

A REVIEW ON FORMULATION AND EVALUATION OF HERBAL SHAMPOO

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ABSTRACT

As a part of the present study, herbal shampoo formulation using natural ingredients was formulated and evaluated for safety and efficacy, so that chemical ingredients would not be a potential source of risk. It has been aimed at combining the technology of modern formulation with the benefits of natural ingredients in order to develop a formula that would be effective. An attempt has been made to combine modern formulation technology into a formula based on natural ingredients. It removes sebum, dirt, dandruff, promotes hair growth, strengthens and darkness of the hair. Moreover it also act as a conditioning agent and performs all these actions without affecting or damaging hair. The shampoo was prepared by taking the extracts of pomegranate (active ingredient), curry leaves and amla in different proportions. The main objective of this study was to eliminate harmful synthetic ingredient from shampoo formulation and substitute them with safe natural ingredient. The herbal shampoo contains more effective actions rather than chemicals. Herbal shampoo is a cosmetic that now a days mostly marketed because it gives natural effect.

INTRODUCTION

Shampoo is a hair care product, typically in the form of a viscous liquid that is used for cleansing hair. The goal of using shampoo is to remove dirt that is build up on the hair, provide nourishment and give healthy look to the hair without stripping out so much sebum from it. The shampoo sector is probably the largest market for sale amongst the hair care products since shampoos are one of the cosmetic products used in daily life. Many synthetic shampoos are present in the current market both medicated and non –medicated; however, herbal shampoo are nowadays mostly popularized due their natural origin, safety, increasing consumer demand, low cost and negligible side effects^[1]. Herbal shampoo is a cosmetic preparation which uses herbs from plants and it is meant for washing of hair and scalp just like a regular shampoo. Herbal formulations are considered as alternative to synthetic shampoo but formulating cosmetics using completely natural raw material is challenging task. It is extremely difficult to prepare a herbal shampoo using a single natural material that would be milder and safer than the synthetic ones, and at the same time would compete well with its foaming, detergency and solid content. The selection of active ingredients for hair care 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. We therefore made an attempt to develop a basic protocol for herbal shampoo formulation for effective hair care. In the present study, herbal shampoo was formulated containing suitable ingredients such as pomegranate (*Punica granatum*), Curry leaves(*Murraya koenigii*), and Amla(*Phyllanthus emblica*) etc.. In different proportions and evaluated for physicochemical properties. The uniqueness of this herbal formulations due to its active ingredients, pomegranate peel. Pomegranate peel feeds the hair from the roots removes the fatty layer above the follicles that hinders hair growth and completely eliminates inflammation and prevents skin alopecia. Its natural uv ray blocking property prevents aging in hair and makes hair shiny and soft.

HERBAL SHAMPOO

Herbal shampoo are cosmetic preparations that involve the usage of traditional Ayurveda herbs^[2], natural ingredients in hair product can gently yet effectively help to impart vitamins, minerals, oils, and botanical extracts to clean the scalp and the hair follicles and hair shafts reduce the chance of hair loss. It also used for removal of oils, dandruff, dirt, environmental pollutions etc...



Natural shampoos are plant-based formulated without harsh chemicals and other additives. Most natural shampoos are sulfate free, paraben free, silicone free and use natural compounds and essential oil to add fragrance. They can also gently stimulate the growth of new hair, help hair retains its natural moisture and enhance the overall texture and appearance of hair.

FUNCTIONS^[3]

- ❖ LUBRICATION
- ❖ CONDITIONING
- ❖ HAIR GROWTH
- ❖ MAINTAINENCE OF HAIR COLOUR
- ❖ REMOVAL OF EXCESS SEBUM

INGREDIENTS



B

POMEGRANATE PEEL

The polyphenols in pomegranate peel powder combat hair loss prevent dandruff and darken hair color. It strengthen hair follicles by stimulating circulation and improves blood flow to the scalp thereby stimulating healthy hair growth^[4].





CURRY LEAVES

Curry leaves are rich source of beta-carotene and proteins, which reduce hair loss and increase hair growth. They also contain amino acids and antioxidants which strengthen the hair follicles and moisturizing scalp^[5].



AMLA FRUIT

Amla is a potent ingredient for hair that adds strength to each hair strand. With antioxidant and vitamins, amla nourishes the dry scalp and eliminates hair thinning and breakage. To prevent premature graying of hair^[6].

METHOD OF PREPARATION

The parts of plants like pomegranate (peel) were collected from the local market. Curry leaves and amla fruit were obtained from nursery. These were washed under running water to remove contaminants⁽⁷⁾. They are dried in sunlight convert in to coarse powders and sieved using 60 meshes. The extract were prepared by decoction method by 5g of curry leaves powder, 5g of pomegranate peel powder and amla powder were mixed with 100 ml water in a stainless steel vessel. The mixture was kept for boiling until the water reduced to one quarter. It was then filtered. The clear extract obtained was used as herbal extract.

Formulation of herbal shampoo was done as per the formula. To increase the thickness of formulation, SLS (7.5%) solution was prepared using 0.1M NaCl. 20 ml of the herbal extract was added to 20ml SLS solution with 20ml NaCl solution and mixed by shaking gently. The final volume was makeup to 100ml by adding 10ml guar gum extract, 2ml of glycerin and 25ml water. To improve the aroma in formulation, sufficient quantity (q.s) of essential oil (lavender oil) was added. The shampoo also included one capsule of vitamin E for conditioning, activated charcoal for color and 2ml of lemon juice as preservative.

Composition of herbal shampoo^[8]

Herbal extract	20 ml
SLS (7.5%)	20 ml
0.1 M NaCl	20 ml
Guar gum	10 ml
Glycerin	2 ml
Vitamin E capsule	1
Lemon juice	2 ml
Essential oil (lavender)	q.s
Activated charcoal	q.s
Water	25ml

Evaluation of herbal shampoo

To evaluate the prepared formulations, quality control tests including visual assessment and physicochemical controls such as pH, density, viscosity, surface tension, foam volume, foam stability and wetting time were performed using standard protocols.

1. **Physical Appearance/Visual Inspection:** The formulation prepared was evaluated for the clarity, color, odour and foam producing ability and fluidity⁽⁹⁾.

2. **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 meter⁽¹⁰⁾.

3. **Determination of solid content percentage:** A clean dry evaporating dish was weighed and 4g 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 solid contents present in the shampoo was calculated after drying⁽¹¹⁾.

4. **Wetting time:** Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.44g was cut into a disc of diameter measuring 1-inch. Over the shampoo (1%v/v) surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch⁽¹⁴⁾.

5. **Rheological evaluation:** The viscosity of herbal shampoo was determined by using Ostwald's viscometer. The viscosity of the herbal shampoo was measured by counting drops of herbal shampoo from mark to bottom.

$$ny = nw \frac{dyty}{dwtw}$$

6. **Cleansing action:** The cleansing property of the herbal shampoo was evaluated by the application of the shampoo on hair that has not been washed for seven days. The shampoo was used to wash the hair of human subjects that had applied oil 4-5hours before washing. The performance of the shampoo was assessed on its ability to remove oily dirt from scalp.⁽¹³⁾

7. **Surface tension measurement :** Measurement was carried out with herbal shampoo through stalagmometer. The principle is to measure the weight of the drops of herbal shampoo falling from a capillary glass tube, and thereby calculate the surface tension of the fluid. We can determine the weight of the falling drops by counting them. From it we can determine the surface tension as show below.⁽¹⁵⁾

$$ST = \frac{nl}{nw} \times \frac{dl}{dw} \times tw$$

8. **Foaming ability and foam stability:** Cylinder shake method was used for determining foaming ability. 50ml of the 1% herbal shampoo solution was put into a 250ml graduated cylinder and the cylinder was covered with hands and shaken for 10minutes. The total volume of the foam content after 1 minute shaking was recorded. Immediately after shaking the volume of foam at 1 minute intervals for 10minutes were recorded. The foam volume remains same throughout the period of about 5minutes showing that the generated foam by the shampoo has good stability.⁽¹²⁾

9. **Stability study:** The stability of the formulation was studied for a period of 4 weeks by keeping at temperature of 25-30°C.⁽¹⁵⁾

10. **Skin irritation test:** Prepared herbal shampoo was applied on skin for 5minutes after that was washed and tested for irritation or inflammation to the skin.⁽¹⁶⁾

11. **Conditioning attributes:** The conditioning effect of the shampoo on the hair was evaluated after the hair had been washed with it. Conditioning properties include all desirable benefits imparted to the hair such as increased mass to the hair, improved lustre, softness and silkiness.^[17]

12. **Microbial examination:** 100 microliter of shampoo was mixed with melted Muller Hinton agar and poured to sterile petridishes under aseptic conditions. The plates were rotated to mix thoroughly and then allowed to set. The plates were incubated at 37°C for 24 hours and observed for microbial growth.^[18]

13. **Anti-microbial activity:** The test was carried out to determine the susceptibility or resistance of organisms to formulation ingredients according to the method described by Cheesbrough. The Gram positive (Bacillus) and Gram negative (E.coli) test organisms were sub cultured on nutrient broth and incubated at 37°C till desired turbidity.^[19] The developed culture was streaked on the surface of Muller Hinton agar on which four wells were punched with sterile cork borer. 25, 50, 100 and 150ml shampoo were filled in these wells in increasing order. The plates were incubated at 37°C for 24 hours. And zone of inhibition around the wells were measured using ruler.

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