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Formation And Evaluation Of Antidandruff And Antifungal Shampoo Involves Extracting Herbal Ingredients

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***Abstract*:** A shampoo is a preparation containing a suitable surfactant (i.e. surface-active material)-liquid, solid or powder-which, when used under the prescribed conditions, removes surface grease, dirt and skin debris from the hair shaft and scalp without adversely affecting the user. Various anti-fungal agents are used for the dandruff procedure in hair care preparations. Such drugs show various side effects such as hair loss, increased scaling, scratching, discomfort, nausea and headache. Therefore, an attempt was made to Formation and evaluation of herbal neem-based shampoo that is safer in terms of health and treating the dandruff condition than the anti-dandruff shampoo based on chemicals. Herbal anti-dandruff shampoos have been formulated using herbal ingredients such as Bhringraj Leaves extract, Lemon Grass Oil, Neem oil, Henna, Aloe Vera gel and other ingredients for base shampoo preparations. The formulated shampoos were subjected to evaluation parameters such as visual inspection, pH, viscosity, solid content percentage, dirt dispersion, surface tension, foaming capacity and consistency of the foam, PityrosporumOvale strain anti-fungal activity test. Formulation (F4) showed strong antifungal activity, i.e., maximum inhibitory region.

***Keyword*:** Antidandruff, Antifungal, Shampoo, Herbal, Ingredients

INTRODUCTION

Dandruff is a major hair problem and a great public distress in India and in all over the world. Dandruff is one of the most common dermatological skin states and is a long non-inflammatory state of the scalp that is characterized by overweening scaling of scalp tissue. Dandruff caused by a fungus called *Malassezia restricta*and *M. globusa*. Malassezia is also called pityrosporum is a yeast which is cause disinfection of skin[1]. Shampoos are most usually used in cosmetic product. Earlier soap cakes were used for washing hair, but now days both men and women's population mostly uses shampoos. A shampoo may be defined as preparation of surfactant in a suitable form liquid, solid or powder which when used under the conditions specified will remove surface grease and skin debris from the hair[2].

Shampoos are most probably used as cosmetics. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives preservatives and active ingredients[3]. Hair is a mid-way between nature and culture. Hair care attitudes are different from one society to another regardless of economic differences, and from one person to another within societies[4]. Shampoo is a polyherbal

formulation that consists of extracts of Neem. These herbs have been selected on the basis of a traditional system and scientific justification with modern uses[5]. Many synthetic shampoos are present in the current market both medicated and non-medicated; however, an anti-dandruff and antifungal shampoo popularized due to natural origin which is safer, increases consumer demand and free from side effects[6].

Herbal formulations of shampoos, personal care, and toiletry products have long been considered as better alternatives to synthetic ones[7]. Aloes are important sources of herbal inputs in producing cosmetic, personal care, and toiletry products. However, only *A. barbadensis* Miller (A. vera L.) is extensively used in producing lotions, soaps, shampoos, creams, and facial cleansers[8]. This study aims at describing the physicochemical characteristics of lab-based Neem shampoo formulations.

MATERIALS AND METHODS

Collection and preparation of plant specimens: The anti-dandruff and antifungal shampoo contains the natural ingredients with herb extract. It includes amla, reetha, shikakai, aloe etc. in proportion. All the ingredients are obtained from nature.

Table No. 1: List of herbal ingredients for formulation of shampoo

S. No:	Ingredients	Weight of ingredients
1	Amla	2.55 gm
2	Reetha	0.87 gm
3	Shikakai	2.55 gm
4	Aloe vera	0.5 gm
5	Distilled water	1 ml
6	Lemon juice	0.5 gm
7	Hibiscus	2 gm
8	Fenugreek seeds	0.4 gm
9	Rose oil	0.5 ml

Healthy and mature leaves of *neem* were collected The leaves were washed with tap water to remove dirt and soil. The outer green skin (i.e., the leaf) and the inner gelatinous mass (i.e., the gel) were separated by peeling the skin off with scalpel. The gel mass was dried in shade at room temperature for 18 days. The dried gel mass was then pulverized into powder in an electrical grinder and stored in sealed container until used for the phytochemical study.

Figure 1: herbal ingredients for formulation of shampoo

Preparation of solvent extract

Extraction of *Azadirachta indica*: Fresh neem leaves are collected and shed dried for 15 days. The dried leaves are then powdered using a motor and pestle. The Powdered Neem leaves are sieved and weighed 24.45 g and macerated in a beaker using 200 ml of distilled water with continuous stirring. The prepared mixture is kept covered with aluminium foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper. The excess solvent is evaporated using a Rotary evaporator and then

the remaining mixture was dried on a hot water bath. The dried extract was collected and kept in desiccator for cooling. The prepared extract is weighed.

Extraction of *Phyllanthus emblica*: Fresh amla fruit were finely chopped and shed dried for 15 days and powdered using mortar and pestle. The powered amla weigh 17.02g mixed with 0.25ml chloroform in 100ml water. Stir it for 15mins and macerate it for 3 days while stirring in between. Filter the solution and allow it to evaporate in rotary evaporator. Take the filtrate out of rotary evaporator and completely dry it on hot water bath. Keep the extract in desiccator for cooling. Collect and weigh the obtained extract.

Extraction of *Sapindus mukorossi*: Fresh reetha fruit is collected; seed is removed and chopped finely using a clean knife. The chopped fruit is shed dried for 3 weeks. The dried fruit is then powdered using a mixer grinder; the prepared powder is sieved so as to remove any large pieces of the fruit. The fine powder is then weighed 17.15 gm. Measured 100 ml of petroleum ether using a measuring cylinder, transfer it to a beaker and add the prepared powder. Stir the mixture and cover it with an aluminium foil and macerate it for 3 days. After that the macerated mixture is filtered using a filter paper and the filtrate is then kept on hot water bath for drying. The completely dried extract is then collected and kept in desiccators for cooling. The cool extract is then weighed on a digital weighing machine.

Formulation of shampoos:

Formulation of an anti-dandruff and antifungal shampoo:

- Take 3.5 ml of 0.1M sodium chloride in a beaker.
- Add 1gm of guar gum to the beaker Weigh 0.1ml of glycerine and add it to the beaker
- Add 3.5ml gelatine, one capsule of vitamin E and 1gm of activated charcoal powder to the beaker.
- Add 2.55 gm of reetha extract, 5gm of amla extract and 1.95 gm of neem extract and mix it well
- Add water as required to make it a smooth and uniform paste.
- Now add 2-4 drops of rose oil to the mixture.
- Add 1drop of lemon oil as a preservative.
- Continue to stir it for some times to avoid formation of any lumps
- Allow it to cool and evaluate.

Aloe vera shampoos were prepared from gel mass by mixing it with six ingredients, namely, coconut oil, jojoba oil, lemon juice, olive oil, pure glycerin oil, and vitamin E. Five shampoo formulations were prepared by mixing the ingredients at varying concentrations (amounts) and homogenizing the contents by a mechanical stirrer. The volumes of all the formulations were fixed at 20 mL by adding sterile distilled water.

Table No. 2: Formulation of Aloe vera shampoos

Ingredients	UoM	F_1	F_2	F_3	F_4	F_5
Neem	mL	4	6	8	10	10
Coconut oil	Drops	1	1	1	1	2
Olive oil	Drops	1	2	1	2	1
Jojoba oil	Drops	1	1	1	1	1
Glycerin oil	Drops	1	1	1	1	1
Vitamin E	Drops	1	1	1	1	1
Lemon juice	Drops	1	1	1	1	1
Proportion of aloe vera gel	(%), v/v	20	30	40	50	50

Evaluation of the Characteristics of the Shampoos

The five shampoo formulations were physically evaluated by inspecting and measuring their color, clarity, odor, consistency, spreadability, and pH at 25°C. Likewise, the qualities of the formulations were evaluated by analyzing their solid contents, surface tension, dirt dispersion, rheology (viscosity) (Model DV-l Plus, LV, USA), foaming stability, wetting time, and conditioning performance based on the procedures established by many researchers.

RESULT AND DISCUSSION

Gross Phytochemistry of *Neem*: *Aloe vera*, like all aloes, can be the source of many phytochemical constituents applicable in preparing cosmetic, pharmaceutical, and many other products. Preliminary phytochemical screening of methanol gel extracts using standard tests showed the presence of anthraquinones, flavonoids, saponins, and tannins and the absence of alkaloids and terpenoids (Table 3). Brhane et al. [30 used multiple extraction solvents and reported the presence of alkaloids, flavonoids, tannins, saponins, polyphenols, and terpenoids with in vitro antioxidant properties. Leaf latex of the plant is also reported to be the source of two anthrones with anti-inflammatory activities [31. Besides, proximate analysis exhibited that the moisture and ash content, crude fat, total protein, and carbohydrate of the plant's gel were $92.19 \pm 0.03\%$, $3.51 \pm 0.01\%$, $0.24 \pm 0.04\%$, $1.64 \pm 0.09\%$, and $2.61 \pm 0.07\%$, respectively [32. In fact, there are many plants species that produce useful chemical constituents for hair care such as vitamins, amino acids, sugars, glycosides, phytohormones, bioflavonoids, fruit acids, and essential oils, thus commonly used in the formulation of shampoos.

Evaluation ff prepared Shampoos:

Table No. 3: Physical inspection of Shampoos

Formulations	Color	Clarity	Odor	Consistency	Spreadability
F_1 (4 mL)	White	Turbid	Characteristic	Thin	Good
F_2 (6 mL)	White	Turbid	Characteristic	Thin	Best
F_3 (8 mL)	White	Turbid	Characteristic	Slightly thick	Best
F_4 (10 mL)	White	Turbid	Characteristic	Slightly thick	Best
F_5 (10 mL)	White	Turbid	Characteristic	Slightly thick	Best
Commercial	Green	Turbid	Characteristic	Slightly thick	Best

Table No. 4: Evaluations of neem shampoo formulations

Formulation	Solid content	Foam stability	Dirt dispersion	Surface tension	Wetting time test	Conditioning performance
F_1 (4 mL)	23%	Good	Not detected	38	142	Good
F_2 (6 mL)	24%	Good	Not detected	37	150	Good
F_3 (8 mL)	26%	Very good	Not detected	36	152	Good
F_4 (10 mL)	28%	Very good	Not detected	34	153	Good
F_5 (10 mL)	25%	Very good	Not detected	33	157	Good
Commercial	26%	Very good	Not detected	32	185	Good

Table No.5: Viscosities of Shampoos

Formulations	Viscosity (poise)	pH	Temp. (°C)
F1 (4 mL)	22.19	6.4	25
F2 (6 mL)	24.09	6.4	25
F3 (8 mL)	24.11	6.5	25
F4 (10 mL)	26.17	6.6	25
F5 (10 mL)	26.86	6.8	25

CONCLUSION

The main purpose behind this investigation was to develop a stable and functionally effective shampoo. The present study was carried out with the aim of preparing the anti-dandruff and antifungal shampoo that provides smooth and straight effect to hairs, safer than the chemical conditioning agents. An anti-dandruff and antifungal shampoo was formulated with the aqueous extract of medicinal plants that are commonly used for cleansing and smoothing hair traditionally. To provide the effective conditioning effects, the present study involves the use of Neem extracts instead of synthetic cationic conditioners. The factors like UV radiations, use of harsh chemical products have direct and indirect impact on the hair. The present work focuses on the potential of herbal extracts from cosmetic purposes. Hence we conclude that the formulation of Shampoos for antidandruff is effective in providing smoothing and shiny effect and better conditioning effect. Results shows that all ingredients use to formulate the shampoo were found to be safe and physiochemical evaluation shows ideal results .Stability studies showed a stable homogenous appearance during 3-4 weeks at 3-8°c 40 degree Celsius ambient temp however F1 formula A gives best and optimum stability and active results.

Aloes have been vital components of ethno-medicine. Studies on phytochemical constituents and medicinal properties of the aloes showed that they are good sources of bioactive compounds. Few studies explored the phytochemical properties of Aloe vera. Our phytochemical screening using the Froth test was positive for saponins—the principal class of phytochemicals with natural surfactants. Moreover, GC-MS analysis of the methanol gel extracts showed that the plant is the source of high amount of many phytochemicals used in the production of cosmetics and personal care products (e.g., dodecanoic acid, hexadecanoic acid, and phytol). The lab-based shampoo formulations of gel extracts prepared and evaluated in the present study exhibited desirable features like the marketed shampoo used for comparison. Sensory observation and physiochemical tests also revealed that the formulations have required qualities. Further studies are recommended to elucidate the complete phytochemical profile of the plant and develop a more refined protocol of shampoo making.

CONFLICTS OF INTERESTS

There are no any Conflicts of interests.

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