

AN AYURVEDIC SHAMPOO: DEVELOPMENT & EVALUATION

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Abstract

Background: With the developing role of *Ayurveda* in the market of cosmetics, demand of Herbal shampoos have been enhanced worldwide. Thus entailed development of this *Ayurvedic* shampoo, which is made up of plant extracts and cow urine, aids in providing nutrition to scalp and hair; and it has antimicrobial effect with good cleansing action.

Objective: Present study aims to develop *Ayurvedic* Shampoo and evaluating using suitable analytical techniques.

Methods: *Ayurvedic* Shampoo was formulated with active ingredients like *sariva* and cow urine selected from *kamratnam*, other ingredients viz. *Shikakai*, *Reetha*, *Jatamansi*, *Mandookparni* and *Bhringraj* selected due to their proved *Keshya* properties. To contriving an idea total active part 51.5% used in formulation, that is maximum in quantity. Because presence of high amount active part reduces the self-life of formulation & for the preparation of good emulsion (oil in water) sufficient quantity of base ingredients were needed.

Formulated product was tested by various appropriate methods, Organoleptic and Physiochemical tests

Result: Various analytical evaluation showed that *Ayurvedic* Shampoo was brown colour viscous liquid, good foaming quality, with soothing fragrance & acceptable quality.

Conclusion: The formulated *Ayurvedic* shampoo was containing high amount of active part. Having excellent cleansing property with antimicrobial and nourishing effect. As a cosmetic product, an *Ayurvedic* shampoo fulfilled all certain aesthetic functions beyond to its technical functions.

Key words: *Ayurvedic* Shampoo, Herbal Shampoo, Cosmetics, Plant extracts, *Kwath*, *Keshya*, Emulsion.

1. Introduction

Shampoo plays an important role in the removal of surface grease and dirt from the hair shaft and scalp. The primary role of shampoo is to carry out cleansing or detergent action. However, the foaming characteristic of shampoo plays significant role in its acceptability.¹

According to the world health organization, herbal medicines are being used by approximately 80% of the world population primarily, in the developing countries, for primary health care. This plant-based traditional medicinal system continues to play an essential role in health care.^{2,3} In busy life of 21st century, people are becoming negligent about protecting their hair and maintaining hair homeostasis.⁴ Thus it is the need of the hour to formulate a hair care product which contains herbal ingredients, and nourishes hair, protect hair from microbes and damage during busy schedule and is easy to use. Thus in the present study, an *Ayurvedic* shampoo was formulated which contained 50% active part in the form of *Kwath*. Active ingredients like *sariva* and cow urine selected from *kamratnam*⁵ Other ingredients viz. *Shikakai*, *Reetha*, *Jatamansi*, *Bhringaraj*, *Mandukaparni* selected due to their proved *Keshya* properties.

2. Materials

All the plant materials were collected in the dry form from the pharmacy of National Institute of *Ayurved*, Jaipur. Collected plant materials were identified and authenticated by the Dravyaguna Dept. of NIA. Base ingredients were collected from the Drug testing Laboratory (DTL) of *Rasa Shastra & Bhaishajya Kalpana* Department, NIA, Jaipur. Cow urine was collected from local dairy healthy cow. It was ensured that urine sample collected was the morning first urine. (See table 1 & 2)

Table 1: List of active Ingredients

S.No.	Name	Botanical name	Family	Part used
1.	<i>Shikakai</i>	<i>Acacia concinna</i>	Mimosaceae	Pods
2.	<i>Reetha</i>	<i>Sapindus mucorossii</i>	Sapindaceae	Fruit Pericarp
3.	<i>Jatamansi</i>	<i>Nardostachys Jatamansi</i>	Valarianaceae	Rhizome
4.	<i>Mandukaparni</i>	<i>Centella asiatica</i>	Apiaceae	Whole Plant
5.	<i>Sariva</i>	<i>Cryptolepis buchanani</i>	Apocynaceae	Root
6.	<i>Bhringaraj</i>	<i>Eclipta alba</i>	Asteraceae	Whole Plant
7.	Cow urine	-	-	-

Table 2: Composition of Developed formulation

S.No.	Ingredients	Function	Concentration %	Quantity in grams (for total 5 kg.)
Main Ingredients				
100 ml <i>Kwath</i> derived from 4.2 g of each drugs (25.0 g Herbal drugs)				
1.	<i>Bhringaraj</i>	<i>Kwatha</i> Main active ingredient	50	2500 g
2.	<i>Reetha</i>			
3.	<i>Shikakai</i>			
4.	<i>Jatamansi</i>			
5.	<i>Mandukaparni</i>			
6.	<i>Shikakai</i>			
7.	Cow Urine	Active ingredient	1.5	75 g
Base Ingredients				
8.	Glycerine	Humectant	5.0	225 g
9.	Polyquaternium-7	Foam Stabilizer	2.0	100g
10.	Coco Di Ethanol amide (CDEA)	Thickener	2.0	100 g
11.	Sodium Lauryl Ether Sulphate (SLES)	Surfactant	32.0	1600 g
12.	Sodium Lauryl Sulphate(SLS) Needle	Surfactant	1.0	50 g
13.	Cetyl alcohol	Thickener	0.5	25 g
14.	Cetostearyl alcohol	Thickener	0.5	25 g
15.	Coco Mono Ethanol amide (CMEA)	Thickener	2.5	125 g
16.	Citric acid	Maintains pH	0.2	10 g
17.	Glycerol Monostearate (GMS)	Pearly effect	2.0	100 g
18.	Preservative	Presservation	1.0	50 g
19.	Fragrance (Lavender)	Aroma	0.5	25 g
Total			100 %	5000 g

3. Methods

Formation of the *Ayurvedic* Shampoo had been carried out in the Department of *Rasashastra* and *Bhaishajya Kalpana*, NIA, Jaipur. Following steps were followed during formation of same.

3.1 Plant extract preparation

Plant extract was prepared in the form of decoction. To formulate decoction coarse powders of herbs such as *Shikakai*, *Reetha*, *Jatamansi*, *Mandukaparni*, *Sariva*, *Bhringaraj* were taken and weighted separately then soaked in R/O water for overnight and next day 16 times water

was added & reduced to 1/4th part on mild heat. Prepared kwath was filtered through the double layered cloth.

3.2 Cow urine sterilization

To sterilization obtained cow urine was filtered through a double layered cloth and removed sediments from it then kept in a hot air oven for 20 min. at 110°C to kill any bacteria if present in it and then kept in glass cleaned flask for further use.

3.3 Formulation of Ayurvedic Shampoo

All the materials were mixed in the proportion described in table no. To formulate the *Ayurvedic* Shampoo Phase I & II were prepared separately to avoid coagulation. Phase I (water phase) developed by the *Kwath* of main active ingredients, Cow urine, Sodium Lauryl Sulphate, Glycerine, Sodium Lauryl Ether Sulphate, Polyquaternium-7 and Citric acid. In the wide mouthed large steel vessel all the constituents were added one by one with continuous stirred at maintained temperature of 75°C-85°C. In another glass jar Phase II (oil Phase) was developed at the same time by adding Cety alcohol, Cetocetyl alcohol, Glycerol Monostearate, Cocomono and Cocodye one by one with continuous stirred at maintained temperature of 75°C -85°C. Then Phase II (oil phase) was mixed in Phase I(water phase) at reducing temperature of 80°C -50°C with continuous slow stirring, used electrical stirrer until it becomes lukewarm and thick. After cooling fragrance was added in it.

3.4 Packing of Ayurvedic Shampoo

Formulated *Ayurvedic* Shampoo was packed in Food grade HDPE Plastic bottles of 100ml. capacity procured from local market then dry sterilization & labelling was done. 100 ml. *Ayurvedic* Shampoo filled in bottles with sterilized funnel.

4. Analytical evaluation of Ayurvedic Shampoo

For the analysis of *Ayurvedic* shampoo various quality control tests has been done such as Organoleptic and physiochemical tests included pH, Viscosity, Foaming index, Total acidity, Total fat content, Rancidity and Total solids. Analytical study was carried out at departmental drug testing lab and some tests were done at AYUSH approved SR labs, Jaipur.

4.1 Organoleptic evaluation

Physical appearance, colour and odour were noted.

4.2 Ditermination of pH

The pH of 10% shampoo solution in distilled water was determined at room temperature using a pH meter.⁶

4.3 Measurment of Viscosity

The relative viscosity was measured by using Ostwald-type viscometer.⁷

4.4 Foaming ability and stability

Cylinder shake method was used for determining foaming ability. 50 ml of the 1% shampoo solution was put into a 250 ml graduated cylinder and covered the cylinder with hand and shaken for 10 times. The total volumes of the foam contents after shaking were recorded. Foam volume was calculated only. Immediately after shaking the volume of foam at 1-minute interval was calculated until 20 min. immediately after shaking the volume of foam and 20 min. interval were recorded.⁸

4.5 Total acidity evaluation

Estimation of total acidity was done by using phenolphthalein indicator by titration method.⁹

4.6 Total fat content

For estimation of total fat content the Weibull- Stoldt method was followed.

4.7 Rancidity evaluation

Kreis test was followed for the evaluation of rancidity.

4.8 Total solids

A clean dry evaporating dish was weighed and added 4 grams of shampoo to the evaporating dish. The dish and shampoo was weighed. The exact weight of the shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated.¹⁰

4.9 Total microbial count¹¹**4.10 Thermal stability test**

Physical stability test of the formulations were carried out for two weeks at various temperature conditions like at 45°C temperature, room temperature, 4°C and 45% relative humidity in a close container.

5. Result**Table 3: Organoleptic parameters of Ayurvedic Shampoo**

S.No.	Organoleptic parameters	Ayurvedic Shampoo
1.	Appearance	Viscous liquid
2.	Color	Brown
3.	Odour	Pleasant

Table 4: Analytical test parameters of Ayurvedic Shampoo

S.No.	Test Parameters	Ayurvedic Shampoo
1.	pH Value	6.9
2.	Viscosity @ 25°C	116.13 Pa.s
3.	Foaming Index	Primary Height -120ml After 20 min. Height-62ml
4.	Total Acidity	0.18
5.	Total Fat Content	3.14% w/w
6.	Rancidity Test	Absent
7.	Total solid	19.921%

Table 5: Total bacterial count of Ayurvedic Shampoo

S.No.	Test Parameters	Limits	Ayurvedic Shampoo
1.	Microbiological analysis Total bacterial count	100000 cfu/g	20000 cfu/g

Table 6: Thermal Stability of Ayurvedic Shampoo at different temperatures

S.No.	Thermal Stability	At 4° Temp.	At Room Temp.	At 45° Temp.
1.	0 Days	Stable	Stable	Stable
2.	7 Days	Stable	Stable	Stable
3.	15 Days	Stable	Stable	Stable

6. Discussion

In the present study herbal active part used in the form of *kwath*, however there are so many extraction methods were described in the classics and in modern science as well. But here *Kwatha kalpana* (decoction) method is used because it is convenient, less time consuming, suitable for both hard and soft plant materials, Suitable for large scale production, less energy and water consuming, economic, usually resulted in extraction of oil-soluble compounds compared to maceration and infusion.¹² Fresh Gomutra after sterilization process was used because Cow urine contain higher amount of Phenols than distillate cow urine, that make it more effective against microbes.¹³ Cow urine was used in less amount 1.5% to avoid bad smell & it has alkaline nature and can alter the pH of formulation. *Ayurvedic* Shampoo was oil in water type of emulsion in viscous liquid form.

To make the product technically more effective total 51.5% active part used in formulation, that is sufficient in quantity. Because presence of high amount active part reduces the self-life of formulation & for the preparation of good emulsion (oil in water) sufficient quantity of base ingredients were needed. Base ingredients were added according to melting point. Colour of *Ayurvedic* Shampoo was brown due to high amount of *kwatha*. Synthetic colour was not used. For pleasant effect fragrance was added in formulation. *Ayurvedic* Shampoo was made as anti-dandruff Shampoo.

The **pH of shampoo** has been shown to be important for improving and enhancing the qualities of hair, minimizing irritation to the eyes and stabilizing the ecological balance of the scalp.¹⁴ Shampoos pH should be between 6 and 8. Mild acidity prevents swelling and promotes tightening of the scales, there by inducing shine. The *Ayurvedic* shampoo was slight acid balanced 6.9 pH, which is near to the skin pH that was good for hair.

The level of oxidation in a sample can be determined by the **rancidity test**. When the lipids like fat and oils go rancid, nutritional value of product is compromised and the lipids will take on a rancid taste and odour. To determine the shelf life of the product rancidity testing is an essential component. In the present formulations *Ayurvedic* Shampoo rancidity was found absent. It means that the product is stable and not pharmaceutically rancid.

Viscosity and rheological properties play important role for liquid shampoos. They could influence many of the product attributes, such as shelf-life, its beauty, its transparency, easy removal from its packaging, its expansion and its consistency.¹⁵ The viscosity property of this

formulation showed that this formulation has a proper consistency. Viscosity of *Ayurvedic* Shampoo 113.16 Pa.s., it signify that the product go out from the container easily.

Acid contribute to corrosiveness and influence chemical reaction rates, chemical speciation and biological processes. Acidity of water is its quantitative capacity to react with a strong base to a designated pH.¹⁶ The measured value may vary significantly with the end point pH used in the determination. total acidity of *Ayurvedic* Shampoo was 0.18 that was good for formulation.

Total fat content refers to the sum of triglycerides, phospholipids, wax ester, sterols and minor amount of non fatty material. *Ayurvedic* Shampoo has 3.14%w/w total fat content. *Ayurvedic* Shampoo has few amount of total fat content because it does not contain any oil.

Although **foam generation** has little to do with the cleansing ability of shampoos, it is of paramount importance to the consumer and is therefore an important criteria for evaluating shampoos. A point to be noted here is that there does not seem to be any direct correlation between detergency and foaming. Foam productivity is one of the favourite factors for consumers. This research showed that *Ayurvedic* Shampoo has good foam productivity showed primary height 120 ml. after 20 min. 62 ml. foaming characteristics in distilled water. The high volume foam productivity is usually considered as shampoo efficiency. The foam produced by a shampoo has psychological effects and it is also a value to show that shampoo has sufficient ability for hair cleaning (Arzhavitina, 2010).

If the shampoo has too many solids it will be hard to work into the hair or too hard to wash out. In general, the appropriate solid content for shampoo is between 20% and 30%.¹⁷ The result of percent of **solids contents** is 19.921% that is nearer to appropriate value and easy to wash out.

Microbiological assay of the formulations have not shown any contamination with microbes and hence completely safe and have been prepared under Good Manufacturing Practices (GMP).

Thermal stability test revealed that present formulation was chemically and physically stable and acceptable.

7. Conclusion

As a cosmetic product, an *Ayurvedic* shampoo fulfilled all certain aesthetic functions beyond to its technical functions. Thus, present shampoo offer natural brown colour, soothing fragrance and rich foam. These aesthetic properties can be very important in influencing the customer's purchase and repurchase of a product. All the evaluations on the basis of organoleptic and physiochemical parameters provided quality standards for *Ayurvedic* Shampoo.

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