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FORMULATION AND EVALUATION OF HERBAL ANTI-DANDRUFF SHAMPOO

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ABSTRACT

Dandruff is a common disorder affecting the scalp condition caused by Pityrosporum *yeast*. Dandruff cannot be completely remove but can only be controlled. A shampoo is a composition carry surfactant in a suitable form liquid, solid or powder which when used under the specified order will eliminate surface grease, dust and skin debris from the hair shaft and scalp without adversely affecting the user. Many anti-fungal compound are employed in hair care preparations for the dandruff treatment. These products appear many side effects like loss of hair, increased scaling, itching, irritation, nausea, and headache. Hence an effirt was made to formulate herbal anti dandruff shampoo which is efficacious in terms of safety and treating the dandruff condition better than the chemical based anti-dandruff shampoo. Herbal anti-dandruff shampoos were manufacture using herbal element like Retha, Amla and Shikakai extract use for preparing shampoo. The formulated shampoos were subjected to evaluation parameters like visual inspection, pH, viscosity, Percentage of solids constituents, Dirt dispersion, Surface tension, Foaming ability and foam stability, anti-fungal activity test using Pityrosporum Ovale strain.

KEYWORDS: Retha, Amla and Shikakai, Herbal anti-dandruff Formulation,

1. INTRODUCTION

Hair is a protein filament that grows from follicles on the dermis or skin. Scientific name of hair is pili or pilus. Hair is a component of the integumentary system and extends downward into the dermal layer where it sits in the hair follicle. Hair is an important part of overall appeal of human body, historically been associated with beauty and social distinction. Innumerable insects from all art forms can be cited supporting the special prominence accorded to hair by people of virtually all times and cultures. Dandruff is reported to be a harmless, chronic condition that occurs when scalp becomes dry or greasy and produces white flakes of dead skin that appear in hair or on shoulders. People most often think of it as anything that produces a flakes scalp. Although it is harmless, dandruff can be embarrassing for those who have it. It usually starts between the ages of 10 and 20 and affects up to 40% of people over the age of 30. Microorganism causing dandruff fungus belonging to genus Malassezia.

1.1 Hair anatomy

Hair grows from hair follicles situated within the fatty layer of the scalp. Contrary to the popular belief that hair grows as single strands, hair follicles actually grow in groups of 1-4 hairs called.

Parts of the hair

1. **Dermal papillae:** The dermal papilla is responsible for regulating the hair cycle and hair growth, and is also comprised of androgen receptors that are sensitive to the presence of DHT.
2. **Matrix:** The matrix surrounds the dermal papillae and contains all the active cells needed for hair growth and for the development of the different parts of the hair, particularly the outer root sheath, the inner root sheath and the hair shaft.
3. **Outer root sheath:** The outer root sheath, or trichilemmal, is the outermost part of the hair and is keratinized. It covers the entire hair follicle inside the dermis and then transitions through to the epidermis, providing the hair follicle with an opening from which to surface from.
4. **Inner root sheath:** inner root sheath is comprised of three parts: the Henley layer, Huxley layer, and cuticle. The Henley's and Huxley's layers are capsular layers that anchor onto each other with the purpose of stabilizing the hair. The cuticle, which is the

innermost part that it closest to the hair shaft, is made from dead hardened cells and give the hair shaft added protection.

5. **Hair shaft:** The hair shaft is the solitary part of the hair follicle that fully exits the surface of the skin. The hair shaft is made up of three layers: the medulla, cortex, and the cuticle. The **medulla** is described as an unsystematic and unstructured area located in the innermost region of the hair shaft and is not always present. The **cortex**, in contrast to the medulla, is highly structured and organized.

1.2 Dandruff

Dandruff represents one of the Most common dermatological skin conditions and is a chronic, non - inflammatory conditions of the scalp that is characterized by excessive scalping of scalp tissue. Dandruff is apparently caused by a fungus called Malassezia restrict a and M. globose. Malassezia formerly called Pityrosporum is a yeast causing infection of skin and scalp. It often cause itching. warm and humid atmosphere, overcrowding and poor personal hygiene are ideally suited for the growth of Malassezia . Dandruff affects 5% of the population and mostly occurs after puberty, between 20-30 years and dandruff affects males more than females. Dandruff occurs exclusively on skin in areas with high leaves of sebum.

1.3 Cause of dandruff

Dandruff is a skin condition that affects around half of the world's population. The most obvious sings of dandruff are white or grey colored flakes that appear on the scalp and hair. These flakes are old skin cells that have been shied at a faster rate.

The extract cause of dandruff is still unknown , but it has been linked to the presence of a microbe called Malassezia which feeds on the scalp's natural When the scalper's protective barrier becomes weakened, irritants produced by Malassezia cause it to shed more skin cells than usual.

1.4 Shampoo

Shampoo is a preparation constraining surfactant in a suitable form-liquid, solid or powder-which when used under the specified condition will remove surface grease, dirt, and skin debris from the hair shaft and scalp without adversely affecting the user. Most shampoo contain water, a detergent (cleaning agent), surfactant (lather making agent), salt fragrance (nature and acritical), preservative and food coloring. With the exception of water and salt (sodium chloride), different chemical compounds are used depending on the desired result of

the shampoo. Many shampoo also contain vitamins and moisturizing alcohols to prevent too much of the hair and scalp's nature oils from being stripped away during cleansing.

2. Experimental work

2.1 Plant material collection

Phyllanthus Emblica, Sapindas indica and *Sapindas trifoliate* were collected from rural area of Satna (M.P.).

2.2 Extraction of plant material

Phyllanthus Emblica, Sapindas indica and *Sapindas trifoliate* have been extracted with hydroalcoholic using Soxhlet process for 6 hrs, filtered and dried using vaccum evaporator at 40^0C.

2.3 Determination of percentage yield

The percentage yield of each extract was calculated by using following formula:

$$\text{Percentage yield} = \frac{\text{Weight of Extract}}{\text{Weight of powder drug Taken}} \times 100$$

2.4 Preparation of shampoo

Preparation of anti-dandruff shampoo: Shampoo was formulated using simple mixing process. Herbal anti-dandruff shampoo was formulated by adding the required amounts of herbal ingredients as given in the formulation.

Formulation of Herbal Anti-Dandruff Shampoo

S.N.	Ingredients	F1	F2	F3
1	Retha Extract	1.0	1.5	2.0
2	Amla Extract	1.0	1.5	2.0
3	Shikakai Extract	1.0	1.5	2.0
4	Sodium Lauryl Sulfate(gms)	15	10	5
5	Glycerin (ml)	1	1	1
6	EDTA (gm.)	0.15	0.15	0.15
7	Sodium Hydroxide	To adjust pH	To adjust pH	To adjust pH
8	Water	q.s	q.s	q.s
9	Perfume	q.s	q.s	q.s

2.5 Evaluation of shampoo

1. Physical Appearance/Visual inspection

The formulation prepared was evaluated for the clarity, color, odor and foam producing ability and fluidity.

2. Foam and Foam stability

200 ml of surfactant solution is dropped into a glass column containing 50ml of the same solution. The height of the foam generated is measured immediately and again after a specified time interval, and is considered proportional to the volume.

3. Cleaning Action and Detergency

5gm sample of soiled human hair is placed at 35°c in 200 cc of water containing of 1 gm of shampoo. The flask is shaken 50 times a minute for 4 minutes. Then washed once again with sufficient amount of water, then after filter the hair dried and weighed. The amount of soil is removed under this condition is calculated.

4. Determination of pH

A 10% v/v shampoo solution was constituted in distilled water and the pH of the solution was measured by using a calibrated pH complete.

5. Surface tension

Surface tension measurement it has been mentioned that a proper shampoo should be ableto decrease the surface tension of pure water to about 40 dynes/cm. Surface tension reduction is one of the mechanisms implicated in detergency.

6. Determination of solid content percentage

A clean dry evaporating dish was weighed and 4 grams of shampoo was added to the evaporating dish. The evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the solid contents present in the shampoo was calculated after drying.

7. Viscosity

Viscosity of the samples changes gradually with the increase in rpm, therefore the shampoo formulations were time dependent. Secondly as the data showed the viscosity decreases with increase in rpm, so the shampoo formulations were shear thinningor pseudo plastic in nature.

3. RESULTS AND DISCUSSION

The aim of the present work is to prepare Antidandruff shampoo by using anti-dandruff agents such as Shikakai, Amla, Retha by various combinations. The prepared Antidandruff

shampoo was evaluated for physical appearance/visual inspection, determination if pH, determine % of solid contents, foam ability.

3.1 Result of yield of extraction

The crude extracts so obtained after the maceration process, each extracts were further concentrated on water bath evaporation the solvents completely to obtain the actual yield of extraction. To obtain the percentage yield of extraction is very important phenomenon in phytochemical extraction to evaluate the standard extraction efficiency for a particular plant, different parts of same plant or different solvents used. The yield of extracts obtained from samples using hydroalcoholic as solvent is depicted in the table 3.1.

Table no. 3.1: % Yield of hydroalcoholic extract.

S. No.	Solvent	% Yield (w/w)		
		Shikakai	Amla	Retha
1.	Hydroalcoholic (70:30)	5.8 %	6.2	4.9

3.2 Result of evaluation of herbal Shampoo

3.2.1 Result of physical appearance

Physical Appearance results of visual inspection of series of formulations are listed in Table. As can be seen, all formulations had the good characteristics with respect to foaming.

Table no. 3.2: Result of formulations for physical appearance.

S. No.	Formulations	Appearance
1	F1	Pale yellow color, Good Foaming
2	F2	Pale yellow color, Good Foaming
3	F3	Pale yellow color, Good Foaming

3.2.2 Result of foaming ability

Foaming ability 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 criterion in evaluating shampoos. All the Three shampoos showed similar foaming characteristics in distilled water. The foam retention ability of Three samples is given in table. All Three shampoos showed comparable foaming properties. The final formulation produced stable foams there was little bet change in foam volume.

Table no. 3.3: Result of foam ability of herbal shampoo.

Time in Mins	Foam Volume (ml)		
	F1	F2	F3
1Min	173	142	169
2Min	169	137	166
3Min	166	136	163
4Min	164	133	162
5Min	162	132	160

3.2.3 Result of cleaning action (%)

Dirt Dispersion Shampoo that cause the ink to concentrate in the foam is considered poor quality, the dirt should stay in water. Dirt that stays in the foam will be difficult to rinse away. It will redeposit on the hair. All Three shampoos showed similar results. These results indicate that no dirt would stays in the foam.

Table no. 3.4: Result of formulations for cleaning action (%).

S. No.	Formulations	Cleaning action (%)
1	F1	23.62±0.06
2	F2	29.36±0.04
3	F3	19.57±0.03

3.2.4 Result of pH

The pH of shampoos has been shown to be important for improving and enhancing the qualities of hair, minimizing irritation to the eyes and stabilizing. The current trend to promote shampoos of lower pH is one of the ways to minimize damage to the hair. Mild acidity prevents swelling and promotes tightening of the scales, there by inducing shine. As seen from Table all Three shampoos were acid balanced and were ranged 5.78 to 5.96.

Table no. 3.5: Result of formulations for pH.

S. No.	Formulations	pH
1	F1	5.78±0.03
2	F2	5.81±0.05
3	F3	5.96±0.07

3.2.5 Result of surface tension

The reduction in surface tension of water to 31.53 dynes/ cm by the herbal shampoos is an indication of their good detergent action.

Table no. 3.6: Result of formulations for surface tension.

S. No.	Formulations	SurfaceTension (dy/cm)
1	F1	29.69±0.72
2	F2	31.53±0.24
3	F3	28.48±0.63

3.2.6 Result of percent of solids contents

Percent of Solids Contents If the shampoo has too many solids it will be hard to work into the hair or too hard to wash out. The result of percent of solids contents is in table and found between 19.85-25.64%. As a result, they were easy to wash out.

Table no. 3.7: Result of formulations for percent of solids contents

S. No.	Formulations	Solids (%)
1	F1	19.85±0.02
2	F2	22.28±0.02
3	F3	25.64±0.02

3.2.7 Result of viscosity

These formulations showed pseudo plastic behavior which is a desirable attribute in shampoos formulation. At low rpm the herbal shampoos showed high viscosity and increase in the shear rate the viscosity of the shampoos drops, this is a favorable property which eases the spreading of the shampoos on hair. The results obtained from the rheological studies were fitted into different flow behaviors, using the linear or non-linear regression.

Table no. 3.8: Result of formulations for viscosity.

RPM	Viscosity(cp)		
	F1	F2	F3
0.3	-	78563.25	-
0.5	58349.00	66245.55	-
1.0	41283.44	49748.48	28472.33
1.5	31968.00	38628.00	16245.33
2.5	22482.65	23473.33	8237.33
5	13282.45	14326.33	6268.00
10	8161.00	9869.66	5386.26

CONCLUSION

At this time, Hair fall is the major problem so in this case we try to add some type of herbal drugs in the formulation to prevents hair fall, make smooth, as well as give anti-dandruff action. The formulation of herbal anti-dandruff shampoo are given positive effect and reduce dandruff and other type of fungal infection from hair. This type of formulation we use Retha,

Shikakai and Amla herbal plant which contain anti-dandruff property. There are no any type of side effect, so they are useful for all of them. The formulation of Anti-dandruff hair shampoo provides a method for treating a scalp dandruff or seborrheic dermatitis. Herbal antidandruff hair shampoo containing 2ml of herbs concentration of Retha, Shikakai, Amla with sodium lauryl sulfate base could be used as an effective in treatment of Dandruff on scalp.

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