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EFFECT OF CONTAINER ON AYURVEDIC DRUGS – A SELECT STUDY

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ABSTRACT

Effect of packing material on the stability of four Ayurvedic drugs viz., Hingvatsaka Curna, Brahmi ghrta, Dasamula Kvatha Curna and Ajamodarka have been studied by distributing the drugs in different containers by observing the physical and biological changes. The study revealed that Hingvatsaka Curna keeps well for at least 6 month, Ajamodarka is stable for minimum period of six months when stored in glass bottle exposed to light. Dasamula K vatha Curna showed the presence of insects at the completion of three months. In the second month itself Brahmi ghrta becomes rancid on storing in glass and amber colored bottles.

Keywords: Container effect, Hingvatsaka Curna, Brahmi ghrta, Dasamula Kvatha Curna, Ajamodarka.

INTRODUCTION

The Ayurvedic Formulary of India, Part-I is containing 444 formulations of different categories. The Ayurvedic classical text also mentions the shelf-life, condition for preservation along with suitable containers for each category of medicine[1]. In order to study the effect of the packing material on the stability and quality, four Ayurvedic drugs prepared in laboratory scale were stored under different conditions and studied for their stability. The present paper deals with the stability study on Hingvatsaka Curna, Brahmi Ghrta, Dasamula Kvatha Curna and Ajamodarka.

MATERIALS AND MATHODS

The raw drugs were procured from Chennai market, identified in the Botany/ Chemistry department of this Institute[2]. After purifying the drugs, the compound formulations were prepared as per The Ayurvedic Formulary of India, Part-I in the Pharmacy department of this institute[1]. The formulations were analyzed as soon as they were prepared and then they were distributed in different containers according to the protocol evolved for this purpose. Each sample is examined at intervals of one month over a period of six months and the results were recorded[3]. All the containers used for storing the drug were either steam sterilized or heat sterilized.

The ingredients used in the preparation of Hingvatsaka Curna and Brahmi ghrta are shown in tables I and II. Equal quantities of Hingvatsaka Curna were packed in glass bottles, one colorless and the other amber colored and third in polythene jar. The sample was analyzed immediately after the preparation[3]. Microbiological observations and other necessary analysis were done periodically every month for a period of six

months to evaluate effects of packing material on the curna[5]. (Table III).

Brahmi Ghrta which was green in color with pleasant aroma was stored in (1) a colorless glass bottle exposed to light (2) colorless glass bottle kept in dark, and (3) an amber colored bottle.

Ajamodarka is the liquid preparation obtained by distilling *ajamodA-Apium* leptophyllous seeds (1kg.) in water (2kg). The Ajamodarka was kept in (1) glass bottle exposed to light (2) glass bottle kept in dark volatile matter and induced alkalinity were determined periodically in addition to microbiological examination (Table IV).

Dasamula Kvatha Curna is a combination of coarse powder of the roots (each on part) of CAIaparNI-*Desmodium gangeticum DC., Prsniparni – Uraria picta Desv., bRhatI-Solanum indicum Linn., Kantakari-S. Suranttense* Burm.F., Goksura- *Tribulus terrestris* Linn., Bilva-*Aeglemarmelos Corr.,* Agnimantha – *Clerodenrum phlomidis* linn.F, Syonaka – *Oroxylum indicum* Vent, Kasmari-*Gmelina asiatica* Linn. and Patala – *stereospermum tetragonum* DC[2]. Dasamula Kvatha Curna was packed in two different glass bottles – One colorless and the other amber coloured bottle and also in a polythene bottle. Organoleptic characters, moisture content, ash value, microbiological examinations were determined at the completion of one month of storage.

Analytical data

Analyses of the samples were done as per standard procedures of CCRAS, 1987[3]. Free fatty acid FFA) was estimated using the following method mentioned in fatty acids and Products Chemical Engineering Series[4].

Kreis test for rancidity

Oil (10ml) was shaken with 0.1% phloroglucinol in ether (10ml) and con. HCI (10ml) for 20 minutes. Appearance of pink colour indicates rancidity[6].

Microbial load

Bacterial and fungal contaminations were determined following the WHO (1998) guidelines[5].

RESULTS AND DISCUSSION

Hingvastaka Curna

The curna was brown in colour with a pleasant smell. Microbial analysis revealed that there was no growth of any organism during eth entire study of six months. Ash value (27%) as well as loss on drying (70%) almost remained the same revealing that the curna retains its potency at leas for six months (Table III). This may be due to the presence of saindava lavana as one of the ingredients.

Dasamula Kvatha Curna

All the three samples remained good as evidenced by constituent values over a period of three months. On the fourth month, the sample stored in the polythene bottle showed the presence of insects which multiplied rapidly (Table IV). Similarly the other two glass bottles were also found to be infected largely with insects from the fifth month onwards. Hence further analysis of the samples was given up.

Ajamodarka

The Ajamodarka remained colourless with no sediments throughout the period of observation and no fungal growth was also seen during this period the volatile matter remained steady at about 0.02% and there was no induced alkalinity due to glass of the bottle used. Ajamodarka was stable for a

minimum period of six months when stored in glass bottle exposed to light (Table V).

Brahmi ghrta

Brahmi ghrta was Yellow green in colour with pleasant odour. FFA and Kreis test were performed on the extracted fat at the completion of one month of storage on each sample. Even on the second month itself, the samples stored in (1) glass bottle exposed to light and (3) amber coloured bottle answered positively for the test, thereby showing that they have become rancid, while the sample stored in glass bottle kept in dark also became rancid on the fourth month, Further work was discontinued (Table VI).

Conclusion

The present study on the effect of packing materials on the stability and quality of Hingvastaka Curna, Brahmi Ghrta, Dasamula K vatha Curna, Ajamodarka were done. In Hingvastaka Curna, all the results were more or less concordant during entire the shelf-life study proving that the Hingvatsaka Curna keeps well at least for six months. This might be due to the presence of saindava lavana.

The result on the study on Dasamula K vath Curna shows that as no heating or other form of processing which has the effect of sterilization is employed in the preparation of Kvath curna, insect eggs which might be originally in any of the ingredients would cause spoilage of the curna.

Ajamodarka is stable for a minimum period of six months when stored in glass bottle exposed to light.

The appearance of rancidity in the Brahmi Ghrta during the second month itself without significant increase in free acidity confirmed the observation that the two phenomena are not parallel.

Rancidity is highly undesirable in any food or drug and further work would appear to be necessary to evolve a method of preparation that will rule out the possibility of rancidity development.

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Table I: Ingredients of Hingvastaka Curna

Sl.No.	Name of the drug	Botanical /Chemical Name	Anatomical part	Quantity (g)
1.	Sunti	Zinziber officinale Rose.	Rhizome	120
2.	Marica	Piper nigrum Linn	Fruit	120
3	Pippali	Piper longum Linn	Fruit	120
4.	Ajamoda	Apium leptophyllum (Pers.) Muell.	Fruit	120
5.	Saindhava	Sodium chloride lump	-	120
6.	Sveta jiraka	Cuminum cyminum Linn.	Fruit	120
7.	Krsna Jiraka	Carum carvi linn	Fruit	120
8.	Hingu	Ferula foetida Regel	Exudate	120

Table II: Ingredients of Brahmi ghrta

Sl.No.	Name of the drug	Botanical /Chemical Name	Anatomical part	Quantity (g)
1.	Brahmi Svarasa	*Bacopa monnieri (Linn.) Pennell*	Whole plant juice	1.536(lit)
2.	Ghrta (cow's ghee)	-	-	768
3.	Sunti	*Zinziber officinale Rose.*	Rhizome	12
4.	Marica	*Piper nigrum Linn*	Fruit	12
5.	Pippali	*P. longum Linn*	Fruiting inflorescence	12
6.	Syama (Krsna Trivrt)	*Operculina turpethum (Linn.) Silva Manso*	Root	12
7.	Sveta trivrt	*Ipomoea turpethum R.Br.*	Root	12
8.	Danti	*Baliospermum montanum Muell.-Arg.*	Root	12
9.	Sankhapusipi	*Convolvulus pluricaulis Choisy.*	Whole plant	12

10	Aragvada	*Cassia fistula Linn.*	Fruit pulp	12
11.	Saptala	*Euphorbia dracunculoides Lam.*	Whole plant	12
12.	Vindanga	*Embelia ribes Burm.f.*	Fruit	12

Table III: Effect of container-Hingvastaka Curna

Period	Parameter	Glass-colorless	Glass-amber	Polythene
Oct	**Organoleptic**			
	Colour	Brown	Brown	Brown
	Touch	Fine	Fine	Fine
	Odour	Pleasant	Pleasant	Pleasant
	Microbial load	No organism	No organism	No organism
	LOD%	7.23	6.7	7.06
	Ash%	27.48	27.13	27.26
Nov.	**Organoleptic**			
	Colour	Brown	Brown	Brown
	Touch	Fine	Fine	Fine
	Odour	Pleasant	Pleasant	Pleasant
	Microbial load	No organism	No organism	No organism
	LOD%	6.3	7.15	8.85
	Ash%	27.49	27.11	26.83
Dec.	**Organoleptic**			
	Colour	Brown	Brown	Brown
	Touch	Fine	Fine	Fine
	Odour	Pleasant	Pleasant	Pleasant
	Microbial load	No organism	No organism	No organism
	LOD%	6.51	6.02	7.31
	Ash%	27.24	27.42	26.83
Jan.	**Organoleptic**	Brown	Brown	Brown
	Colour	Fine	Fine	Fine
	Touch	Pleasant	Pleasant	Pleasant
	Odour	No organism	No organism	No organism
	Microbial load	6.73	6.58	7.25
	LOD%	26.93	27.9	26.89
	Ash%			
Feb.	**Organoleptic**			
	Colour	Brown	Brown	Brown
	Touch	Fine	Fine	Fine
	Odour	Pleasant	Pleasant	Pleasant
	Microbial load	No organism	No organism	No organism
	LOD%	6.53	6.64	7.31
	Ash%	27.83	27.83	26.89
Mar.	**Organoleptic**			
	Colour	Brown	Brown	Brown
	Touch	Fine	Fine	Fine
	Odour	Pleasant	Pleasant	Pleasant
	Microbial load	No organism	No organism	No organism
	LOD%	6.25	Not done	Not done
	Ash%	27.32	27.96	26.88
	Organoleptic			
	Colour	Brown	Brown	Brown

April.	Touch Odour Microbial load LOD% Ash%	Fine Pleasant No organism 6.68 27.81	Fine Pleasant No organism 7.2 27.22	Fine Pleasant No organism 7.22 26.78

LOD= Loss on during at 105^{o}C

Table IV: Effect of container on Dasamula Kvatha Curna

Period	Parameter	Glass-colorless	Glass-amber	Polythene
Sep.	**Organoleptic** Colour Touch Odour Microbiological load LOD Ash	 Yellow brown Coarse Pleasant No organism 8.54 6.54	 Yellow brown Coarse Pleasant No organism 8.04 6.54	 Yellow brown Coarse Pleasant No organism 8.38 6.2
Oct.	**Organoleptic** Colour Touch Odour Microbiological load LOD Ash	 Yellow brown Coarse Pleasant No organism 8.25 6.4	 Yellow brown Coarse Pleasant No organism 7.98 6.29	 Yellow brown Coarse Pleasant No organism 9.72 6.29
Nov.	**Organoleptic** Colour Touch Odour Microbiological load LOD Ash	 Yellow brown Coarse Pleasant No organism 9.36 6.47	 Yellow brown Coarse Pleasant No organism 8.43 6.36	 Yellow brown Coarse Pleasant No organism 11.88 6.23
Dec.	**Organoleptic** Colour Touch Odour Microbiological load LOD Ash	 Yellow brown Coarse Pleasant No organism 9.27 6.28	 Yellow brown Coarse Pleasant No organism 9.62 6.54	 Yellow brown Coarse Pleasant No organism 11.20 6.44
Jan.	**Organoleptic** Colour Touch Odour Microbiological load LOD Ash	 Yellow brown Coarse Pleasant No organism 10.17 6.42	 Yellow brown Coarse Pleasant No organism 11.86 6.42	 Yellow brown Coarse Pleasant No organism 10.16 6.58

Table V: Effect of container on Ajamodarka

Period	Parameter Organoleptic	Glass bottle (exposed to light)	Glass bottle (Kept in dark)
July	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear
	Sediments	No sediments	No sediments
	Microbiological growth	No organism	No organism
	Volatile matter	0.024%	0.024%
	Alkalinity due to glass	Nil	Nil
Aug.	**Organoleptic**		
	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear
	Sediments	No sediments	No sediments
	Microbiological growth	No organism	No organism
	Volatile matter	0.023%	0.024%
	Alkalinity due to glass	Nil	Nil
Sep.	**Organoleptic**		
	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear
	Sediments	No sediments	No sediments
	Microbiological growth	No organism	No organism
	Volatile matter	0.022%	0.023%
	Alkalinity due to glass	Nil	Nil
Oct.	**Organoleptic**		
	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear
	Sediments	No sediments	No sediments
	Microbiological growth	No organism	No organism
	Volatile matter	0.022%	0.023%
	Alkalinity due to glass	Nil	Nil
Nov.	**Organoleptic**		
	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear
	Sediments	No sediments	No sediments
	Microbiological growth	No organism	No organism
	Volatile matter	0.208%	0.0216%
	Alkalinity due to glass	Nil	Nil
Dec.	**Organoleptic**		
	Colour	Colourless	Colourless
	Odour	Pleasant	Pleasant
	Clarity	Clear	Clear

	Sediments Microbiological growth Volatile matter Alkalinity due to glass	No sediments No organism 0.0198% Nil	No sediments No organism 0.0203% Nil
Jan.	**Organoleptic** Colour Odour Clarity Sediments Microbiological growth Volatile matter Alkalinity due to glass	 Colourless Pleasant Clear No sediments No organism 0.0192% Nil	 Colourless Pleasant Clear No sediments No organism 0.0196% Nil

Table VI: Result of study of the effect of container on Brahmi ghrta

Period	Parameter	Glass Colourless (exposed to light)	Glass Colourless (kept in dark)	Glass - amber
Sep.	Organoleptic Colour Touch Odour Microbiological load FFA Rancidity test	 Yellow green Oily Pleasant Sterile 1.897% Negative	 Yellow green Oily Pleasant Sterile 1.442% Negative	 Yellow green Oily Pleasant Sterile 2.075% Negative
Oct.	Organoleptic Colour Touch Odour Microbiological load FFA Rancidity test	 Yellow green Oily Pleasant Spores are seen 1.74% Positive	 Yellow green Oily Pleasant Sterile 1.93% Negative	 Yellow green Oily Pleasant Sterile 1.70% Positive
Nov.	Organoleptic Colour Touch Odour Microbiological load FFA Rancidity test	 Yellow green Oily Pleasant Spores are seen 2.037% Positive	 Yellow green Oily Pleasant Sterile 1.837% Positive	 Yellow green Oily Pleasant Sterile 1.663% Positive
Dec.	Organoleptic Colour Touch Odour Microbiological load FFA Rancidity test	 Yellow green Oily Pleasant Spores are seen 1.68% Positive	 Yellow green Oily Pleasant Sterile 1.85% Positive	 Yellow green Oily Pleasant Sterile 1.91% Positive