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# Pharmaceutico- Analytical Study of A Herbal Cosmetic I.E. Varnak Ghrita

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#### **Abstract:**

The purpose of the present research work was to development and evaluation of herbal cosmetic i.e.Varnak Ghrita. Herbal cosmetics offer several advantages over other chemical based. The majority of existing cosmetics which has prepared from drugs of synthetic origin and give extras fairness to face, but it has several side effects such as itching or several allergic reactions. Herbal cosmetics do not have any of these side effects, without side effects it gives the nourishment to skin. In Ayurvedic texts, there are so many special procedures and thousands of medicaments for Varnaprasadhana. Acharya Chakradutta had depicted one such formulation "Varnak Ghrita" as Varnaprasadhana. Sneha Siddha drugs have better pharmacokinetics action in comparison to other dosage form because of the lipid nature of bio- membrane, as lipid soluble substances readily permeate into cells. Snehakalpana is successfully used for ages in treating various skin ailments. Ghrita has valuable importance either used internally or externally. Present paper includes pharmaceutical as well as analytical study of Varnak Ghrita.

**Keywords:** herbal cosmetic, *Varnaprasadana*, *Varnak Ghrita*.

#### Introduction

Skin is the largest organ of human body and requires proper care. In the present era there is demand of good appearance either a slim body or a beautiful skin. Increasing call of cosmetics all over world from teen to adult has increased awareness related to safety issue. Group of fragrances, preservatives, antioxidants, ultraviolet absorbers, emollients, emulsifiers etc are the most common ingredient in cosmetics. Numbers of skin problems, skin irritation, skin carcinoma etc. are reported due to use of cosmetic made up of harmful chemicals. Mother Nature has given human, the most loved formation of God, with all that he expected to live on this planet: air to inhale, water to extinguish thirst, grains to appetite, flame to light etc. Human body is the microcosm of whole universe & the response to every human issue lies in keeping up congruity with the enormous musicality. Nature has offered the way to keep up that parity. Herbs are one such means. In traditional era people were used to various Lepa, Alepa, Pralepa etc for saundaryaprasadan karma. Nature has offered the way to keep up that parity. Herbs are one such means. "Roopam, Gunam, Vayastyag, Iti Shubhanga Karanam." There are three pillars of beauty Roopam, Gunam, Vayastyag. Roopam is outer beauty personified by shining, healthy hair and a clear, radiant complexion. Gunam refers to inner beauty and Vayastyag means lasting beauty — looking and feeling younger than your chronological age.

The use of plants is as old as mankind and in the coming years, the market will see many new products containing natural oils and herbs. Plants were once the main source and foundation of all cosmetics, before methods were discovered of synthesizing substances with similar properties.

Cosmetics are the products that are created for application on the body for the purpose of cleansing, beautifying or altering appearance and enhancing the beauty. The poly-herbal cosmetic formulations have been recommended for the management of skin properties for a long time and their effects are also well

accepted in the community of countries like India, Pakistan, China and Brazil<sup>1</sup>. Literature survey revealed that content of *Varnak Ghrita* has '*Varnaprsadaka*', '*Vali-Palitnashnam*<sup>2</sup>etc. effects on application.

#### **Material and Methods**

Materials and methods gives the information about the drugs and process used in the planned study. Present study has been divided into two main studies which are following-

- 1. Pharmaceutical study
- 2. Analytical study

**A). Pharmaceutical Study:** For preparing samples of *Varnak Ghrita* following practical were carried out in the *Rasashastra & Bhaishajya Kalpana* Department, Rishikul Ayurvedic Medical College, Haridwar, (Uttarakhand).

To validate the procedure, following steps were included in current study-

- 1. Raw drug procurement & Authentication
- 2. Process Validation

### 1. Raw Drug Procurement

- Freshly prepared home-made Go-ghrita was procured.
- All dry herbs needed for the pharmaceutical procedure were collected from Pannalal Traders of Hardwar.
- Chandan was collected from Gandhi Makanji Shamji, Junagadh, Gujarat, India.
- Bee- wax was prepared from honeycomb.

### -Authentication of raw materials

All the herbs were authenticated from P.G. deptt.of Dravyaguna Rishikul Campus UAU

### 2. Process Validation:

- Preparation of coarse powder of ingredients
- Preparation of *kalka* for *Ghrita Murchana*.
- Preparation of decoction for Varnak Ghrita.
- Preparation of *kalka* for *Varnak Ghrita*.
- Preparation of Varnak Ghrita.

The study was conducted as following experiments:

**Experiment 1**: Preparation of yavkutachurna for Murchana process.

**Experiment 2**: Preparation of *Kalka* for *Murchana* process.

**Experiment 3**: *Murchana* of *go-ghrita*.

**Experiment 4**: Preparation of *Kalka for varnakghrita*.

**Experiment 5**: Preparation of Kwatha *for varnakghrita*.

**Experiment 6**: Preparation of *varnakghrit*.

### **Experiment No: 1**

**Objective:** Preparation of Yavkut Churna for go-ghrita Murcchana.

Classical Advertence: Sharandhar Samhita Madhyam Khand<sup>3</sup>

#### Procedure-

- 1. After proper identification and cleaning, ingredients were taken in required amount.
- 2. These ingredients were crushed into coarse powder separately with the help of iron mortar and pestle.

**Experiment No: 2** 

**Object:** Preparation of *Kalkas* of *Murchandravyas* **Working Principle**: *Kalka Kalpana (paste formation)* **Textual Reference**: *Sharandhar Samhita Madhyam Khand*<sup>4</sup>

#### Procedure:

- 1. All the *Murchandravyas* were cleaned, dried and taken in sufficient amount.
- 2. Coarse powder obtained according to experiment no. 1 were taken in required amount & soaked in sufficient amount of water overnight.

**Experiment No: 3** 

**Object:** Murchan of Go-Ghrita

**Textual Reference:** Bhaishjaya Kalpanajwar chikitsa<sup>5</sup>

### **Procedure:**

- 1. *Go-Ghrita* was poured in a big-wide mouthed vessel and kept over fire to get rid of the water, i.e. up to the subsiding of foam and sound. At that time the temperature of *Ghrita* was 140°C.
- 2. When characteristics vapours having some smoke in heated *Ghrita is* observed then it is removed from the fire and after some cooling, the *Kalka dravya* obtained from experiment no.1 and water was added carefully in the *Ghrita* and the whole mass was then again kept over mild fire.
- 3. Again the froth appears on the *Ghrita* & watery contents starts evaporating.
- 4. The *Ghrita* was allowed to be on the fire till the whole watery contents get evaporated along with the disappearance of froth.
- 5. The temperature remains constant at about 80°C. After filtration, *Murchita Ghrita* was obtained.
- 6. The obtained Ghrita was kept separately for the preparation of Varnak Ghrita.

#### **Observation & Results:**

Table no.1: Day wise observation

Day	Time	Observation	Temperature
	8:40 A.M.	Gau-Ghritamurchana started	80-70° C
	9:15 A.M.	Moisture free condition was obtained	100 ° C
	9:20 A.M.	Kalka added	65-70 ° C
Day 1	9:35 A.M.	Addition of water	70-75 ° C
	2:30 P.M.	Phenodgam	70-75 ° C
	3:00 P.M.	Heating continued, vaporization was seen	70-75 ° C
	3:30 P.M.	Stop heating	
Day 2	9:30 A.M.	Heating continued	60-70 ° C
	12:20 P.M.	Kalka was rolled into varti, no cracking sound	70-75 ° C
		heard when ghrita dipped cloth piece was put on	
		fire.	

### Table No.1 (a) Illustrates the yield of *Murchita Ghrita* from the ingredients

Sample No.	Go-Ghrita	Total Kalka Dravyas	Water	Obtained Murchita Ghrita
1.	1.125 gm	216 gm	1.125 ml	1.110 g

The tests of Sneha-Siddhi i.e, properly Murchita Go-Ghrita were observed<sup>6</sup>

## **Experiment No. 4**

**Object:** Preparation of *Kalka* from the ingredients of '*Varnak Ghrita*'

**Classical Reference:** Sharangdhar Samhita Madhyam Khand<sup>4</sup> **Ingredients:** 

Table no. 2: Detail of ingredients used for kalka preparation

Sr.No.	Ingredients	Parts taken	Amount taken
1.	Madhuka	1 part	28.12 gm
2.	Chandana	1 part	28.12 gm
3.	Priyangu	1 part	28.12 gm
4.	Sarshap	1 part	28.12 gm
5.	Padmaka	1 part	28.12 gm
6.	Kaliyaka	1 part	28.12 gm
7.	Haridra	1 part	28.12 gm
8.	Lodhra	1 part	28.12 gm
9.	Water	-	q.s.
10.	Kesar	1/4 <sup>th</sup> part	7.03gm

**Procedure:** Same as exp. No. 2. All kalka dravya are kept in the container except kesar.

**Observation & results:** -Kalka Dravyas becomes soft with characteristic smell.

- Yield: 225 gm

**Experiment No. 5** 

**Object**: Preparation of *Kwatha*<sup>7</sup> for *Varnak Ghrita*by boiling.

**Ingredients:** 

Table 3: Detail of ingredients used for kwatha preparation-

Sr.No.	Ingredients	Amount taken
1.	Madhuka	225 gm
2.	Chandana	225 gm
3.	Priyangu	225 gm
4.	Sarshap	225 gm
5.	Padmaka	225 gm
6.	Kaliyaka	225 gm
7.	Haridra	225 gm
8.	Lodhra	225 gm
9.	Water	14400 ml

**Procedure:** Above ingredients were taken in stainess steel vessel and mild heat was provided until the volume of the liquid (kwatha) reduced to 1/4<sup>th</sup> of its initial quantity.

### **Observation & Result:**

Dark reddish brown coloured liquid obtained.

Yield: 3.6 lts

### **Experiment No. 6**

**Object:** Preparation of Varnak Ghrita from *Kwath* obtained in Experiment 8.

Textual Reference: Chakradutta kshudraroga chikitsa 77-80

**Method of Preparation:** Sneha Paka<sup>8</sup>

## **Materials Required:**

1. Murchit Go-Ghrita- 900 gm from Exp. No. 3

- 2. Kalka of all dravyas- 225 gm from Exp. No.4
- 3. Kwath obtained- 3600 ml from Exp. No.5

#### **Procedure:**

- 1. *Murchita Go-Ghrita* was poured in a big wide mouthed stainless steel container and kept over fire for heating.
- 2. *Ghrita* was heated till characteristic vapors having smoke on the heated *Ghrita* was observed. The vessel was then removed from fire and after some cooling, *Kalka* obtained from experiment no.4 and *kwatha* obtained from experiment no.5 was then added to the *Ghrita*.
- 3. The whole mass was again kept over fire & heated on mild fire so as to evaporate the water content completely.
- 4. During this process to avoid adhering of the material with the wall of the vessel, it is quite important to stir the mass continuously with the help of ladle. This process was completed in 3 days.
- 5. After attaining the *Sneha Siddhi Lakshan* the fire was withdrawn and the *Ghrita* was filtered by help of washed and dried cloth when it is lukewarm.
- 6. Again Ghrita was heated on mriduagni, then sikhta (1:6) and kesar(1:4) were added and continuous stirring is allowed till the formation of semi solid substance.

### **Observation & Results:**

### Table no.4 results of varnak Ghrita preparations

Murchita	Kwathadravya	Kalka	Siktha	Kesar	Varnak	Total	% Loss
Ghrita		dravya			Ghrita	Yield	
900 gm	3.6 lt	225 gm	150gm	7.03	760 gm	84.4%	15.56%

# Table No.5 Physical Examination of Prepared Ghrita

Appearance	Colour	Touch	Odour
Soft	Greenish yellow	Unctuous	Slightly pungent

### B). Analytical Study

### **Aims and Objectives**

- 1. To analyze and compare Ghrita, Murchita Ghrita & Varnak Ghrita on various analytical parameters.
- 2. To assess the comparative HPTLC profile of Ghrita, Murchita Ghrita and Varnak Ghrita.

### **Place of work:** The tests were conducted at:

1. Vasu Research Centre, Makarpura, Vadodara, Gujarat

#### **Parameters Studied:**

Parameters were taken according to "Protocol of testing of Ayurvedic, Siddha, and Unani Medicines", written by Dr. D.R. Lohar, published by Government Of India, Department of Ayush, Ministry of Health and Family Welfare, and Pharmacopoeia Laboratory For Indian Medicines, Ghaziabad.

**HPTLC**<sup>9</sup>: High-Performance thin-layer chromatography is an enhanced form of thin layer chromatography (TLC). A number of enhancements can be made to the basic method of thin layer chromatography to automate the different steps, to increase the resolution achieved and to allow more accurate quantitative measurements.

### Ghrita, Murchit Ghrita, Varnak Ghrita

**Preparation of Test solutions:** Accurately weighed 5 g of sample and transferred in a separating funnel, add 40ml mixture of methanol and hexane (1:1). Shake thoroughly and kept aside for 15 min to separate both the layers. Discard the hexane layer and wash methanolic layer with 20ml hexane twice. Collect methanolic layer, filter it with whatman filter paper no.1, centrifuge the filtrate and collect the supernatant to use for HPTLC profiling.

Chromatographic Condition				
Application mode	CAMAG Linomat – Applicator			
Filtering System	Whatman Filter paper No. 1			
Stationary Phase	MERCK-TLC/HPTLC Silica gel 60 F <sub>254</sub> on Aluminum sheets			
Application (Y axis) Start Position	10 nm			
Development End Position	80 nm from plate base			
Space Between Band	a)13 nm (Ghrita, Murchit Ghrita, Varnak Ghrita)			
Sample Application Volume	10.0μL			
Development Mode	CAMAG TLC Twin Trough Chamber			
Chamber Saturation Time	30 minutes			
Mobile Phase (MP)	Toluene: Ethyl Acetate: Formic acid (7:3:1)			
Visualization	@ 254 nm,@366 nm & @ 540 nm (after derivatization)			
Spray reagent	Anisaldehyde Sulphuric Acid reagent			
Derivatization Mode	CAMAG – Dip tank for about 1 minute			
Drying Mode, Temp. & Time	TLC Plate Heater Preheated at 100± 5°C for 3 minutes			

 Observation: After Derivatization, plate was examined visually for appearance of different bands at different R<sub>f</sub>.

Table No: 6 Results of Organoleptic characters of Ghrita, Murchita Ghrita and Varnak Ghrita

Sr.No	Parameters	Ghrita	Murchita Ghrita	Varnak Ghrita
1	Appearance	Semi solid liquid	Semi solid liquid	Semi solid liquid
2	Colour	Yellow	Yellow	Yellow
3	Odour	Characteristic	Characteristic	Characteristic
4	Taste	Characteristic	Characteristic	Characteristic
5	Touch	Unctuous	Unctuous	Unctuous

Table No: 7 Physico chemical characters of Ghrita, Murchita Ghrita and Varnak Ghrita

Sr.No	Parameters	Ghrita	Murchita Ghrita	Varnak Ghrita
1	Acid Value	1.71	0.90	0.46
2	Peroxide Value	0.57	3.13	3.07
3	Saponification Value	238.40	242.80	257.61
4	Refractive index	1.467	1.467	ND
5	Viscosity	1810 ср	1580 ср	16050 ср

# Table No: 8 Microbial limit tests of Ghrita, Murchita Ghrita and Varnak Ghrita

Sr.No	Parameters	Ghrita	Murchita Ghrita	Varnak Ghrita
1	Total Bacterial Count	NA	NA	142 cfu/g
2	Total Yeast &Molds	NA	NA	NIL
3	Escherichia coli	NA	NA	Absent
4	Salmonella enteric spp.	NA	NA	Absent
5	Staphylococcus aureus	NA	NA	Absent
6	Pseudomonas aeruginosa	NA	NA	Absent

# Table No: 9 Heavy Metal Analyses of Ghrita, Murchita Ghrita and Varnak Ghrita

Sr.No	Parameters	Ghrita	MurchitaGhrita	VarnakGhrita
1	Lead	NA	NA	1.14 ppm
2	Cadmium	NA	NA	0.14 ppm
3	Mercury	NA	NA	ND
4	Arsenic	NA	NA	pm

# Table No: 10 HPTLC Analyses of Ghrita, Murchita Ghrita and Varnak Ghrita at R<sub>f</sub>@254 nm

Sr. No.	Track -1	Track -2	Track -3
1	-	0.38	-
2	-	0.43	-
3	-	0.70	0.70

# Table No: 11 HPTLC Analyses of Ghrita, Murchita Ghrita and Varnak Ghrita at R<sub>f</sub>@366 nm

Sr. No.	Track -1	Track -2	Track -3
1	-	0.54	0.54
2	-	0.68	0.68

Table No: 12 HPTLC Analyses of Ghrita, Murchita Ghrita and Varnak Ghrita at R<sub>f</sub>@540 nm

Sr. No.	Track -1	Track -2	Track -3
1	-	-	0.28
2	-	0.38	0.38
3	-	0.42	-
4	0.53	0.53	0.53

5	-	0.69	0.69
6	0.81	0.81	0.81
7	0.89	0.89	0.89

Track- 1: Ghrita

Track -2: Murchita Ghrita Track -3: Varnak Ghrita

#### **Discussion & Conclusion**

During the preparation of *Ghrita Murchana Or Varnak Ghrit*time taken was two & three days respectively as because of involvement of heat, more therapeutically active ingredient must be extracted. Temperature is one of the most important factors in the procedure so it is noted at different stages as shown in table no.1. The final yield of Murchitghrit and varnakghrit is shown in table no. 2.

**1.Organoleptic Parameters:** These characters are useful for determining quality of formulation. The appearance of Ghrita, Murchita Ghrita, & Varnak Ghrita are yellow colour semi solid liquid.

**2.Acid value:** Acid value is the mass of potassium hydroxide (KOH) in milligram that is required to neutralize one gram of chemical substance. The acid value is a measure of the amount of carboxylic acid groups in a chemical compound such as a fatty acid, or in a mixture of compounds. As oil-fats rancidify, triglycerides are converted into fatty acids & glycerol, causing an increase in acid. Less acid value denotes the less chance of decomposition of the composition of Ghrita thus increasing both life span & therapeutic value10. The fatty acid profile affects the shelf life, flavor & the stability of Ghrita. The acid value of plain Ghrita was 1.71, indicating the amount of free fatty acid present in the Ghrita. Its value gets decreased considerably from 1.71 to 0.90 & 0.46, which shows decrease in rancidity. It may be due to the heating during Murchana process & Ghritapaka which causes the evaporation of any moisture contents thus leading to decrease in acid value.

**3.Peroxide Value:** The peroxide value is defined as the amount of peroxide oxygen per kilogram of fat or oil. Detection of peroxide gives the initial evidence of rancidity in unsaturated fats & oils. The most common cause of milk fat deterioration is rancidity which is due to oxidation, ther by affecting its flavor & quality. The acceptability of Ghrita largely depends on the extent to which the oxidative deterioration has occure. It is generally considered that the first product formed by oxidation of an oil or fat is hydroperoxide. The peroxide further decomposes to secondary oxidation products i.e., aldehydes & ketones which imparts bad flavor in Ghrita. Peroxide Value is a indicator of products primary oxidation & thus imparts the rancidity or degree of oxidation but not the stability or shelf life of fat. Fresh Ghrita has a peroxide value equal to zero.

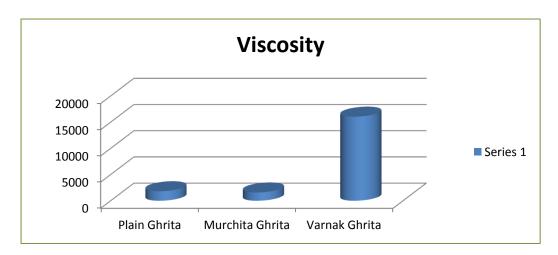
Peroxide value of plain Ghrita, Murchita Ghrita and Varnak Ghrita are 0.57, 3.13 and 3.07 respectively. As the normal peroxide value ranges in Ghrita below 4 that is within the permissible limits of rancidity<sup>11</sup>.

**4.Saponification Value:** The saponification value is the number of mg of potassium hydroxide recquired to neutralize fatty acids, resulting from the complete hydrolysis of 1 g of oil. The amount of alkali needed to saponify a given amount of fat will depend upon the number of – COOH group present. Thus fats containing short chain fatty acids will take up more – COOH groups per gram than long chain fatty acids and this will take up more alkali and hence will have higher saponification number. Medicated oil with high saponification value has a better absorption. High saponification value indicates the presence of fatty acids of low molecular weight (molecules are in simple form). Low saponification value indicates that the molecules are in complex form. As Ghrita are esters that undergo a hydrolysis process in the presence of an alkali (in the presence of the alkaline nature of kalka dravya or the other dravadravya used in snehapaka process), the formation of fatty acid (short chain) occur. This shows that Varnak Ghrita has greater short chain fatty acids than murchit and plain Ghrita.

Varnak Ghrita has higher saponification value (257.67) than other two i.e., murchita Ghrita (242.80) & plain Ghrita (238.40), which fairly indicate their order of absorption.

**5.Refractive index:** It is the ratio of velocity of light in a vacuum to its velocity in the substance. The refractive index (or index of refraction) of a medium is a measure for how much the speed of light is reduced inside the medium. It is a fundamental physical property of a substance often used to identify a particular substance, confirm its purity, or measure its concentration. The consistency of the media and solutes present in the media brings the difference in the refractive index. More will be refractive index, there will be more concentration of light which facilitates rancidification of Ghrita. Refractive index of plain Ghrita and murchita Ghrita were 1.467, while it was not detected in Varnak Ghrita.12

**6.Viscosity:** Viscosity is a measure of a fluid's resistance to flow. It describes the internal friction of a moving fluid. A fluid with large viscosity resists motion because its molecular make up gives it a lot of internal friction. Viscosity is inversely propertional to rate of absorbtion. If Viscosity of the sample is increased, the rate of absorption decreases. In other words, viscosity of fluid is a measure of its resistance to deformation at a given rate. Viscosity of Plain Ghrita (1810 cP) is decreased after Murchana process (1580 cP) is due to addition of dravadravya like water as these are less viscous than Ghrita.13 In Varnak Ghrita (16050 cP) its viscosity is further increased due to addition of more solid content (Kalka & Kwatha Dravya) to it and hence more absorption. However the interpretation of Viscosity in Ayurvedic terms can be linked with Snigdha & Picchilaguna. More Viscosity should indicate more Snigdhata and vice versa.



**7.HPTLC:** Ghrita, Murchita Ghrita & Varnak Ghrita being composed of number of herbs excluding water and siktha in respective formulations, and there are no available reference standard of the formulation, it was not possible to carry out HPTLC profiling using all individual constituent markers. Hence, comparable results of these three sample are found for various analytical parameters tested in the present study.

At  $R_f$  @254 nm- no Active Botanical Ingredient(ABI) in Track 1, three ABI in Track 2 with  $R_f$ value 0.38, 0.43 & 0.70 and in Track 3 only one ABI with  $R_f$ value 0.70.

At R<sub>f</sub> @366 nm- track 1 show no ABI, Track 2 & 3 show same ABI with R<sub>f</sub>value 0.54 & 0.68.

At  $R_f$  @540 nm- Track 1 shows ABI with  $R_f$ value 0.53, 0.81, & 0.89, Track 2 shows ABI with  $R_f$ value 0.38, 0.42, 0.53, 0.69, 0.81, & 0.89, Track 3 shows ABI with  $R_f$ value 0.28, 0.38, 0.53, 0.69, 0.81, & 0.89.

At R<sub>f</sub> @254 nm Track 2 & 3 shows similarity of one ABI with R<sub>f</sub>value 0.70.

At R<sub>f</sub> @366 nm Track 2 & 3 show same ABI with R<sub>f</sub>value 0.54 & 0.68.

At  $R_f$  @540 nm ABI with  $R_f$ value 0.53, 0.81, & 0.89, are present in all three Tracks. ABI with  $R_f$ value 0.38, 0.69 are present in Track 2 & Track 3.

Similarity of spots fairly indicates the presence of ABI in Track 1 might also be present in other two Tracks. Track 1 Track 2 & Track 3 represents Ghrita, Murchita Ghrita & Varnak Ghrita respectively. It is not feasible to cite that to which component these Rf values corresponds.

**8.Heavy metals:** Heavy Metals were absent in all three samples of Ghrita, Murchita Ghrita & Varnak Ghrita showing that the drug is non-toxic and safe for application. A within permissible limit of Lead, Cadmium & Arsenic of 1.14 ppm, 0.14 ppm & 1.12 ppm are present in Varnak Ghrita.

**9.Total microbial count:** Total Microbial Count were absent in all three samples. A 142 cfu/g of total bacterial count is present in Varnak Ghrita which is within permissible limit. It depicts that no harmful pathogen was present in the samples and the drug is safe for application.

### **CONCLUSION**

As the formulation is still in texts, only it need pre-clinical and clinical studies to implement it as a potent herbal cosmetic. And it also need to convert into new dosage form i.e. cream so that can be user friendly as ghrita is oily and sticky.

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