

## Formulation and Evaluation and Comparison of herbal shampoo with Marketed Shampoos

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### ABSTRACT

The aim of present research work is to FORMULATION AND EVALUATION AND COMPARISON OF HERBAL SHAMPOO WITH MARKETED SHAMPOOS the composition of herbal shampoo amla, Phyllanthus emblic, amla and antiviral, antibacterial Reetha soap berry used as cleansing hair, kakai used as antioxidants and promote hair growth, lemon juice use as perfume, sorbitol used as thickening agent, methyl parabens used as bulk forming agent, essential oils, additives, fragrances. In the evaluation test we performed pH determinations. The formulated herbal shampoo shows pH value  $5.91 \pm 0.01$  given in Table 1, which is close to the skin pH and its other marketed counterparts. The percentage of solid found in 20-30% solid for its balanced cleaning action. A significant value of detergency ability i.e. 95.94% was found in Acacia concina formulation as compared to others. During the foaming test the bubbles of the foam should be small in velocity. The shampoo are prepared highly viscous cm. Formulated herbal shampoo reduced surface tension of water up to 33.17 dynes/cm. The conditioning performance of the shampoo was rated in terms of Score 1-4 (4 - excellent, 3 good, 2 - satisfactory, and 1 - poor).

### I. INTRODUCTION



### Fig no 1 :- composition of herbal shampoo Amla, Shikakai, Reetha

Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning scalp and hair in our daily life. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives, preservatives, and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The purpose of using shampoo is to remove dirt that is built up on the hair without stripping out much of the sebum. Herbal shampoos are concerned in stability criteria, depending upon the nature of the ingredients, they may be simple or plain shampoo, antiseptic or antidandruff shampoo and nutritional shampoo containing vitamin, amino acids, proteins hydrolysate. The selection of active ingredients for hair care powders is based on the ability of the ingredient to prevent skin damage as well as to improve the quality of skin by cleansing, nourishing and protecting the skin. Some of these additives have to be added in a shampoo formulation to increase its stability and safety.

### Ideal characters of shampoo

- Should effectively and completely remove the dust, excessive sebum.
- Should effectively wash hair.
- Should produce a good amount of foam.
- The shampoo should be easily removed by rinsing with water.
- Should leave the hair non dry, soft, lustrous with good, manageability.
- Should impart a pleasant fragrance to the hair.
- Should not make the hand rough and chapped.
- Should not have any side effects or cause irritation to skin or eye.

### II. MATERIALS AND METHODS:-

The herbal shampoo powder was formulated using following natural ingredients:

#### Sample collection

All plant materials Amla, Reetha and Shikakai powder were obtained from the market and were identified and authenticated by a botanist of RTMNU University. Two commercially available shampoos namely ayur Shampoo® and patanjali Herbal Essences shampoo® were purchased from the local super market

**Decoction Method:**

Weighed all the ingredients according to the formula. Decoction of Amla, RITHA, Shikakai Powders, prepared in one part of water. Filter it, by using muslin cloth. Collect filtrate. Decoction of Shikakai, and Ritha was prepared in another part of water. Filter it by using muslin cloth. Collect filtrate. Mixed to each other of above filtrate with constant stirring. Mixed gaur gum as a thickening agent for maintenance of consistency of herbal shampoo as like semisolid nature. Preservatives and perfume was added lastly

**Preparation of the Herbal Shampoo**

**Weighing**

All the required herbal powders for shampoo preparation were weighed individually.

**Size reduction**

The crude ingredients were collected and these ingredients were size reduced using hand driven mixer individually.

**Mixing**

All these fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder.

**Packing and labeling:** Then it was packed and labeled suitably.

**Identification test**

**Phytochemicals Screening:**

Identification tests for *Phyllanthus emblica*, *Sapindus*, *Acacia concinna*

> **Test for Tannins and Phenolic compounds**

Iodine test

Ferric chloride test

> **Test for Flavonoids**

Shinoda's test

Lead acetate test

> **Test for alkaloids**

Dragendroff's reagent

Mayers test

> **Test for saponins (Foam test)**

2ml extract + 2ml benedicts reagent

> **Terpenoids**

Salkowski test

> **Glycosides**

Brontager test

**formulating of shampoo**

Sr no	Material	Quantity
1	Amla extract	10 gm
2	Reetha extract	20 gm
3	Shikakai extract	10 gm
4	Lemon juice	1 ml
5	Methyl parabens	1ml of 0.05% preservative
6	Sorbitol	5 ml
7	Citric acid	q.s
8	Gelatin solution	q.s
9	Essential oil	0.1ml

**preparation of shampoo**

The plant extracts were mixed in different proportions to obtain a shampoo whose formula is shown in Table 3. Herbal extracts were added to 10% gelatin solution and were mixed by shaking for 20 min. Lemon juice (1mL) and Methyl

paraben were also added with stirring. Finally the pH of the solution was adjusted by adding sufficient quantity of 1% citric acid solution. Few drops of rose essential oil were also added to impart aroma to the prepared shampoo and the final volume was made to 100 mL with gelatin solution

## EVALUATION OF HERBAL SHAMPOO

### pH Determination

pH is an important parameter for the evaluation of the shampoo because pH is responsible for eye irritation and skin irritation while it is necessary for good shiny hair and tightening of scalp. Alkaline shampoos are generally promote swelling of scalp and make them open up that's why cosmetic manufacturer provide wide pH range of shampoos rather than a fixed pH value. But according to new trends, mild acidic pH shampoos gaining popularity among the consumers. The formulated herbal shampoos shows pH value  $5.91 \pm 0.01$  given in Table, which is close to the skin pH and its other marketed counterparts.

### **2. Percentage of solids**

Studies shows that if a shampoo has higher % of solids in it than it is hard to wash out but if it doesn't have enough solids than it will remain watery and quickly washed out upon use. An ideal shampoo should have 20 – 30 % solids for its balanced cleaning action which is found and given

### **3. Dirt dispersion.**

Shampoo that promotes the dirt to accumulate in the foam is considered poor quality. Dirt that stays in the foam will be difficult to rinse away, dirt should stay in water. If it remains in foam, it will redeposit on the hair. All samples of shampoos show satisfactory result in our study which is shown in Table 5.

### **4. Foaming test**

however generation of foam by a shampoo has a less correlation with its cleaning ability but it represent the physical appearance of product so it is gain enough importance as evaluation parameter. A good shampoo should produce 100 ml or more foam during the test and the bubbles of the foam should be small given in Table 4, because smaller the bubbles the longer the foam will persist.

### **5. Viscosity**

Viscosity is a thickness or thickness of a liquid. Viscosity of shampoo is depending on the % of solids present in the shampoo. In Table 7, results shows that the viscosity of samples gradually change with increases in rpm and shows pseudo plastic behavior and all the samples shows pseudo plastic rheogram which is desirable for an ideal shampoo

### **6. Determination of surface tension**

Previous studies has been reveals that an ideal shampoo should be able to reduce the surface tension of dist. water from 72 dynes/cm to about 40 dynes/cm. Formulated herbal shampoo reduced surface tension of water up to 33.17 dynes/cm given in Table 9, which is an indication of its good cleaning and detergent property

### **Foam quality and retention**

The volume of foam which is produced by a shampoo should be stable and should remain at least for 5 minutes lesser than this may cause consumer dissatisfaction. In our study all sample shows good retention time in Table

### **7. Antifungal activity**

Dandruff characterizes by excessive scaling of scalp tissue. It is chronic, non-inflammatory condition of the scalp one of the most common dermatological skin condition. In antifungal activity all samples shows a significant zone of inhibition against the fungus which may be attribute by their herbal ingredients like lemon, orange peel, henna which well thought out to possess anti-fungal property in table 10

### **Skin /eye irritation test**

The eye and skin irritation tests revealed that the herbal shampoo powder shows no harmful effect on skin and eye. This is due to the absence of synthetic surfactants. Most of the synthetic surfactants produce inflammation of the eyelid and corneal irritation. But in this formulation of herbal shampoo powder, the uses of all ingredients are obtained naturally. So it does not produce any harmful effect on skin and eye.

## III. RESULT :-

**Table no. 01 Phytochemical screening of formulated shampoos:**

Sr no	Plant constituent	Test / reagent	Amla extract	Reetha extract	Shikakai extract

1.	Alkaloid	Dragendroff's reagent	+	+	+
		Hagers test	+	-	-
		Mayers test	-	-	+
		Wagners test	+		-
2.	Flavonoids	Shinoda's test	+	+	-
		Lead acetate test	+		
3.	Saponin	2ml extract + 2ml benedicts reagent	+	++	+
4.	Tannins	Iodine test	+	+	+
		Ferric chloride test	+		
5.	Phenols	Extract + fecl3	+	-	-
6.	Terpenoids	Salkowski test	-	-	-
7.	Glycosides	Borntrager test	-	-	++

Table no.02 of Physical appearance and content analysis

Sr No	Formulated Extract	Physical Appearance	Transparency	Odour	Ph(Initial Mo)	Ph (After 3 Mo)	Total Solids Content
1.	Acacia Cancina	Pale Orange, Good Foaming	Opaque	Fair	5.5 ± 0.3	5.72 ±0.2	2.909gm
2.	Sapindus Mukorossi	Faint Yellow, Good Foaming	Opaque	Good	5.5 ± 0.2	5.70 ±0.3	2.374 gm
3.	Phyllanthus Emblica	Faint Orange, Good Foaming	Opaque	Fair	5.5 ± 0.3	5.70 ±0.1	3.069 gm

**Table no.03 Result of Thin Layer Chromatography**

b	SOLVENT	PLANT	SPOT	COLOUR 10% H2SO4
1	Hexane	phyllanthusemblica	1,2 & 3	Purple, Yellow & Dark green
2	Diethyl ether	phyllanthusemblica	1 & 2	Orange & Yellow
3	Chloroform	phyllanthusemblica	1,2	Green, Light blue, Yellow
4	Ethyl acetate	phyllanthusemblica	1,2 & 3	Black, Yellow & Dark green
5	Methanol	phyllanthusemblica	1,2,3 & 4	Purple, Yellow, Dark red & Blue

**Table no.04 of Solid Content**

Sr No	Sample	% Of Solids
1.	Ayur Herbal Shampoo	25%
2.	PatanjaliHerbal Shampoo	30%
3.	Prepared Herbal Shampoo	20%

**Table no. 05 of Foaming Ability And Foam Stability**

S.no.	Sample	Foam volume	Bubble size
1.	Ayur herbal shampoo	80 ml	small
2.	Patanjali herbal shampoo	70 ml	small
3.	Prepared herbal shampoo	50 ml	Small

**Table no. 06 of Detergency Ability and Dirt Dispersion**

Sr no	Extracts	Dirt dispersion (initial minute)	Dirt dispersion (after 3 minute)	Detergency ability (initial minute)	Detergency ability (after 3 minute)
1.	Acacia concinna	Moderate	Moderate	95.43%	94.96%
2.	Sapindus mukorossi	Moderate	Moderate	83.82%	79.83%
3.	Phyllanthus emblica	moderate	moderate	81.34%	78.28%

**Table no.08 of Viscosity**

Table No. 11: Viscosity Profile of marketed sample and prepared formulation of herbalshampoo

Speed in rpm	Ayur herbal shampoo		Patanjali herbal shampoo		Prepared herbal shampoo	
	%tor	Viscosity	% tor	viscosity	% tor	viscosiy

<b>0.3</b>	<b>15.35</b>	<b>95732.3</b>	<b>-</b>	<b>-</b>	<b>14.35</b>	<b>84435.00</b>
<b>0.5</b>	<b>21.85</b>	<b>82154.0</b>	<b>16.5</b>	<b>607663</b>	<b>19.52</b>	<b>73582.00</b>
<b>1.0</b>	<b>32.87</b>	<b>54156.0</b>	<b>22.2</b>	<b>4266.6</b>	<b>27.65</b>	<b>51516.33</b>

**Table no.09 of Surface Tension Determination**

Determination of surface tension in marketed sample and prepared formulation of herbal shampoo

<b>S.no</b>	<b>Sample</b>	<b>Surface tension (dy/cm)</b>
<b>1.</b>	<b>Ayur herbal shampoo</b>	<b>30.12+0.02</b>
<b>2.</b>	<b>Patanjali herbal shampoo</b>	<b>31.25+0.01</b>
<b>3.</b>	<b>Prepared herbal shampoo</b>	<b>33.17+0.01</b>

#### **IV. DISCUSSION**

With the help of different aqueous extracts, an herbal shampoo was formulated by mixing different constituents in specific proportions. Selected plant materials are rich in polyphenol compounds such as a flavonoid, phenolic and saponin. Dirt dispersion test was carried out by dispersing ink in shampoo preparations. It is suggested that ink or dirt saturation in foam is difficult for rinsing and gets deposited again on hairs. If ink or dirt stays into water portion, it proves better cleansing activity. Cleansing and detergency abilities are two important aspects for shampoo formulation. Hydrophobic molecules such as phenolics and flavonoids show grease encapsulating i.e. cleansing activity.

#### **V. CONCLUSION**

The present study, we formulated an herbal shampoo containing amla, reetha and shikakai traditionally used for hair cleansing in India. All the ingredients used to formulate the shampoo are safer than generic commercial shampoos and the physicochemical evaluation showed ideal results, but further research is required to improve its quality especially on the conditioning performance and to identify the constituents which are responsible for performance.



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