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Herbal Banquet of Shampoo against Dandruff

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ABSTRACT

Shampoo is a hair care product used for the removal of oils, dirt, skin particles, dandruff, environmental pollutants and other contaminant particles that gradually build up in hair. It is a cosmetic preparation; its primary function is of cleansing the hair of accumulated sebum, scalp debris and residues of hair-grooming preparations. All shampoos are basically water and synthetic detergent mixtures. These shampoos of synthetic ingredients are harmful especially during regular usage. This causes severe dryness of hair and shaft leading fall in hair and destroying budding hair shafts. Herbal ingredients or their formulations are viable alternative to synthetic agents. The main objective of this study was to eliminate harmful materials from shampoo formulation and substitute them with a safe natural product.

Key words: Herbs, Hair Conditioning, Shampoo, Dandruff, Cosmetics

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INTRODUCTION

The shampoo sector is probably the largest unit scale among the hair care products since shampoos are one of cosmetic products used in daily life. These are primary products used in daily life. Many shampoos are available in Indian market under "natural" or "herbal", etc. however; Synthetic detergents and preservatives some times were cause of adverse effect among consumers. Basically, Alkanolamides are used for the formation of stable foam; but because of producing nitrosamines, they are potentially carcinogenic compounds. A more radical approach in reducing the synthetic ingredients is by incorporating natural extracts whose functionally is comparable with their synthetic ingredients [1].

The general feeling among consumers is that a good shampoo is one that foams very well. The increasing variety and large number of chemicals introduced onto the market and also into the environment each year, and the resulting requirements for protection of human health and the human environment, have necessitated the monitoring of environmental materials and specimen banking as well as the development of rapid and reliable methods for toxicity evaluation and risk assessment.

Harry defined shampoo as "a preparation of a surfactant i.e. surface active material in a suitable form – liquid, solid, powder. But the usage of surface active material becomes very harmful from long time for the youth as well as our environment. Various synthetic compounds, chemicals, dye and their derivative has been proved to cause various skin diseases having numerous side effects. The word herbal is a symbol of safety in contrast to the synthetic one which has adverse effects on human health. Thus there is increasing attractiveness of herbal cosmetics and the tremendous range of herbal products now generally available to the public. [2]

The basic idea of hair growth enhancing & conditioning shampoo lies deep in the Rig-Veda, Yajurveda, Ayurveda, and Unani and Homeopathic system of medicine. These are the products in which herbs are used in crude or extract form. These herbs should have varieties of properties like nervine tonic, cleansing and softening activity, antiseptic properties, promote the growth of hair, and antibacterial etc.[3]

Today's busy life schedule has created the negligence of an individual to protect their hair from various problems. People don't have time for different treatment for getting good results. The objective of this study was to develop a formulation for hair growing and strengthen without affecting or damaging hair and mainly which show effective treatment against dandruff.

MATERIALS AND METHOD

The different parts of the plants were selected for the study having hair care property which is already proved. The lists of herbs are given in the table 1.

Table 1:Herbs used in the preparation herbal shampoo

S.no	Name	Scientific name	Parts use	Category
1	Rose Mary oil	*Rosamarinus officinalis*	flower	Anti fungal and anti bacterial agent
2	Aloe vera gel	*Aloe vera*	leaves	Sequestering & anti dandruff agent
3	Soap nut	*Sapindus indica*	Fruit	Detergent
4	Shikakai	*Acacia concinna*	fruit	Detergent
5	Hibiscus oil	*Rosa-sinencis*	flowers	Conditioning agent
6	Amla oil	*Emblica officinalis*	Fruit	Strengthen hair, antidandruff agent, promotion of hair growth
7	Lemon	*Citrus limon*	Fruit	Antidandruff, natural cleanser, pH modifier
8	Lemongrass oil	*Cymbopogan citrullus*	leaves	Anti fungal anti bacterial agent

Preparation of anti-dandruff shampoo[4-9]:

Shampoo was formulated using simple mixing process. Herbal shampoo was formulated by adding the required amounts of herbal ingredients as given in the formulation table 2.

Table 2: Formulations and their composition

S.No	Ingredients	F1	F2	F3
1	Rose Mary oil	2ml	-	1ml
2	Lemon grass oil	-	2ml	1ml
3	Amla oil	-	-	1ml
4	Aloe vera gel	1ml	1ml	1ml
5	Soap nut	2gm	2gm	2gm
6	Shikakai	1gm	1gm	1gm
7	Hibiscus oil	1ml	1ml	1ml
8	Lemon	1ml	1ml	1ml
9	Water	q.s to 10ml	q.s to 10ml	q.s to 10ml
Total		**10ml**	**10ml**	**10ml**

Evaluation of prepared herbal shampoo:

The prepared herbal shampoo formulation should be evaluated for its appearance, pH, viscosity, foaming ability, surface tension, percentage solid content, detergency ability, rheology, dirt dispersion and anti-fungal activity against *pityrosporum ovale.*

Physical appearance/visual inspection:

Developed formulation was evaluated for their clarity, color and odour. All evaluations where reported and discussed.

Determination of pH:

Developed formulation was diluted using distilled water to pre-pare a sample with 10 % concentration. The prepared sample was checked for pH using a digital pH meter at room temperature 30±2°C.

Determination of percentage solids contents:

A clean dry china dish was weighed and added with 4 grams of shampoo. The dish with shampoo was weighed. The exact weight of the shampoo was calculated. The china dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight after drying was calculated.

Measurement of viscosity:

The viscosity of the shampoo was determined by using Brookfield Viscometer LVDV Prime-I. The viscosity of shampoo was measured at room temperature i.e. 30±2°C with varying rpm and torque.

Surface tension measurement:

Dilute the shampoo using distilled water to fix 10% as concentration. Measurements were carried out using stalagmometer. Dip the flattened end of stalagmometer in to beaker containing sample of developed shampoo and suck it until the level reaches the mark. Fix that in the stand and allow the sample to run slowly from the mark. Count the number of drops formed when level of liquid reaches from A to B. Repeat the experiment with distilled water. The data was calculated using following equation.

$$R_2 = \frac{(W_3 - W_1)N_1}{(W_2 - W_1)N_2} \times R_1$$

W1 is weight of empty beaker.

W2 is weight of beaker with distilled water

W3 is Weight of beaker with shampoo solution.

N1 is no. of drops of distilled water.

N2 is no. of drops of shampoo solution.

R1 is surface tension of distilled water at room temperature.

R2 is surface tension of shampoo solution

Foaming ability and foam stability:

Cylinder shake method with slight modification was used for deter-mining foaming ability. 50ml of the 1% shampoo solution was put into a 250 ml graduated measuring cylinder and covered

with hand. Measuring cylinder was shaken for 1 minute. The total volume of the foam contents after 1 minute shaking was recorded. The procedure was continued for 5 minutes.

Safety evaluation:

Safety is an important aspect of a shampoo; it should be tested by conducting animal studies like eye irritation test and skin sensitization test, using albino rabbits.

Stability studies:

Stability studies were carried out by placing glass tubes and in humidity chamber at 45°Cand 75% relative humidity. And their appearance, physical stability were inspected for a period of 3 months at interval of one month.

Antifungal activity against *Pityrosporum ovale:*

The herbal anti-dandruff shampoo formulations (F5-F8) were subjected to anti-fungal activity by adopting disc-diffusion method. Potato Dextrose Agar (PDA) medium was used for growing fungus. PDA was prepared with addition of Butter. Dandruff was dissolved in Potato dextrose broth for its further use as inoculum. The inoculum obtained was serially diluted to 10-6 and 10-7 dilutions and 100µl of inoculum was inoculated onto the PDA plate which was spread using an L-Shaped spreader. The Petri plates were then sealed using a parafilm and incubated at 30 degree Celsius for 48 hours to get plates with uniform growth of fungus. Then different dilutions of shampoo as prepared and poured into petri plates and incubated, the growth of fungus were checked at regular intervals. Disk diffusion method was used to check the zone of inhibition for all the dilutions of shampoo.

RESULTS AND DISCUSSION

Physical appearance/visual inspection:

The results of visual inspection of formulations were listed in table 3. All formulations show good characteristics with respect to foaming.

Table 3: Organoleptic evaluation:

S.No	Organoleptic evaluation	F1	F2	F3
1.	Colour	Dark brown	Light brown	Yellowish brown
2.	Odor	Acceptable	Acceptable	Acceptable
3.	Foaming	poor	good	Very good

Determination of pH:

Developed formulations were acid balanced and ranged 5.5-6.1, which are nearer to skin pH.

Determination of percentage solids contents:

If he shampoo has too many solids it will be hard to work into the hair or too hard to wash out. The percentage of solid content was found to be between 20-25%, so they are easy to wash out.

Measurement of viscosity:

Product rheology plays an important role in defining and controlling many attributes such as shelf life, stability and product aesthetics value such as clarity, pour ability, spreading capacity on hair and product consistency in the package. Therefore viscosity evaluation is of paramount impotence in the study. Table. 4 indicates that viscosity values of formulations.

Surface tension measurement:

It has been mentioned that a proper shampoo should be able to decrease the surface tension of pure water to about 40 dynes/cm12. The reduction in surface tension of water from 72.8 dynes/cm to 34.2 dynes/ cm by the herbal shampoos is an indication of their good detergent action. The results are shown in Table 4.

Foaming ability and foam stability:

Foam generation has little to do with the cleansing ability of shampoos, it is of paramount importance to consumer and is there of an important criterion in evaluating shampoos. All the shampoos showed similar foaming characteristics in distilled water and showed comparable foaming properties. The values are noted in table 4.

Safety evaluation:

There were no hypersensitive reactions by these formulations. All formulations are good. Hence it is safe for use without any side effects. The results are showed in figure 1- 4.

Table 4: Physicochemical evaluation

S.No	Physico chemical evaluation	F1	F2	F3
1	P^H	5.5	5.7	6.1
2	Viscosity	poor	good	good
3	Surface tension **(dy/cm)**	23.15	27.58	32.45
4	% solid content	22	23	25
5	Foming volume	5ml	7ml	11ml

Figure: 1 Initial Skin Condition of Rabbit

Figure: 2 No Skin sensitivity for F3 after 3hrs

Figure: 3 Initial eye Condition of Rabbit

Fig ure: 4 No eye irritation for F3 after 3hrs

Stability studies:

Stability and acceptability of organoleptic properties (odour and color) of formulations during the storage period indicated that they are chemically and physically stable. The stability of herbal formulation is listed in table 5.

Table .5: Stability studies

Stability			
Parameter	**After 1month**	**After 2 months**	**After 3months**
Appearance	brown, good foaming	brown, good foaming	brown, good foaming
pH	6.1	6.0	6.0
Viscosity(cp)	good	good	good
% Solids	25	225	25
Surface tension (dy/cm)	32	31.22	31
Foaming volume(ml)	10ml	10ml	10ml

Antifungal activity against *Pityrosporum ovale:*

The results of antifungal activity are described in table 6 and zone of inhibition was shown in figure. The formulation F3 showed maximum zone of inhibition. Therefore it is concluded that as the concentration of the herbs increased, the zone of inhibition was also increased, hence the formulation F3was the best formulation for treating dandruff. results were showed in figures 5 .

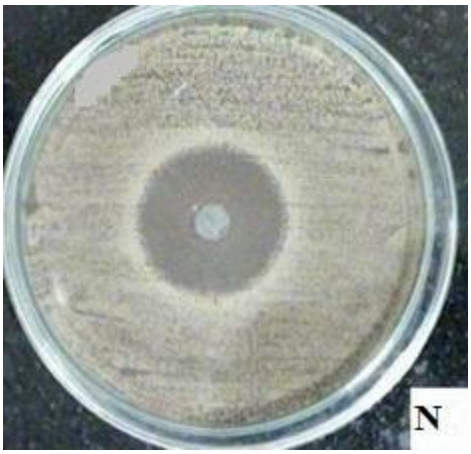

Figure 5: Antifungal activity of F3 herbal anti-dandruff shampoo against *Pityrosporum ovale*

Table 6: Anti Microbial Activity of Prepared Formulations

S.No	Formulation	Name of micro organism	Zone of inhibition in mm
1	F1	*Candida albicans*	12
		Gram +ve bacteria	17
		Gram - ve bacteria	11
2	F2	*Candida albicans*	13
		Gram +ve bacteria	17
		Gram -ve bacteria	12
3	F3	*Candida albicans*	15
		Gram +ve bacteria	18
		Gram -ve bacteria	14

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