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Pharmaceutico Analytical Study of *Kanakbindvarishta* prepared by two different methods

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ABSTRACT

Kanakbindvarishta is a self generated alcoholic preparation of Ayurveda. It is described in *Charak Samhita* in the context of *Kushta Roga* (skin disorders). *Khadir* (Acacia catechu) is a main ingredient in this formulation. It is used in condition like *Kushta* (mainly used in *Kaphaja Kushta*), Asthma, Cough, Fistula and Diabetes. In present study *Kanakbindvarishta* was prepared by two different methods, Pharmaceutical study was done along with analytical study. Analytical test of finished product like pH, specific gravity, refractive index, total solid content, viscosity, density, reducing sugar and alcohol content were done, LOD%, total Ash, pH and extractive value (water extractive, alcohol extractive) of raw material were also done. Two different type of *Kanakbindvarishta* compared with pharmaceutical as well as analytical aspect. As a result, slight changes were observed in both the preparations.

Key words: *Kanak, Acacia Catechu, Arishta, Sandhana, Fermentation, Kushta.*

INTRODUCTION

Sandhana Kalpana has been divided into two types *Madhya Janak Sandhan* (alcoholic fermentation) and *Amlajanak Sandhan* (acidic fermentation). In Acidic preparation there is no sweetening agent and *Sandhan Pravartak Dravyas* (fermentative agent) is used and in Alcoholic preparation sweetening agent (e.g. Jaggery, Honey and Sugar) and *Sandhan Pravartak Dravyas* (fermentative agent) is used, e.g. *Dhataki Pushpa* (*woodfordia fructicosa* flower).

Kanakbindvarishta[1] is an Ayurvedic formulation described in *Charaka Samhita* in the context of *Kushtaroga*. In the reference the ratio to prepare the decoction of *Khadira* and which sweetening agent should be used is not mentioned, so it is taken from *Sharangdhara Samhita*.

Kanakbindvarishta is an alcoholic type of fermentation procedure. This formulation has longer shelf life, quick absorption, action and excellent therapeutic efficacy. It is mainly used in *Kilasa Kushta*, Asthama, Cough, Fistula and Diabetes.

Kanakbindvarishta was prepared by two different methods. One is a classical preparation and another one is modified preparation. In classical preparation *Dhataki Pushpa Kalka* was used and in another second modified preparation instead of *Dhataki Pushpa Kalka*, *Dhataki Pushpa Phanta* was used, *Prakshepa Dravyas* was added after seven days, *Sandhi Bandhana* was done after 7 days.

Raw material testing was carried out like LOD, Ash, pH, extractive value and TLC. Analytical testing of finished product was carried out as pH, specific gravity, refractive index, total solid, viscosity, reducing sugar, alcohol content and density. Need of this study

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was to compare both preparation analytically and pharmaceutically.

AIM OF THE STUDY

Pharmaceutico Analytical study of *Kankbindwarishta* prepared by two different methods.

OBJECTIVE OF THE STUDY

1. Classical preparation of *Kanakbindvarishta*. Ref. *Charaka Chikitsa* (*Kushtarogadhikar*) 7/76-79
2. Modified preparation of *Kanakbindvarishta*.
3. Pharmaceutico analytical study of both the preparations.

MATERIALS AND METHODS

1. Materials

Table 1: Details of ingredients of *Kanakbindvarishta*

Dravya Type	Drug name	Latin name[7]	Part used[7]	Quantity	
				Sample A	Sample B
Adhara Dravya	*Khadira*	*Acacia Catecha*	*Khadirsara, Twak*	1280 gm	1280 gm
Prakshepa Dravya (Adheya)	*Amalaki*	*Emblica Officinalis*	Fruit	40 gm	40 gm
	Haritaki	*Terminalia Chebula*	Fruit	40 gm	40 gm
	Bibhitaki	*Terminalia Bellirica*	Fruit	40 gm	40 gm
	Sunthi	*Zinziber Officinalis*	*Kanda*	40 gm	40 gm
	Maricha	*Piper Nigrum*	Fruit	40 gm	40 gm
	Pippali	*Piper Longum*	Fruit	40 gm	40 gm
	Vidanga	*Embelia Ribes*	Fruit	120 gm	120 gm
	Haridra	*Curcuma Longa*	Fruit	120 gm	120 gm
	Musta	*Cyperus Rotundus*	Root	120 gm	120 gm
	Vasa	*Adhatoda Vasica*	Leaf	120 gm	120 gm
	Indrayava	*Holarrhena Antidycentrica*	Seeds	120 gm	120 gm
	Daruharidra	*Berberis Aristata*	*Twak*	120 gm	120 gm
	Amruta	*Tinospora Cordifolia*	*Kanda*	120 gm	120 gm
Fermentative agents	*Dhataki*	*Woodfordia Fructicosa*	Flower	50gm	50gm
Sweetening agents[2]	Jaggery			2.5 Kg	2.5 Kg
	Honey			1.25 Kg	1.25 Kg
Others	*Katak Beeja*	*Strychnous potatorum* seeds	Seeds	5 gm	5 gm

Picture 1: Raw drugs of *Kanakbindvarishta*

2. Methods

- Standardization of ingredients
- Method of preparation
- Analytical test of finished product

2.1 Standardization of ingredients

Drug standardization was done in research laboratory of Dr. D. Y. Patil College of Ayurveda and Research

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Center, Pimpri, Pune and their values were compared with API.

Table 2: Standardization of ingredients

Name of drug	LOD%	Total Ash%	pH %	Extractive Value		TLC		
				Alcohol %	Water %	Solvent System	Alcohol - Rf	Water -Rf
Khadira[8]	6.50	2	5.25	6	12	Toluene : Ethylacetate, 9:1	0.76	0.08, 0.77
Amalaki[8]	10.15	0.082	3.44	54	57.49	Toluene : Ethylacetate, 9:1	0.018, 0.84, 0.66	0.43, 0.056
Haritaki[8]	6.2	5	3.78	41.2	58.6	Toluene : Acetone : Glacial Acetic Acid : Formic Acid, 3.5:5:1.5:0.5	0.67, 0.77	0.22,0.51, 0.77
Bibhitaki[8]	4.6	5	4.58	8	38	Chloroform : Acetic Acid : Water, 5:4.5:0.5	0.45, 0.52, 0.67	0.46, 0.6
Sunthi[8]	10.75	5.5	5.05	3.2	12.8	Toluene : Ethylacetate, 7:3	0.35, 0.47, 0.54	0.28, 0.35, 0.42, 0.48, 0.57
Maricha[10]	5.4	5	7.03	7.6	11.4	Toluene : Ethylacetate, 7:3	0.44, 0.51, 0.61	0.25, 0.36
Pippali[11]	6.8	5.92	5.86	28.64	29.92	Toluene : Ethylacetate, 9:1	0.17, 0.68, 0.86	0.19
Vidanga[8]	8.16	3.5	5.07	10.4	11.2	Toluene : Acetone : Acetic Acid, 9:1:0.5	0.22, 0.56	0.37
Haridra[8]	7	7.5	5.88	8.6	13	n-Hexane : Ethyl Acetate, 7:3	0.05, 0.14, 0.30, 0.41, 0.53, 0.58	0.1, 0.15, 0.31
Musta[10]	6.6	7	6.20	7.6	11.6	Toluene : Ethylacetate, 9:1	0.24, 0.58	0.38
Vasa[8]	4.6	17	5.64	5	27.2	Methanol : Sulphuric Acid, 5:5	0.33, 0.40, 0.78	
Indrayava[10]	4.40	7.5	6.48	12.4	16.8	Chloroform : Methanol, 5:5	0.83	0.55
Daruharidra[9]	4.1	2	6.28	6.2	9.4	Toluene : Water : Glacial Acetic Acid, 6:3:1	0.22, 0.73	0.43

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Amruta[8]	5.9	0.169	4.43	3.92	11.4	Toluene : Ethylacetate, 9:1	0.08, 0.83, 0.33, 0.66	0.28, 0.67
Jaggery	7.5	2.5						
Honey			4.30			Glacial Acetic Acid: Chloroform : Ethanol, 2.1:2.3:1.5	0.39, 0.55, 0.94	
Dhataki Pushpa	9.2	1.7289	4.65	8.4	11.54			

Table 3: Sweetening Agents

Honey [12]	**Parameter**	**Test observation**
	Color in Aqueous solution	Light yellow
	pH	4.13
	Specific gravity (g/ml)	1.41 g/ml
	Refractive index	1.4892
	Viscosity	2928.74 cp
	TLC (Glacial Acetic Acid : Chloroform : Ethanol, 2.1:2.3:1.5)	0.39, 0.55, 0.94
Jaggery[12]	**Parameter**	**Test observation**
	Color in Aqueous solution	Light yellow
	pH	4.13
	Specific gravity (g/ml)	1.41 g/ml
	Refractive index	1.4892
	Viscosity	2928.74 cp
	TLC (Glacial Acetic Acid : Chloroform : Ethanol, 2.1:2.3:1.5)	0.39, 0.55, 0.94

2.2 Method of preparation

Following are the important elements in preparation of *Kanakbindvarishta;*

1. *Adhara Dravya* - Water, Decoction of *Khadira Twak*
2. *Prakshepa Dravya* (*Adhey*) - All *Prakshepa Drvayas* mentioned in above chart.
3. Sweetening agent - Honey and Jaggery
4. Fermentative agent - *Dhataki Pushpa*

2.2.1 Sample A[4][5]

1. Coarse *Khadira* bark was mixed with 16 parts of water and soaked overnight.
2. Decoction was prepared by classical method on mild flame.
3. Decoction was filtered through cloth and when it got cool jaggery and honey mixture was stirred till jaggery get dissolved.
4. Ceramic jar was sterilized by *Dhoopana* method.
5. The decoction was poured in sterilized ceramic jar and *Prakshepa Dravyas* with *Dhataki Pushpa Kalka* were added.
6. The container was sealed with mud smeared cloth and kept in clean and dry room for fermentation.
7. After one month fermentation was completed.
8. *Sandhana Pariksha* were carried out (Crackling sound and candle flame test)
9. Fermented material was filtered through cloth and was collected in sterilized jar and *Kataka Beeja* (*strychnous potatorum* linn seeds) were added for *Nirmalikarana.*[5][6]
10. Analytical tests were carried out.

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Picture 2: Preparation of *Khadira Kwatha*

Picture 3: Filtration of *Kwatha*

Picture 4: Addition of *Prakshepa Dravyas*

Picture 5: *Dhoopana* of Jar

Picture 6: Pouring the mixture in Jar

Picture 7: *Sandhi Bandhana*

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Picture 8: *Galana* of *Sandhana*

2.2.2 Sample B

1. All procedure, ingredient and their quantity were same as mentioned for sample A.
2. But instead of *Dhataki Pushpa Kalka* 200 ml *Dhataki Pushpa Phanta* were added and *Prakshepa Dravyas* were added after 7 days.

Picture 9: Preparation of *Dhataki Phanta*

2.2.3 *Arishta Siddhi Lakshana*

Following *Lakshanas* were found in sample A and B.[5]

- The preparation had the characteristics as typical aromatic and alcoholic odor.
- There was no crackling sound heard in ceramic jar.
- Burning candle burns brightly when placed in just above *Sandhana Patra*.
- Powdered drugs settled down completely
- *Arishta* was clear, no froth was there on the top

Picture 10: Candle Flame Test

Picture 11: Clearity Test

2.3 Analytical test of finished product

Instrument used for analysis of *Arishta* are as following.

1. pH meter
2. Abbe's refractometer
3. Pyknometer
4. Oswald viscometer

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5. Water bath
6. Weighing balance

1. pH

The pH of solution provides a useful practical means for the indication of the acidity or alkalinity of a solution. The pH value of *Kanakbindvarishta* preparation was determined by using 1.021% w/v solution of potassium hydrogen phthalate as a primary standard and then pH of *Kanakbindvarishta* was determined.

2. Refractive Index

The refractive index of formulation was found out by using Abbe's refractometer.

3. Viscosity

The viscosity is the internal resistance to the flow of fluid. The viscosity of *Kanakbindvarishta* was determined by using Oswald viscometer. The Ostwald viscometer cleaned, dried and clamped in a vertical position. Both bulbs A and B was immersed in a constant temperature bath. Then taken specified volume of distilled water into the bulb A and sucked the liquid into the bulb B just above the mark M, about half of the bulb A still contain the liquid, the time of flow of the liquid level to fall from the mark M to the mark X was determined. A stopwatch was used to determine the time.

4. Specific gravity

A specific gravity is the ratio of specific weight of the material to the specific weight of the distilled water. A specific gravity bottle of 10 ml capacity was cleaned, dried and weighed, it is filled upto the mark with water at the required temperature and weighed. The specific gravity bottle was next filled upto the mark with the sample. The specific gravity was determined by dividing weight of the sample expressed in grams by the weight of the water, expressed in grams.

5. Total solid content

25 ml of formulation was taken in evaporated dish which was previously weighted and allowed to evaporate so that only solid content remains in the dish and rest of the fluid gets evaporated, then it gain weight and the solid content of formulation calculated.

Analytical test	Sample A	Sample B
pH	4.27	4.31
Specific gravity	1.085 g/ml	1.1588 g/ml
Refractive Index	1.3745	1.3789
Total Solid	74.36 gm	71.96
Viscosity	1.855 c.p.	1.8640 c.p.
Density	1.1676 g/ml	1.1588 g/ml
Reducing Sugar	Present	Present
Alcohol Content	6.22	6.82

OBSERVATION AND RESULTS

Sample A and B of *Kanakbindvarishta* were subjected to organoleptic and physico-chemical studies in order to develop analytical profile. The following parameters were carried out in this phase.

Parameters	Sample A	Sample B
Rupa (Color)	Light reddish	Dark reddish
Rasa (Taste)	*Tikta, Kashaya, Madhura*	*Tikta, Kashaya, Madhura*
Gandha (Odor)	Slightly Alcoholic	Alcoholic
Sparsha (liquid consistency)	Thin	Thin

Determination of pH, specific gravity, refractive index, total solid content, viscosity, density, reducing sugar and alcohol content of sample A and B is as below.

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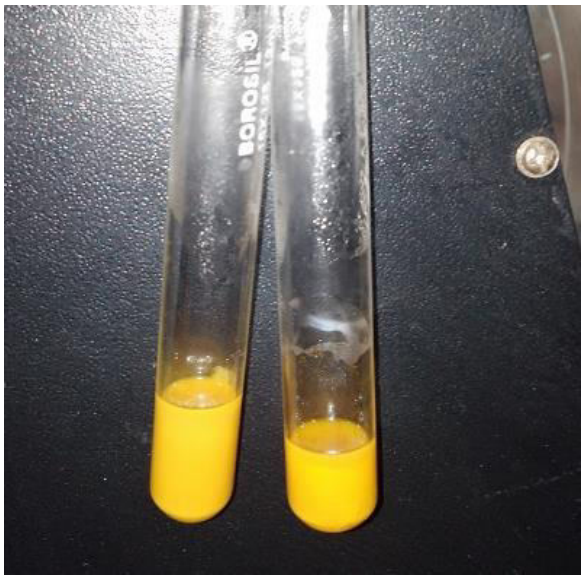
Analytical test	Sample A	Sample B
pH	4.27	4.31
Specific gravity	1.085 g/ml	1.1588 g/ml
Refractive Index	1.3745	1.3789
Total Solid	74.36 gm	71.96
Viscosity	1.855 c.p.	1.8640 c.p.
Density	1.1676 g/ml	1.1588 g/ml
Reducing Sugar	Present	Present
Alcohol Content	6.22	6.82

Fehling's Test

Benedict's Test



Finished Product

DISCUSSION

Kanakbindvarishta was prepared by two different methods. All precautions were carried out for making sample A and B. Standardization of raw drug was done carefully. Decoction was prepared as mentioned in classical test. Mixture was heated on mild flame as the quantity get reduced 1/4th of initial volume.

All used equipment was sterilized. *Dhoopana* of jar was carried out with *Haridra*, *Jatamansi*, *Guggula*, *Sarjarasa* and *Vacha* as it was necessary to clean jar properly to avoid growth of fungi which might be promoted due to organisms present in the water used to clean the vessel.

The filtered *Arishta* was clear without froth at the top. The preparation had the characteristics as typical aromatic and alcoholic odor. It was stored in air tight jar. *Dhataki Pushpa* flower was used in both sample A and B preparation, the inoculum of yeast comes from *Dhataki Pushpa* (*woodfordia fructicosa* flowers), which contains the wild species of the yeast, which is necessary for fermentation process.[5]

Fermentation is incomplete oxidation of sugar into ethanol and CO_2 in the absence of O_2, brought about by enzymes , invertase and zymase secreted by yeast cells.

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Honey and Jaggery were also used for fermentation, Jaggery contains sucrose, glucose and phosphate. Due to phosphate fermentation process increases. Honey contains nitrogenous elements which helps in fermentation. Jaggery has *Saraka* and *Mutrala* properties and honey has *Raktadoshaghna*, *Vranashodhana* and *Vranaropana* property, that's why both are effective in *Kushta*.[5]

Even after completing *Sandhana* in one month turbidity was there, so to remove turbidity 5gm *Kataka Beeja* (*stychnous potatorum* linn) in both sample was added for *Nirmalikarana* process. *Sychnous potatorum* linn contains natural poly-electrolytes which can be used as coagulants to clarify turbidity.[6]

Sandhana examination were carried out, there was no crackling sound and candle flame also didn't go off.[3]

CONCLUSION

Kanakbindvarishta prepared by two different methods. Sample A prepared by classical method and sample B prepared by modified method. In sample B *Dhataki Pushpa Phanta* was used and *Prakshepa* drug added after 7 days. And in sample A *Dhataki Pushpa Kalka* was used. After fermentation process finished product obtained of sample A was 4400 ml and of sample B it was 4500 ml. Odor of sample A was slightly alcoholic and of sample B was alcoholic. This study has future scope in antimicrobial and clinical study (Skin disorders).

Analytical tests were carried out on both these two samples. There is difference in total solid content (residue). Total solid content of sample A was 74.36 gm and of sample B it was 71.96 gm. pH of sample A was 4.27 and of sample B it was 4.31. Refractive index of sample A was 1.3745 and of sample B was 1.3789. Viscosity of sample A was 1.855 c.p. and of sample B it was 1.8640 c.p. Density of sample A was 1.1676 g/ml and of sample B was 1.1588 g/ml. Reducing sugar was present in both sample. Alcohol content in sample A was 6.22 and in sample B it was 8.82.

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