
ORIGINAL ARTICLE

Formulation and evaluation of herbal shampoo

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ABSTRACT

The objective of the study was to formulate herbal shampoo by excluding synthetic additives. Synthetic shampoo was known to cause damage to the hair cuticles leaving it brittle, dull and dry. Present study was point out with the object of preparing the herbal shampoo that reduces hair loss, promote growth and strengthen the hairs. The herbal extracts used in the formulation were powders of hibiscus flowers (For hair growth), banyan roots (Prevent baldness), reetha fruits (Foaming agent), bhringraj (Hair vitalizer), amla fruit (Anti-Oxidant), shikakai fruit (Anti-dandruff), curry patta leave (Moisturizer), neem leaves (Anti-inflammatory), soya seeds (Lustrous effect), fenugreek seeds (Healthy scalp), lemon juice (Anti-inflammatory) and camphor (UV rays absorber). Gelatin is used as thickening agent and pH adjusted by using citric acid. Phytochemical constituents were identified by performing tests of extracts. Formulated Herbal shampoo was evaluated for pH, solid content, dirt dispersion, surface tension measurement, viscosity, foam-producing ability, Foam stability and wetting etc.

Key words: Herbal shampoo, Anti-dandruff, Lustrous, hair vitalizer

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INTRODUCTION

In early era, soap cakes were commonly used for washing the hairs and there were no concept of use of shampoo. Shampoo which we are using in modern days was first introduced in 1930s. The first synthetic shampoo using synthetic surfactant instead of soap was used initially for the laundry and for cleaning carpets and later it was evolved as a hair shampoo [1]. Today large population use shampoo for washing the hairs. For cleansing hairs and scalp in our daily life shampoos are probably the most widely used cosmetic products. A shampoo is basically a solution of a detergent containing suitable additives for other benefits such as hair conditioning, lubrication, medication, nourishment etc. Now-a-days many synthetic, herbal, medicated and non-medicated shampoos are available in the market [2].

Herbal shampoos are prepared by using natural ingredients and used for cleansing hair and scalp just like regular shampoo. These shampoos are free from side effects since no surfactants are involved as present in the other shampoos, have good stability and are less harmful compared to synthetic shampoo [3]. Synthetic shampoo contains surfactants. Long term use of these surfactants can lead to serious effects like scalp irritation, loss of hairs, drying of hairs, greying of hairs, split ends and eye irritation. Due to these reasons the popularity of herbal shampoo among consumers is on rise because it is believed that these products are safe and free from side effects [4].

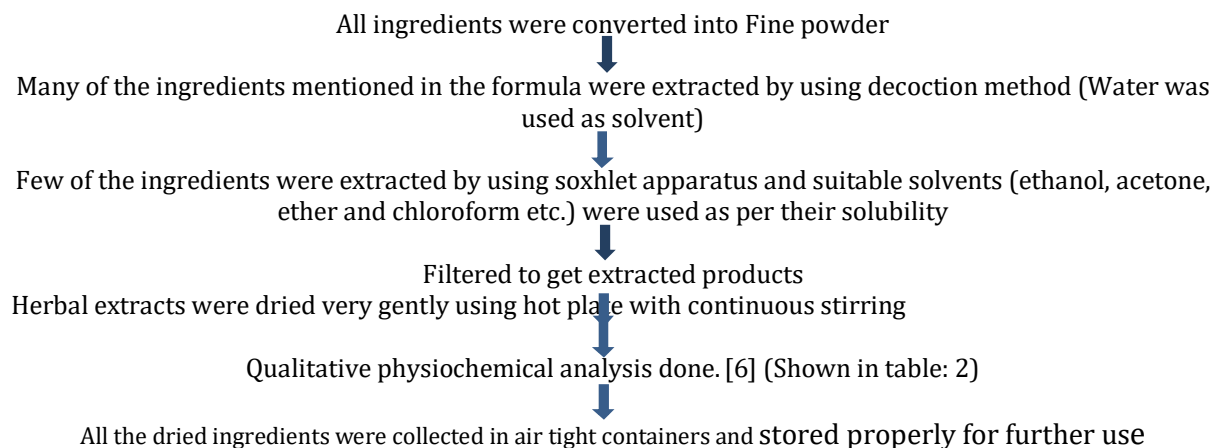
MATERIAL AND METHODS

Materials:

Powders of Hibiscus flower, Banyan root, Reetha fruit, Bhringraj root, Amla fruit, Shikakai fruit, Curry patta leaves, Neem leaves, Soya seeds, Fenugreek seeds, Lemon juice, Camphor.

Methods:

Method of extraction [5]:



Formulation of herbal shampoo [7]:

Method for formulation of herbal shampoo:

All plant extracts were weighed as per formula and mixed in half quantity of water with continuous stirring. Final volume was made by using remaining quantity of water and pH was adjusted by using citric acid.

Evaluation of shampoo:

Physical appearance/visual inspection: The formulations prepared were evaluated for colour, odor, clarity and foam producing ability [8].

Determination of pH: The pH of 10% v/v shampoo solution in distilled water was determined at room temperature by using pH meter [9].

Determination of percent of solids contents: A clean, dry evaporating dish was weighed and 4gm of herbal shampoo was added to the evaporating dish. The dish and shampoo was weighed again to confirm exact weight of shampoo. Then evaporating dish was placed on hot plate to evaporate the liquid portion. The weight and percent solid content after drying was calculated [10].

Dirt dispersion: Two drops of shampoo were added in large test tube containing 10 ml of distilled water. One drop of ink was added in the test tube; test tube was stoppered and shaken for ten times. The amount of ink in the foam was estimated as none, light, moderate or heavy [11].

Rheological evaluations: Pseudo plastic behaviour is a desirable attribute in shampoos formulation.¹² The viscosity of the shampoos was determined by using Brookfield Viscometer set at different spindle speeds from 0.3 to 10 rpm. The viscosity of the shampoo was measured. The temperature and sample container's size was kept constants during the study.¹³

Surface tension measurement: The prepared shampoo in distilled water (10%v/v) was evaluated for surface tension using stalagmometer at room temperature [14].

Foaming ability and foam stability test: To determine foaming ability, cylinder shaking method was used. 50 ml of formulated shampoo (1%) was taken in 250ml graduated cylinder and shaken for 10 times vigorously. The total foam volume was recorded after 1min of shaking. Foam stability was measured by recording the volume of foam after 1 min and 4 min [15].

Wetting time: Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.44 g 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 [16].

RESULTS AND DISCUSSION

Physical appearance /visual inspection: Formulated shampoo was clear and brown in colour. It has good odour given by the fragrance in the ingredients and has good foam producing ability.

pH: The pH of shampoos has been shown to be important for improving and enhancing the qualities of hair, and stabilizing the ecological balance of the scalp [17]¹⁷. The pH of formulated shampoo was found 5.4(mild acidic). Mild acidity prevents swelling of hair and reduces penetration. Lower pH offers favourable conditions for display of conditioning properties.

Percent of solids contents: It will be hard to work into the hair or too hard to wash out if shampoo has too many solids. Percent of solids contents was found 23.75 %. From this it can be concluded that they were easy to wash out.

Dirt dispersion: The dirt should stay in water. If shampoo that causes the ink to concentrate in the foam is considered poor quality. Since it will be difficult to rinse away dirt that stays in foam. It will redeposit on the hair. Result indicates that no dirt would stay in the foam; ensuring satisfactory cleaning ability and actual effectiveness.

Rheological/Viscosity: The results of rheological evaluation showed that the viscosity of the samples decreases gradually with the increase in rpm. So the shampoo formulation were shear thinning or pseudo plastic in nature. Pseudo plastic behaviour shown by herbal shampoo which is a desirable attribute in shampoos formulation.

Surface tension: It has been mentioned that a proper shampoo should be able to decrease the surface tension of pure water to about 40 dynes/cm [18]. Surface tension reduction is one of the mechanisms implicated in detergency. The reduction in surface tension of water from 72.8 dynes/cm to 30.34 dynes/cm by the herbal shampoos is an indication of its good detergent action.

Foaming ability and foam stability: From the consumer point of view, foam stability is one of the important needs of a shampoo. Determination of foaming ability is considered one of the important parameter in evaluation of shampoo. The foam volume produced by the formulated shampoo is above 65 ml. Uniform, small sized, compact, denser, and stable foam generated by the shampoo. The foam volume remains same throughout the period of about 5 min indicates good stability of foam generated by the shampoo and the prepared herbal shampoo formulation exhibits higher foam property [19].

Wetting time: Wetting time to test the efficacy of the shampoo, wetting ability of a surfactant needs to be calculating which depends on the concentration of surfactant [18]. Canvas disc method was used for the evaluation of wetting ability. Which is an efficient, quick, easy, and reliable method to determine wetting time. The prepared shampoo shows the wetting time of the about 130seconds.

Table 1: Composition of formulated herbal shampoo

| Sr. No. | Ingredients | Quantity (For 10ml) | Role |
|---------|-----------------------------------|---------------------|---|
| 1 | Hibiscus Flower powder extract | 10mg | Hair Growth, Moisturizing effect |
| 2 | Banyan root powder extract | 10mg | Strong hair root, prevent baldness |
| 3 | Reetha powder extract | 10mg | Foaming agent |
| 4 | Bhringraj powder extract | 10mg | Hair vitalizer, prevent premature greying |
| 5 | Amla fruit powder extract | 10mg | Anti-oxidant |
| 6 | Shikakai fruit powder extract | 10mg | Detergent, Anti-dandruff |
| 7 | Curry patta leaves powder extract | 10mg | Prevent hair loss, Moisturizes the scalp |
| 8 | Neem leaves powder extract | 10mg | Anti-inflammatory |
| 9 | Soya seed powder extract | 10mg | Protein source, lustrous effect |
| 10 | Fenugreek seed powder extract | 10mg | Nutrient for hair promotion |
| 11 | Lemon Juice | 3ml | Anti-inflammatory |
| 12 | Camphor | 0.5mg | Anti-fungal effect, UV rays absorber |
| 13 | Gelatin | 1gm | Thickening agent |
| 14 | Citric acid | Qs | pH adjusting agent |

Table 2: Qualitative phytochemical analysis of powder extracts

| Phytoconstituents | Hibiscus Flower Powder extracts | Banyan root Powder extracts | Reetha Fruit Powder extracts | Shikakai Fruit Powder extracts | Curry patta leaves Powder extracts | Neem leaves Powder extracts | Soya seed Powder extracts | Fenugreek Powder extracts | Lemon Juice |
|-------------------|---------------------------------|-----------------------------|------------------------------|--------------------------------|------------------------------------|-----------------------------|---------------------------|---------------------------|-------------|
| Saponin | + | - | + | + | - | - | - | - | - |
| Alkaloid | + | - | - | - | - | - | - | - | - |
| Flavonoid | + | - | - | - | - | - | - | - | - |
| Amino acid | + | + | - | - | - | - | + | - | - |
| Sterols | - | + | - | - | - | - | - | - | - |
| Fatty acids | - | + | - | - | - | + | + | - | - |
| β-Carotene | - | - | - | - | + | - | - | - | - |
| Protein | - | - | - | - | + | - | - | + | - |
| Glycerides | - | - | - | - | - | + | - | - | - |
| Terpens | - | - | - | - | - | - | - | - | + |

+: indicates present, -: indicates absent

Table 3: Evaluation of herbal shampoo

| Sr.no | Evaluation test | Observation |
|-------|-----------------|----------------|
| 1 | Colour | Brown |
| 2 | Transparency | Clear |
| 3 | Odour | Good |
| 4 | pH | 5.4 |
| 5 | Solid content | 23.75% |
| 6 | Foam volume | 65ml |
| 7 | Surface tension | 30.34 dyne/ cm |
| 8 | Viscosity | 1.90cps |
| 9 | Dirt dispersion | Light |
| 10 | Wetting time | 130 sec |

CONCLUSION

The objective of the study was to formulate herbal shampoo by excluding synthetic additives. Synthetic shampoo was known to cause damage to the hair cuticles leaving it brittle, dull and dry. Present study was point out with object of preparing the herbal shampoo that reduces hair loss promote growth and strength the hair. Hibiscus powder was used for preventing hair loss and promotes hair growth and moisturizes scalp in this formulation. The herbal shampoo preparation was formulated based upon traditional knowledge and emphasis by effective use of shikakai fruit powder extract as conditioning agents reduce hair loss and to provide the effective anti-dandruff and cleanser effects along with other additives such as bhringraj powder extract (Hair vitalizer), amla fruit powder extract (anti-oxidant), reetha fruit powder extract (foaming agent), curry patta powder extract (prevent hair loss), neem leaves powder extract (Anti-inflammatory), soya seed powder extract (protein source), lemon juice (anti-inflammatory), camphor (UV rays absorber). To check performance/quality of the prepared shampoo various quality control tests such as pH, solid content, dirt dispersion, surface tension measurement, viscosity, foam-index, ability and wetting was performed. The herbal shampoo showed good foaming capacity and quick wetting time. From above results it can be concluded that herbal shampoo is best alternative for synthetic due to its safety and efficacy. Also other problems of synthetic shampoo such as damage to the hair cuticles leaving it brittle, dull and dry can be minimized.

COMPETING INTERESTS

The authors have declared that no competing interest exists.

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