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RESEARCH ARTICLE

Pharmaceutical Standardization and Comparative Study of *Varunadi Kvatha Churna* as *Varunadi Ghana Vati*/Tablet and *Varunadi Pravahi Kvatha*

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Abstract

Background: In *Ayurveda*, there are many types of potent dosage forms available with their different specifications, *anupan*, preparation procedure and shelf life. The preparation of medicines of herbal drug origin is generally included in the *Bhaishajya Kalpana* section. In *Bhaishajya Kalpana* there are five basic dosage forms necessary to prepare formulations from herbal origin drugs i.e. *Swarasa, Kalka, Kvatha, Hima* and *Phanta*. These five basic formulations are potent dosage forms which can moulded into different finished formulations. **Aim:** The objectives of this study were to prepare and standardise the *Varunadi Kvatha Churna* as *Varunadi Ghana Vati*/Tablet and *Varunadi Pravahi Kvatha* with a comparative study. **Methods:** Firstly, *kvatha churna* was prepared as per the master formula. The *kvatha churna* was then used in two different ways i.e. firstly it was used to prepare *Varunadi Ghana Vati* (Tablet) without using any additives as it acts as a self-binder. On the other hand, *Pravahi kvatha* was prepared which is a self-generated alcohol formulation, in which *dhataki pushpa*, *gudda* and *babool* are added as a fermentation initiator and additives. **Results:** Physicochemical parameters do not show significant variation. According to the TLC profile, the *Ghana Vati* has six spots i.e. having much more active constituents than the Pravahi kvatha having two spots. Therefore, according to the parameters, it might be stated that the Pravahi kvatha has much more stability than the *Ghana Vati*. But as far as palatability and activity are concerned *Ghana Vati* is comparatively better than Pravahi kvatha **Conclusion**: Converting *Varunadi Kvatha Churna* into *Varunadi Ghana Vati*, *Varunadi Pravahi Kvatha* provides several benefits related to ease of use, dosage precision, and patient preference. Hence based on observation we stated that the *Varunadi Ghana Vati* has a better choice of dosage form as compared to *Varunadi Pravahi Kvatha*, although it has better stability.

Keywords: *Ayurvedic, Ayurveda,* Decoction*, Ghana, Kvatha, Pravahi Kvath*

1. Introduction

Ayurveda serves as one of the oldest systems of medicine in the world[1]. It originated in India and has evolved there over thousands of years. *Ayurvedic* formulations have been used since the existence of human beings because the existence of disease is as old as the existence of human being and their treatment would date almost to the same antiquity[2,3]. During the Samhita period, *Ausadha Kalpanas* were divided into five basic preparations (*Panchvidha Kashaya Kalpan*) and others are derived from these preparations. *Acharyas* had felt the drawbacks of the five basic *Kalpanas*

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since the *Samhita* period like their high doses, less stability, unpalatability etc. and hence adopted them in different modified forms[4,5]. *Kvatha churna* - certain drugs or blends of medications are ground into a coarse powder (*yavkut*) and then preserved to prepare *Kashya*. Such powders are called *Kvatha Churna*[6]. *Kvatha* is a well-known *Ayurvedic* dosage form that is used for therapeutic purposes. In the modern context, it's known as a decoction or we can say aqueous extract[7]. *Kvatha* is prepared by adding water (in specific proportion as mentioned in classical texts)[4] to the coarsely powdered raw material and then boiling it and finally filtered[8,9].

2. Materials and Methods

2.1 Collection and Authentications of the Raw Drugs

The raw materials such as *Varuna, Pashanbheda, Shunthi, Gokshura, Babool, Gudda* and *Dhataki* were bought from the local market of Jalandhar. As of October 29, 2013, Guru Nanak Dev University, Botanical and Environmental Sciences, Amritsar, Punjab, has verified the authenticity of the raw sample i.e. *Pashanbheda, Varuna, Shunthi, Gokshura, Babool Tvaka*, and *Dhataki pushpa* with authentication ref. no. 2014 Bot. and Env. Sc. dated 29-10-2013. Ayurveda Mahavidyalaya Belgaum's Central Research Facility, reference number CRF/13/1000, and is where the *Gudda* authentication was done on November 25, 2013.

2.2 Pharmacognostic Study

2.2.1 Macroscopic Study

Morphological characteristics of drugs like size, shape, colour, fracture, odour and taste may be examined by adopting the procedure mentioned in the official compendium[10-12].

2.2.2 Microscopic Study

Microscopic examination is used to determine the anatomical characterization of the plant materials. The microscopic of the raw herbal drugs is carried out by cutting their transverse section or longitudinal section and placed on the glass slide followed by covering them with the coverslip and examining them under the light microscope through 10X and 45X lenses and observation is noted[10-12].

2.3 Pharmaceutical Study

2.3.1 Preparation of Varunadi Kvatha Churna

All the mentioned raw drug was ground into a coarse powder and kept in a well-closed airtight container.

2.3.2 Preparation of Varunadi Ghana Vati/Tablet

To create a fine powder, weigh out the components according to the formula and pulverize them. To make *Varunadi Ghana*, reheat prepared *Varunadi kvatha*. When it's ready, add the *Varunadi kvatha* churna to Ghana and triturate it thoroughly in a mortar and pestle. Kept this material in the oven at 60°C to dry it out. Now, grind this material finely and make tablets by compressing them directly.

2.3.3 Preparation of Varunadi Pravahi Kvatha

The coarse powdering of the material used for the *kvatha* preparation is carried out. The drugs *Varuna, Gokshura, Pashanbheda* and *Shunthi* were each taken in the same quantity 250 gm each and *kvatha* was prepared by adding 8 times the water and reducing up to 1/4th quantity. After that when the *kvatha* was cooled then it was filtered through the cloth and the jaggery was added and mixed well after that the *sandhan dravya Woodfordia fruticosa* was added to it and mixed properly after that *parkshep dravya* was added into it. The fumigation of the fermented container with *guggulu* was carried out. The mixture was added into the fermented container *sandhi bandhana* was carried out and the container was kept in a dark place for one month. Filtration - The prepared *Varunadi Pravahi kvatha* is filtered to separate the *kinnava* and the *sandhan dravya*. The filtration was achieved by the two folded cloth. Maturation - After the proper filtration the material is allowed to stand undisturbed for some time to sediment the material inside it. It is an essential process because the remaining sediment material, if present in the material leads to further fermentation. When the sedimentation is completed, the material is detained further filtered and stored in an airtight container.

2.4 Preliminary Phytochemical Analysis

Conventional techniques were used in this investigation to determine whether plant parts contained secondary metabolites[4,13-16].

2.5 Analytical Methods

2.5.1 Determination of Foreign Matter

After random sampling, a 500 g sample was obtained and spread out onto a tray. With a magnifying lens, remove any undesired material and determine the proportion of foreign materials[4,13,14].

2.5.2 Determination of Moisture Content (LOD at 105°C)

Approximately 10 g air dried sample kept in hot air oven (at 105^{0}C for 5 hours) and take weight. The process repeated till the difference between the two progressive readings was not less than 0.25 per cent then finally computed the percentage of LOD[4,13,14].

2.5.3 Determination of Total Ash

2g samples were incinerated by using a muffle furnace at 450°C till carbon-free white colour ash was not found and the percentage of total ash was computed[4,13,14].

2.5.4 Determination of Acid Insoluble Ash

Obtained ash was mixed with 25ml of 6N hydrochloric acid and boiled the mixture for 5 min. and the insoluble ash in ashless filter paper was washed using hot water till it became chlorine-free. The residual now ignited in the muffle furnace calculates the percentage of AIA[4,13,14,17].

2.5.5 Determination of Alcohol-Soluble Extractive

About 5 g of coarsely ground drug is extracted with 100 ml of alcohol for 24 hours in a closed flask with occasional shaking. Filter carefully using Whattman filter paper. To the filtrate, transfer 25 ml of the filtrate into a tarred evaporating dish and evaporate in a water bath till dry. Weighed it and kept it in a hot air oven at 60-70 °C for 3 hours to dry it. Weigh the filtrate. Determine the percentage of alcohol-soluble extractive about the air-dried drug[4,13,14,17].

2.5.6 Determination of Water-soluble Extractive

The process was the same as substituting alcohol with water in an extractive that was soluble in alcohol[4,13,14].

2.5.7 pH

The pH meter must be calibrated before each measurement using two or three buffer solutions of known pH values mainly pH 4, pH 7, and pH 9.2[4,13,14].

2.5.8 Specific Gravity at Room Temperature

The liquid's sample weight at room temperature is compared to the weight of an equivalent amount of water at the same temperature[4,13,14].

2.5.9 Determination of Viscosity

Viscosity is measured with the help of the Ostwald Viscometer. When the liquid flows from the capillary tube, the time required for the sample to pass between two marks was determined. The time of flow of the sample under test was compared with the time required for the reference sample of known viscosity[4,13,14].

2.5.10 Refractive Index

The relationship between the sine of the angle of incident light and the angle of refraction of a light emission entering a substance from the air is known as the refractive index of drugs relative to air. The wavelength of the light used to measure it affects it[4,13,14].

2.5.11 Determination of Total Solid Content

50ml of sample evaporated in the evaporating dish obtained residue weight was taken, and the percentage of total solid content was calculated[4,13,14].

2.5.12 Determination of Alcohol Content

Pour 150 millilitres of water into a distillation flask to dilute a 50-millilitre sample. Now, using the distillation apparatus, prepare 100 ml of distillate in a volumetric flask. Next, use the obtained specific gravity to compare with the alcohol table to compute the specific gravity and determine the percentage of alcohol content[4,13,14,18].

2.5.13 Test for the Absence of Methanol

Pour sample (1 drop) into a test tube and now add water (1 drop), 10%w/v phosphoric acid, 1%w/v potassium permanganate, and sodium bisulphate dropwise till de-coloration of permanganate color. If the brown colour persists, add dilute phosphoric acid (1 drop) followed by chronotropic acid (5ml) and heat it at 60°C (10 minutes). If no violet color is produced indicates the absence of methanol[4,13,14,18].

2.6 Post-Compression Parameters

2.6.1 Shape and Appearance

Through visual assessment, it was noted[4,13,14,16,19].

2.6.2 Diameter and Thickness

Measured by using a calibrated dial calliper in randomly selected 5 tablets[4,13,14,16,19].

2.6.3 Hardness[4,13,14,16,19]

Computed by using hardness test apparatus in randomly selected 10 tablets and expressed in kg/cm^2.

2.6.4 Friability (F)

Twenty randomly selected tablets were placed into the Roche friability test apparatus and expressed the observation in percentage[4,13,14,16,19].

2.6.5 Weight Variation Test

Twenty randomly selected tablets were accurately weighed. The single tablet weight was divided by a composite 20 tablet weight. The average weight and standard deviation of the tablets were calculated[4,13,14,16,19].

2.6.6 Disintegration Time

Six tablets were taken in the disintegration test apparatus and discs were placed over the tablet, when all the particles passed through the wire mesh that time was noted and considered as disintegration time[4,13,14,16,19].

2.7 Quantitative Estimation of Reducing and Non-reducing Sugars

The amount of nonreducing sugar was calculated by subtracting the reducing sugars from the calculated total sugars amount. Clarifying reagent: Solution 1: Mix zinc acetate (21.9g) and glacial acetic acid (3ml) in a volumetric flask (100ml) and add distilled water to make a volume of 100ml. Solution II: Mix potassium ferrocyanide (10.6g) in 100 ml distilled water[4,13,14,16,19].

2.7.1 Reducing Sugars

10 ml sample neutralize by using 10% sodium hydroxide solution in water heat the mixture at 50°C to remove the alcohol. After cooling add solution 1 (10ml) followed by solution 2 (10ml), the mixture is filtered through a dry filter paper and 100ml volume in a volumetric flask. Now add Fehling's solution (10 ml) above the prepared sample in a dropwise manner and heat the mixture till Fehling's solution is reduced. Now 1% methylene blue indicator (3-5 drops) is added to the mixture and the titration till the blue color is discharged. Note down the number of ml consumed and calculate the percentage of glucose[4,13,14,16,19].

2.7.2 Non-reducing Sugars

10 ml sample neutralize by using 10% sodium hydroxide solution in water heat the mixture at 50^{0}C to remove the alcohol. After cooling add solution 1 (10ml) followed by solution 2 (10ml), the mixture is filtered through a dry filter paper, now add 0.1 N hydrochloric acid (15ml) and cover the conical flask using a stopper then the mixture is heated up to boiling for 2 minutes. Add phenolphthalein indicator neutralize the mixture with 10% sodium hydroxide solution and transfer it to a 100ml volumetric flask to make the volume. Calculate the percentage of the total sugars[4,13,14,16,19].

3. Result and Discussion

3.1 Primarily Phytochemical Analysis

The preliminary phytochemical characterization of raw materials used in formulation revealed the presence of phytochemicals (Table 1). Physicochemical studies of raw material used in preparation are carried out for various parameters including LOD, total ash, acid insoluble ash, and extractives values Table 2 (a) and (b).

3.2 Organoleptic Evaluation of Herbal Drugs Used

Varuna stem bark includes shape- flat cut pieces, size- 3.6 cm length, colour- outer brownish inner reddish, characteristics, taste - bitter, fracture – hard (Figures 1 and 2). *Pashanbhed* rhizome includes shape – cylindrical, size - length 3 cm, diameter 2 cm, colour – blackish, odour – none, taste – bitter. touch – hard (Figures 3 and 4). *Shunthi* dried rhizome consists of flat cut pieces, size - 3.6 cm in length, colour - outer brownish inner reddish, odour - aromatic, taste - bitter, fracture – hard (Figures 5 and 6). *Gokshura* fruits include shape - five angled spherical, size - 1 cm in length. Colour - yellowish, odour -none, taste – bitter, touch - rough bearing

Table 1. Qualitative test for phytochemicals

Sr. No.	Qualitative Test	Phytochemical constituents	Observations									
			***Varuna* stem bark**	***Pashanbheda* roots**	***Shunthi* dried rhizome**	***Gokshur* fruit**	***Babool* Bark**	***Dhataki* Flower**	***Guda***	**VKC**	**VGT**	**VPK**
1	Ferric chloride test	Tannins	+	+	-	+	+	+	+	+	+	+
	Lead acetate test		+	+	-	+	+	+	+	+	+	+
	Bromine water		+	+	-	+	+	+	+	+	+	+
2	Borntrager's test	Glycoside	+	+	-	+	+	+	+	+	+	+
	Liebermann's Test		+	+	-	+	+	+	+	+	+	+
	Keller-Kiliani Test		+	+	-	+	+	+	+	+	+	+
	Salkowski's Test		+	+	-	+	+	+	+	+	+	+
3	Foam test	Saponin	+	+	-	+	+	+	+	+	+	+
4	Millon's test	Protein	+	-	+	+	+	+	+	+	+	+
	Biuret Reagent test		+	-	+	+	+	+	+	+	+	+
	Ninhydrin Test		+	-	+	+	+	+	+	+	+	+
5	Benedict's solution test	Carbohydrates	+	-	+	+	+	+	+	+	+	+
	Fehling's test		+	-	+	+	+	+	+	+	+	+
	Molisch's test		+	-	+	+	+	+	+	+	+	+
6	Mayer's reagent	Alkaloids	+	+	+	+	+	-	-	+	+	+
	Dragendroff reagent		+	+	+	+	+	-	-	+	+	+
	Wagner's reagent		+	+	+	+	+	-	-	+	+	+
	Hager's reagent		+	+	+	+	+	-	-	+	+	+

Table 1. Continued...

Sr. No.	Quali tative Test	Phyto chemical consti tuents	Observations									
			Varuna stem bark	*Pashan bheda* roots	*Shunthi* dried rhizome	*Gokshur* fruit	*Babool* Bark	*Dhataki* Flower	*Guda*	VKC	VGT	VPK
7	Lieb ermann Burc hard's reaction	Steroids	+	+	+	+	+	-	-	+	+	+
	Salk owski test		+	+	+	+	+	+	-	+	+	+
8	Ferric Chloride Test	Phenols	+	+	+	+	+	+	+	+	+	+
	Lieber mann's nitroso reaction		+	+	+	+	+	+	+	+	+	+
	Lead Acetate test		+	+	+	+	+	+	+	+	+	+
	Gelatin test		+	+	+	+	+	+	+	+	+	+
9	Alkaline reagent test	Flavonoids	+	+	+	+	+	+	+	+	+	+
	Zinc hydro chloride test		+	+	+	+	+	+	+	+	+	+

**Varunadi Kvatha Churna (VKC), Varunadi Ghan Tablet (VGT), Varunadi Pravahi Kvath (VPK),* + Present, - Absent

Table 2 (a). Depicting the testing parameter results

S. No.	Parameter	Standard (API)	*Varuna* stem bark	Standard (API)	*Pashanbheda* roots	Standard (API)	*Shunthi* dried rhizome
1	LOD at 105°C	-	10.6%w/w	-	11.4%w/w	-	11%w/w
2	FM	NMT 2%	1.7%w/w	NMT 2%	1.5%w/w	NMT 2%	1.5%w/w
3	TA	NMT 13%	10.1%w/w	NMT 13%	11.6%w/w	NMT 6%	1.73w/w
4	AIA	NMT 1%	0.55%w/w	NMT 0.5%	0.44%w/w	NMT 1.5%	0.7%w/w
5	ASE	NLS 3%	11.6%w/v	NLS 9%	12.7%w/v	NLS 3%	4.8%w/v
6	WSE	NLS 8 %	8.3%w/v	NLS 15 %	16.7%w/v	NLS 10 %	15%w/v

spikes, cocci – 5 cocci; each cocci bears 2 spikes (Figures 7 and 8). Babool bark consists of shape - longitudinal cut pieces, size - 7.1 cm length, colour - brownish, odour - none, taste - astringent touch - rough fracture - hard (Figures 9 and 10). *Dhataki* flower includes shape - longitudinal, colour - reddish brown, odour- characteristics, taste - astringent, size- 1-2 cm long (Figures 11 and 12). *Guda* consists

Table 2 (b). Depicting the testing parameter results

S. No.	Parameter	Standard (API)	*Gokshur* fruit	Standard (API)	*Babool* Bark	Standard (API)	*Dhataki* Flower	Standard (API)	*Guda*
1	LOD at 105°C	-	9.5%w/w	-	10.4%w/w	-	9.9%w/w	-	9.8%w/w
2	F.M.	NMT 2%	1.4%w/w	NMT 2%	1.7%w/w	NMT 2%	1.1%w/w	-	Nil
3	T.A.	NMT 15%	11.8%w/w	NMT 10%	8.5%w/w	NMT 10%	6.9%w/w	-	7.3%w/w
4	A.I.A.	NMT 2%	1.33%w/w	NMT 1%	0.43%w/w	NMT 1%	0.78%w/w	-	0.56%w/w
5	A.S.E	NLS 6%	7%w/v	NLS 7%	8.7%w/v	NLS 7%	10.2%w/v	-	4.2%w/v
6	W.S.E	NLS 10%	11.6%w/v	NLS 4%	5.2%w/v	NLS 28%	30%w/v	-	42.6%w/v

of shape - oval, size - 6 cm length, colour - brownish, odour - characteristics, taste - sweet, touch - hard and sticky (Figures 13 and 14). Organoleptic characteristics of *Varunadi Kvatha Churna* include appearance: coarse powder, touch was rough, and yellowish colour, odour characteristics and taste bitter. Organoleptic characteristics of *Varunadi Ghana Vati*/ tablet consist of a brownish colour, in tablet form, the shape flattened and round, smooth surface, taste bitter, and odour characteristics. organoleptic characteristics of *Varunadi Pravahi Kashya* include dark brown colour, odour alcoholic, taste astringent and liquid state. Physicochemical studies of *Varunadi Kvatha Churna* are carried out for various parameters such as Loss on Drying (LoD), Total Ash (TA), Acid Insoluble Ash (AIA), extractive values (water and alcohol), pH value (Table 3). Physicochemical parameters of *Varunadi Ghana* for various parameters such as disintegration, weight variation etc. are carried out mentioned in (Table 4). Physicochemical studies of *Varunadi Pravahi Kashya* such as refractive index, reducing and non–reducing sugar, tests for methanol etc. are performed (Table 5). Microscopy of herbal drugs used for preparation is carried out to reveal the presence of microscopical characters such as stone cells, crystals etc. *Varuna* Stem Bark (Figures 15-17) *Pashanbhed* rhizome (Figures 18-20) *shunthi* dried rhizome (Figures 21-23) *Gokshura* fruits (Figures 24-26). The microscopic characters show parenchymatous cortex cork cells on the surface, stone cells, tracheid, starch grains, non-glandular trichomes, vascular bundles, and vessels. TLC profiling of the *Varunadi kvatha churna* was performed by using the solvent system

Table 3. Depicting the physicochemical parameters of *Varunadi Kvatha Churna*

S. No.	Parameters	Observed Result
1	LOD at 105 ° C	8.6%w/w
2	W.S.E	11.2%w/v
3	A.S.E	8%w/v
4	Chloroform soluble extractive	7%w/v
5	T.A	14%w/w
6	A.I.A	1.5%w/w
7	Total solid content	8.25%
8	pH	5

methanol: ethyl acetate: toluene in the ratio of 1:1:6. alcohol (ethanol) soluble extract was used for the spotting. Six spots were observed and the R_f values were found to be 0.31, 0.48, 0.60, 0.67, 0.74 and 0.83 respectively. Four spots were observed under the UV light and the R_f values were found to be 0.14, 0.44, 0.71and 0.74 respectively. TLC profiling of the *Varunadi Ghana* tablet was performed by using the solvent system methanol: ethyl acetate: toluene in the ratio of 1:1:6. Alcohol (ethanol) soluble extract was used for the spotting. Six spots were observed and the R_f values were found to be 0.31, 0.48, 0.60, 0.67, 0.74 and 0.83 respectively. TLC profiling of *Varunadi Pravahi Kvatha* was performed by using the solvent system Methanol: Ethyl acetate: Toluene in the ratio of 1:1:6. The plates were examined under ultra-violet light at 366nm and visualized. Two spots were observed and the R_f value was found to be 0.32 and 0.45 respectively.

Table 4. Depicting the physicochemical parameters of *Varunadi Ghana*

S. No.	Analytical parameter of *Varunadi Ghana Vati*/ tablet	Observed Value
1	pH	5.5
2	LOD at 105 °C	6%
3	W.S.E	18.4%
4	A.S.E	14.4%
5	T.A.	13%
6	A.I.A	1.6%
7	Friability test	Pass
8	Hardness test	4kg/cm^2
9	Weight variation test	Pass
10	Disintegration test	19 minutes

Table 5. Depicting the physicochemical study of *Varunadi Pravahi Kashya*

S. No.	Parameter	Result
1	pH	4.2
2	Alcohol content	4% v/v
3	Specific gravity	1.02
4	Total solid content	11.6% w/w
5	Viscosity	2.306 cp
6	Test for methanol	Absent
7	Refractive index	1.32
8	Reducing sugar	8.78%
9	Non reducing sugar	3.29%

Figure 1. Morphological characters of the sample.

Figure 2. Measurement of the sample.

Figure 3. Morphological characters of the sample.

Figure 4. Measurement of the sample.

Figure 5. Morphological characters of the sample.

Figure 6. Measurement of the sample.

Figure 7. Morphological characters of the sample.

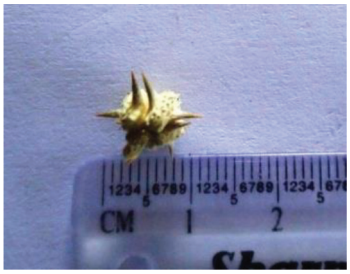

Figure 8. Measurement of the sample.

Figure 9. Morphological characters of the sample.

Figure 10. Measurement of the sample.

Figure 11. Morphological characters of the sample.

Figure 12. Measurement of the sample.

Figure 13. Morphological characters of the sample.

Figure 14. Measurement of the sample.

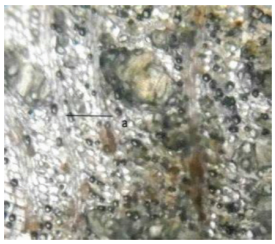

Figure 15. Medullary rays.

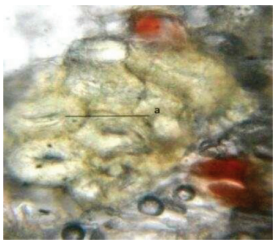

Figure 16. Stone cell.

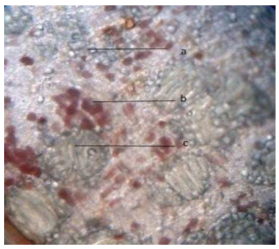

Figure 17. Ca oxalate crystals.

Microscopic characters of the Pashanbhed rhizome

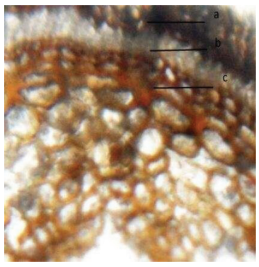

Figure 18. **(a).** Outer cork layer; **(b).** Inner cork layer.

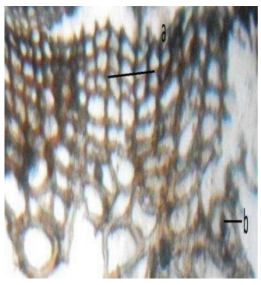

Figure 19. **(a).**Cortex cells; **(b).** Rosette crystal.

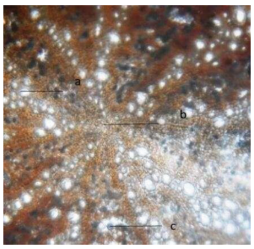

Figure 20. **(a).** Vascular bundle; **(b).** Central pith; **(c).** Cortex layer**. (c).** Ca oxalate crystal.

Microscopical characters of the *shunthi* rhizome

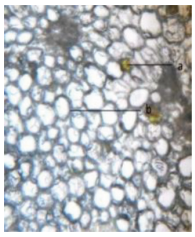

Figure 21. **(a).** Secretion cells.

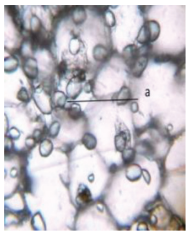

Figure 22. **(a).** Starch grain.

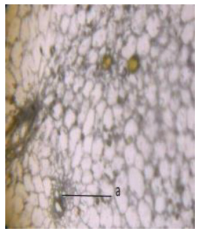

Figure 23. **(a).** Vascular bundle. **(b).** Parenchymatus cells.

Microscopic characters of the *Gokshura* fruit

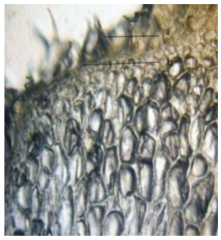

Figure 24. **(a).** Trichomes; **(b).** Epidermis layer.

Figure 25. **(a).** Parenchymatus cells.

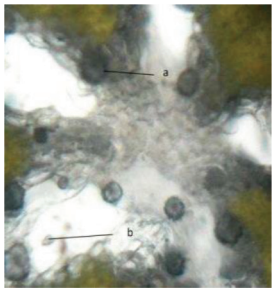

Figure 26. **(a).** Rosette crystal; **(b).** Prismatic crystal.

4. Conclusion

In *Ayurveda*, many types of potent dosage forms are forms with different specifications, *anupan*, preparation procedure and shelf life. Preparation of medicines of herbal drug origin is generally included in *Bhaishajya Kalpana*. In *Bhaishajya Kalpana* there are five basic dosage forms necessary to prepare formulations from herbal origin drugs i.e. *Swarasa, Kalka, Kvatha, Hima, Phanta*. These five basic formulations are potent dosage forms which can mould into different finished formulations. Now the fact is whether these five basic dosage forms have much more therapeutic value or when they are converted into other finished formulations which are being prepared from it. Here a study has been carried out to check which type of dosage form has more stability, palatability and efficacy. In this study, the basic dosage form was chosen as *Varunadi Kvatha Churna,* as it could be easily used to prepare *Vati* tablet and self-generated alcohol formulations. Firstly, *kvatha churna* was prepared by using all the ingredients mentioned in the master formula. The *kvatha churna* was then used in two different ways i.e. firstly it was used to prepare *Varunadi Ghana Vati* (tablet) without using any additives as it acts as a self-binder. On the other hand, *Pravahi kvatha* was prepared which is a self-generated alcohol formulation, in which *Dhataki pushpa, Gudda* and *Babool* are added as a fermentation initiator and additives.

Now a comparative study was done between *Pravahi kvatha, Ghana Vati* as well as *kvatha churna* as a control group. At first, all the physicochemical parameters are carried out to see which one has the most physicochemical stability. On the other hand, palatability is also taken into consideration. It may be said that a large group of people prefer tablets over liquid formulations since they don't meet the tongue and are also quick to reach the site of action. Another matter of fact is a few minors are even barred from the consumption of alcoholic products and some try to avoid it. As per the study, it seems like if stability is a major factor, then the *Pravahi kvatha* has much more stability than that of *Ghana Vati* as the self-generated alcohol acts as self-preservative in the case of *Pravahi kvatha*. But on the other hand, *Ghana Vati* comprises *kvatha* which in turn is much more prone to decomposition as it is similar to fresh water-soluble extracts in compact form. Now in the case of pH, it might be stated that both the drugs are acidic. Therefore, would be a little sour and astringent in taste. But the *Ghana Vati* would be preferable as it doesn't meet the tongue although it is ingested orally. According to the TLC profile, the *Ghana Vati* has six spots i.e. having much more active constituents than the *Pravahi kvatha* having two spots. Therefore, according to the parameters, it might be stated that the *Pravahi kvatha* has much more stability than the *Ghana Vati*. But as far as palatability and activity are concerned *Ghana Vati* is comparatively better than *Pravahi kvatha*. Hence, according to the standardization and physicochemical parameters, it might be stated that the *Varunadi Ghana Vati* has a better choice of dosage form as compared to *Varunadi Pravahi Kashya*, although it has better stability. In such a short period only the physicochemical parameters and standardization are done and hence a platform for further study has been created.

5. References

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