extensively used for its varied benefits. Almost all *Acharyas* of *Ayurveda* have referred this drug for its multiple benefits in therapeutics. The botanical name of Mulak is *Raphenus sativus* Linn. Belongs to family Crucifera. Tuberous root (*Mulaka kanda*) is the major part used for therapeutic action. It having katu,Tikata rasa, Laghu,Teekshana Guna,Tridoshahara.[10].The main threupetic action of Mulak Kshara is *Deepana, Pachana, Svarya, Hrdya, Mutrala, Ashmaribhedana*.[11]

In the present study, the *Mulaka Kshara* has been prepared follow the AFI guidline. It is used *Mutrkrcchra* (dysuria), *Ashmari* (calculus), *Gulma* (abdominal lump).[12]

AIM AND OBJECTIVE

To develop the Standard Manufacturing Process (SMP) for *Mulaka Kshara and* develop their physico- chemical parameter.

MATERIAL AND METHOD

The fresh *Mulaka* Parnchanga was cultivated at Organic Farm "Ram Vadi" of Anandabava Aashram, Near Mahaprbhujinibethak, Jamnagar, Gujarat, India in the month of October to November. The plant specimens were further identified by Botanical Survey of India, Howrah with specimen No. VS 02, certificate has been issued in this concern. The fresh drug was cleaned with water and allowed to dry in sunlight. After complete drying, the *Mulaka Panchanga* was subjected to ash preparation. In order to achieve the quality product, the manufacturing processes should be controlled. The control over this can be achieved by adopting GMP, Standard Operating Procedure (SOP), Validation protocol etc. By this way a Standardized Process as well as standardized finished product can be obtained.

PROCEDURE

(MK_1, MK_2, MK_3)

The preparation of *Mulaka Kshara*.[13] was divided into three stages namely, preoperative (*Purvakarma*), Operative (*Pradhankarma*), Postoperative (*Paschatkarma*) stages. Material taken was subjected to various organoleptic and physiochemical analysis such as texture, colour, teast, Odor, Foreign matter, pH.[14],ash value.[15], acid insoluble ash[16], water soluble ash.[17], loss on drying.[18]

(A) Purva Karma : Preparation of Ash

A matured 205 kg of *panchanga* of *Mulaka* was collected, cleaned well and cut into small slice then dried completely in sunlight. Dried *panchanga* was taken in a big iron pan and burned completely. After self cooling the ash was collected and sieving through sieve no. 40.(Table 1)

(B) Pradhan Karma :Preparation of *Ksharajala*

The ash was taken in a Stainless Steel pot and 6 times of water was added v/v. The mixture of ash and water was rubbed with hand to mix properly and kept without any disturbance for overnight. Next day the clean supernatant liquid was decanted and then was filtered through three folded cotton cloth till clear filtrate obtain. This modification made to get clear supernatant liquid.

(C) Pachach Karma :Evaporation of *Ksharajala*

The *Ksharajala* was taken in steel vessel and heated over the gas stove till the entire water portions get evaporated. Finally a dull white coloured *Kshara* was obtained. Then *Kshara* was powdered and stored in air tight glass container.

Table 1: Showing the Ash formation of *Mulaka panchanga*

Observation	MK1	MK 2	MK 3	Average
Weight of fresh *Mulaka panchanga*	28.218 kg	30.210 kg	29.670 kg	29.366 **kg**
Weight of dry *Mulaka panchanga*	1.575 kg	1.692 kg	1.405 kg	1.557 kg
Weight loss of *Mulaka panchanga* after drying	26.643 kg	28.518 kg	28.265 kg	27.808 kg
% of loss after drying	94.41w/w	94.39 w/w	95.26 w/w	94.68 w/w
Weight of ash obtained	305.8 g	321.7g	317.7 g	315.06 g
% of ash obtained	1.14 w/w	1.12 w/w	1.12 w/w	1.126 w/w

Table 2: preparation of *Mulaka Ksharajala* after 1st washing

Parameters	**Batches**			
	MK1	**MK 2**	**MK 3**	**Average**
Weight of ash taken (g)	305.8 g	321.7g	317.7 g	315.06
Volume of water taken (L.)	1834.8	1930.2	1906.2	1890.4
Ksharajala obtained in ml (after 1st washing)	1287	1421.3	1386	1364.7
pH	10	10.5	10.5	10.33
% of *Ksharajala* obtained in v/v	70.14	73.63	72.71	72.19
% of *Ksharajala* loss in v/v	29.86	26.37	27.29	27.81
Times required for preparation of *Ksharajala*	15 hrs	15.5 hrs	15 hrs	15.16 hrs

Table 3: preparation of *Mulaka Ksharajala* after 2nd washing

Parameters	**Batches**			
	MK1	**MK 2**	**MK 3**	**Average**
Weight of ash taken (g)	305.8 g	321.7g	317.7 g	315.06

Volume of water taken (L.)	1834.8	1930.2	1906.2	1890.4
Ksharajala obtained in ml (after 2st washing)	1611	1694.2	1685.7	1663.63
pH	10	10	10	10
% of *Ksharajala* obtained in v/v	87.80	87.77	88.43	88
% of *Ksharajala* loss in v/v	12.2	12.23	11.57	12
Times required for preparation of *Ksharajala*	15 hrs	15.5 hrs	15 hrs	15.16 hrs

Table 4: Showing the result obtained during evaporation of *Mulaka Ksharajala* after 1st washing

Parameters	**Batches**			
	MK1	**MK 2**	**MK 3**	**Average**
Volume of Ksharajala taken for evaporation (ml)	1287	1421.3	1386	1364.7
Time required for evaporation of Ksharajala(Hour)	1	1.15	1.10	1.08
Kshara obtained in w/w	129.7	134.1	131.87	131.89
% of Kshara obtained w/w	0.459	0.455	0.455	0.456

Table 5:Showing the result obtained during evaporation of *Mulaka Ksharajala* after 2nd washing

Parameters	**Batches**			
	MK1	**MK 2**	**MK 3**	**Average**
Volume of Ksharajala taken for evaporation (ml)	1611	1694.2	1685.7	1663.63
Time required for evaporation of Ksharajala (Hour)	1.08	1.14	1.10	1.07
Kshara obtained in w/w	72.42	75.17	74.10	73.89
% of Kshara obtained w/w	0.25	0.255	0.255	0.253

Table 6: Showing the observations during evaporation of *Mulaka Ksharajala after 1st washing*

Time (mints.)	***Temperature ° C***				**Observations after 1st washing**
	MK1	**MK 2**	**MK 3**	**Average**	
Initial	26°C	26°C	28°C	26.6°C	Brownish colour liquid with characteristic smell and salty taste
0-30	71°C	73°C	72°c	72°C	Aggregation and Vapour started
30-60	80°C	85°C	86°C	83.6°C	Creaking sound, Aggregation and Vapour increased
60-90	91°C	93°C	94°C	92.6°C	Slowly boiling started from center
90-120	100°C	100°C	100°C	100°C	Vigorous boiling, Kshara started adherence to wall of the vessel
120-150	100°C	100°C	100°C	100°C	Vigorous boiling Kshara started sticking to the wall of vessel. Colour changes from brownish

					to dark brown
150 -180	100°C	100°C	100°C	100°C	Grayish semisolid mass
180 -210	100°C	100°C	100°C	100°C	Dull whitish brown Kshara was obtained

Table 7: Showing the observations during evaporation of *Mulaka Ksharajala after 2nd washing*

Time (mints.)	Temperature ° C				Observations after 2nd washing
	MK1	MK 2	MK 3	Average	
Initial	25°C	26°C	27°C	26°C	Yellowish colour liquid with characteristic smell and salty taste
0-30	73°C	74°C	74°C	73.6°C	Aggregation and Vapour started
30-60	85°C	87°C	87°C	86.3°C	Creaking sound, Aggregation and Vapour increased
60-90	94°C	94°C	97°C	95°C	Slowly boiling started from center
90-120	100°C	100°C	100°C	100°C	Vigorous boiling, *Kshara* started adherence to wall of the vessel
120-150	100°C	100°C	100°C	100°C	Vigorous boiling Kshara started sticking to the wall of vessel. Colour changes from Brownish to dark brown
150 -180	100°C	100°C	100°C	100°C	Grayish brown semisolid mass
180 -210	100°C	100°C	100°C	100°C	Dull whitish brown Kshara was obtained

Table 8 :Results Showing the formation of *Mulaka Kshara* :

Batch	Wt. of *Mulaka (Kg)*	Wt. dry of *Mulaka (Kg)*	Wt. of *Ash (g)*	Wt. of *Khara after 1st washing (g)*	% Yield *after 1st washing*	Wt. of *Khara after 2nd washing (g)*	% Yield *after 2nd washing*	Total Weight(g)	% Yield
MK1	28.218	1.575	1.692	1.405	1.557	72.42	0.25	202.12	0.72
MK 2	29.435	1.692	321.7	134.1	0.455	75.17	0.255	209.27	0.71
MK 3	28.982	1.405	317.7	131.87	0.455	74.10	0.255	205.97	0.71
Avg.	28.878	1.557	315.06	131.89	0.456	73.89	0.253	205.78	0.713

Table 9: Results of organoleptic tests:

Sr. No	Character	Mulak ash	Mulak Kshara
1	Colour	Grey	Whitish brown
2	Odour	Characteristic	Characteristic
3	Taste	Characteristic salty	Salty
4	Touch	Powder form	Slimy

Table 10: Showing the results of physico-chemical parameters of different samples of Apamarga

Sr. no	Sample		Foreign matter(w/w)	Loss on drying at 105°c(% w/w)	Ash value (% w/w)	Acid insolubl e ash(% w/w)	Alcohol soluble extractiv e(w/w)	Water soluble extractiv e(w/w)	pH
1	*Mulaka* panchang a powder	MK1	1.782	11.75	18.41	0.9	60	75.52	7
2		MK2	0.565	12.12	18.31	0.94	60.54	76.38	7
3		MK3	1.018	11.53	17.61	0.89	55.78	69.95	6.5
	Average		1.121	11.8	18.11	0.91	58.77	73.95	6.8

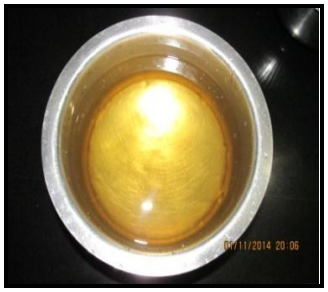
PROCESS OF MULAK KSHARA PREAPARATION

MULAK

ROOT

LEAF

BURNING PROCESS OF DRY PANCHNGA OF MULAK


KSHARAJALA AFTER 1st WASH KSHARAJALA AFTER 2nd WASH

MULAK KSHAR

DISCUSSION

Mulaka Kshara is well known among the *Kshara* preparations and widely used in classical literature. *Mulaka Kshara* is incorporated in many formulations for the treatment of *Mutrakruchha*, *Asmari, Gulma, Vatavikar* etc. Chemically *Mulaka Kshara* is composed of Sodium, Potassium, Chloride, Sulphate, Carbonate, Bicarbonate, Calcium and Magnesium etc. Alkali or caustics have been in use in Indian medicine since very early times. General properties of alkalis include light, warm, acrid, moistening. They are digestives and increases appetite, reduce *kapha*, destroy intestinal worms, heal wounds and open the boils. The Carbonate of potash is pungent, soft and light, it helps discharge of urine. It is recommended for Intestinal obstruction (*Anaha*), Anaemia, Asthma and Enlargement of spleen. Its internal administration is said to dissolve urinary calculi. Refined natron (*Sarji-Kshara*, Carbonate of soda) is very similar in action to the Carbonate of potash.

Alkali is classified into two groups : solid (*kathina*) and liquid (*Tarala*). The solid alkali is meant for external application (Pratisarya) and is as an ingredient in medicines. The liquid alkali is given for drinking along with rice-gruel, curd, buttermilk, decoction or warm water

in several disease conditions. External application is indicated in the conditions like Ringworm, Leucoderma. Leprosy, Ulcer, Warts, Inflammation of Gums and Fistula. Internal administration is recommended in Stones, internal Tumor, Piles etc. Alkali when it is properly prepared must be white in colour, smooth and soapy to touch, neither too strong not too weak and should act speedily and successfully.

There are various methods of preparation of *Apamarga Kshara* are mentioned in classical texts. All scholars have mention that, the collected drug should be burnt in to ash form. But regarding dissolving of this obtained ash in water in an earthen (mud) pot is specially mentioned by *Acharya Sharangadhara* and is followed by *Acharya yadavaji* and in *Ayurveda Sarasamgraha* too.

Regarding the ratio of ash and water quantity, *Acharya Sharangadhara* has mentioned 4 times of water. In *Rasatarangini* & *Ayurveda Prakash* also same ratio is mentioned, whereas according to *Acharya yadavaji Trikamji* ash should be dissolved in 6 times of water while in *Ayurveda Sarasamgraha* 8 times of water is mentioned.

Regarding the time duration of keeping ash and water together, *Acharya Sharangadhara* has mentioned for one night and it is followed by *Acharya Yadavaji* too, while according to *Ayurveda Sarasamgraha* it should be kept for 2 to 3 days. Whereas according to *Rasatarangini* it can be kept only for 3 hours. Regarding the filtration, *Acharya Yadavaji* has mentioned 21 times with a cloth, in *Rasatarangini* 3 folded cloth for one time and in *Ayurveda Sarasamgraha* 4 folded cloth for 7 times is mentioned. In *Rasatarngini* the time duration for soaking 3 hrs and filtered through 3 folded cotton cloth for one time were mentioned. *Achraya tikram* ji stated that, it was filtered through 21 times and *Ayurveda Sarasamgradha* for 7 times with 4 folded cotton cloth. This type of care regarding the filtration is mentioned may be because to avoid the undissolved macro particles of ash and ultimately to facilitate the production of fine *Kshara*. Above description shows the controversy regarding ratio of water of ash, duration of soaking of ash with water, use of earthen pot and number of filtration pattern.

preparation of *Mulaka Kshara* has been carried out by classical method described in AFI. The method of preparation are vary from each other in different classical text on the basis of ratio of water and ash, duration of soaking of ash with water, type of vessel and filtration pattern. Here, an attempt was made to prepare *Mulaka Kshara* and to develop their SOP and

physiochemical profile. In this study three batches were prepared for the pharmaceutical standardization. The whole process was divided into three stages.

Average 29.366 fresh and matured *Mulaka Panchanga* was collected, cleaned and dried. After complete drying about 1.557 kg dry *Panchanga* was obtained which 94.68 w/w loss. The reason behind such a big loss is due to evaporation of water content present in fresh *Mulak*. After burning of *Mulak Panchang*, the total ash obtained 315.06 g, which is 1.126 % w/w of fresh *Mulak panchang*. This ash was sieved through 40# and homogeneously mixed. This ash was utilized for the preparation of the batches of *Mulak Kshara*.

The Average 315.06 g of ash was soaked in 6 times.[19] of distilled water. The soaking time is over night without any disturbance for the preparation of *ksharajala*.The Average percentage of *Ksharajala* obtained in v/v 72.19%. Average 27.81 percentage loss was observed in Ksharajala ,it may be due to the soacking of water in ash which can not be separated. De-mineralized water was used to avoid any interference of inorganic salts present in tap water. A saline tube was used to get maximum volume of *Ksharajala* without disturbing sediment part. This modification made to get clear supernatant liquid. The above sample was filtered through 3 folded cotton cloth till clear filtrate not obtained, it did not contain macro particles of ash. It means sufficient time duration should be provided for complete sedimentation of undissolved macro particles of ash to get clear *Ksharajala*.

In Table 6 & 7 shows shows time, temperature and reduction in water level during evaporation of *Ksharajala*. 1287ml *Ksharajala* of all the samples was evaporated within 1.08hrs. The minimum temperature was recorded between 25^0C to 26.6 ^{0}C while maximum was 100 ^{0}C. Initially *Ksharajala* was yellowish coloured clear liquid. Aggregation, vapours and creaking sound were increased proportionally with temperature. Colour was changed from yellowish to brownish gradually as temperature raised. *Kshara* was started sticking to the vessel in final stage and bumping was observed. It was stirred continuously to prevent bumping and sticking at final stage. Finally a dull white coloured *Kshara* was obtained.

The solubility of *Kshara* increases with increase the amount of water. After 1st washing, maximum concentration of *Kshara* was dissolved in water but due to super saturation condition some amount of remain in ash-mud. Same quantity of water(6 times) also added in this Ash –mud for 2nd washing for complete extraction of *Kshara* from Ash.

The total volume of *Ksharajala* was divided into two parts i.e. a fixed volume (1287ml and 1611 ml) for 1st and 2nd washing and rest of volume in all the samples and were evaporated separately to find out deference in % yield if any by keeping the fixed volume of *Ksharajala*. The fixed volume of *Ksharajala* was evaporated in a stainless steel vessel having a diameter 28.3 cm and depth 17.9 cm. The time required for evaporation of fixed volume of *Ksharajala* in sample 1.08 hrs. Total time required for evaporation of *Ksharajala* was also proportionally increased with water ratio.

Percentage of Kshara obtained w/w in in samples was 0.45% and 0.25% from two time washing with distilled water from *Mulak* panchang ash.

CONCLUSION

A Lot of Classical referance are mention regarding the *Khasra prepration* but this method is the Standard method of get maximum yield 0.71 % in comparision to Fresh *Mulak* .The yield increases after increases the number of washing. These process are validated and their possible quality parametes are develop.

REFERENCES

1. Acharya JT, (ed). SushrutaSamhita withNibandhasangraha commentary by Dalhanacharya, Reprint edition. Varanasi: Choukhambha Sanskrit Sansthan 2010; 44.
2. Waddar S, Gopi KBJ, Rao PN, kumar H, Raj AGR. A case discussion on the efficacy of *Mulaka kshara* in the management of *mutrashmari* (urolithiasis). International Journal of Herbal Medicine 2014; 1(6): 18-21.
3. Acharya JT, (ed). SushrutaSamhita withNibandhasangraha commentary by Dalhanacharya, Reprint edition. Varanasi: Choukhambha Sanskrit Sansthan 2010; 44.
4. Acharya JT, (ed). SushrutaSamhita withNibandhasangraha commentary by Dalhanacharya, Reprint edition. Varanasi: Choukhambha Sanskrit Sansthan 2010; 44.
5. Acharya YT, CharakaSamhita of Agnivesha revised by Charaka and Dridabhala with Ayurveda dipika commentary of Cakrapanidatta. Reprint edition.Varanasi: Choukhambha Sanskrit Sansthan 2006; 645-8.
6. Acharya JT, (ed). SushrutaSamhita withNibandhasangraha commentary by Dalhanacharya, Reprint edition. Varanasi: Choukhambha Sanskrit Sansthan 2010; 44.
7. Acharya JT. SushrutaSamhita with Nibandhasangraha commentary by Dalhanacharya, Reprint edition. Varanasi: Choukhambha Sanskrit Sansthan 2010; 435.

8. Krishnachandra C, BhavaPrakashaNigantu Sa Vimarsha Hindi Tika, Edn 5, Varanasi: ChoukhambhaBharati Academy 1993; 697.
9. Pandey G. Dravya Guna Vijnana (Material- Medica-Vegetable drugs), Reprint edition. Varanasi: Choukhambha Orientalia Academy 2004; 607-616.
10. Krishnachandra C, BhavaPrakashaNigantu Sa Vimarsha Hindi Tika, Edn 5, Varanasi: ChoukhambhaBharati Academy 1993; 697.
11. Acharya YT, CharakaSamhita of Agnivesha revised by Charaka and Dridabhala with Ayurveda dipika commentary of Cakrapanidatta. Reprint edition.Varanasi: Choukhambha Sanskrit Sansthan 2006; 645-8.
12. Anonymous. The Ayurvedic Pharmacopoeia of India. Edn 1, New Delhi: Govt. of India published by the Controller of publications 2007; 107-8.
13. Anonymous. The Ayurvedic Formulary of India. Edn 2, New Delhi: Govt. of India published by the Controller of publications 2007; 166-167.
14. Anonymous. The Ayurvedic Formulary of India. Edn 2, New Delhi: Govt. of India published by the Controller of publications 2007; 166-167.
15. The Ayurvedic Pharmacopoeia of India. 1st ed., Vol. 2, Part 2, Appendix 3 (3.3). New Delhi: Govt. of India, Ministry of Health and Family Welfare; 2006; p: 212.
16. The Ayurvedic Pharmacopoeia of India. 1st ed., Vol. 2, Part 2, Appendix 2 (2.2.3). New Delhi: Govt. of India, Ministry of Health and Family Welfare; 2006; p. 159.
17. The Ayurvedic Pharmacopoeia of India. 1st ed., Vol. 2, Part 2, Appendix 2 (2.2.4). New Delhi: Govt. of India, Ministry of Health andFamily Welfare; 2006; p: 159.
18. 20. The Ayurvedic Pharmacopoeia of India. 1st ed., Vol. 2, Part 2, Appendix 2 (2.2.5). New Delhi: Govt. of India, Ministry of Health and Family Welfare; 2006. p. 159.
19. The Ayurvedic Pharmacopoeia of India. 1st ed., Vol. 2, Part 2, Appendix 2 (2.2.10). New Delhi: Govt. of India, Ministry of Health and Family Welfare; 2006; p: 161.
20. Anonymous. The Ayurvedic Formulary of India. Edn 2, New Delhi: Govt. of India published by the Controller of publications 2007; 166-167.