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Original Article

Development and Characterization of Herbal Shampoo from Cuscuta Reflexa

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ABSTRACT

Herbal cosmetics have gained significant popularity due to their minimal side effects, eco-friendly nature, and enhanced therapeutic benefits. Among these, herbal shampoos have emerged as a natural alternative to synthetic formulations that often contain harsh chemicals leading to scalp irritation and hair damage. This study focuses on the formulation and evaluation of a natural herbal shampoo using a blend of traditional medicinal plants known for their cleansing, conditioning, and restorative properties. Key ingredients include Cuscuta reflexa, Sapindus mukorossi (Reetha) all of which are recognized in Ayurveda for promoting hair health and treating scalp disorders. The herbal extracts were carefully selected based on their phytochemical profiles and synergistic actions. The formulation was evaluated for key physicochemical parameters such as pH, viscosity, foaming index, surface tension, wetting ability, and stability. It exhibited excellent cleansing properties, moderate foaming, good spreadability, making it suitable for regular use. Additionally, the presence of natural Bioactive imparts antimicrobial and antioxidant benefits, contributing to reduced dandruff, hair fall, and scalp irritation. The study concludes that the formulated herbal shampoo is a safe, effective, and sustainable alternative to commercial products. It holds promise for consumers seeking gentle, herbal-based hair care solutions and supports the integration of traditional knowledge with modern cosmetic science.

Keywords: Herbal shampoo , Cuscuta reflexa , Antimicrobial activity, Hair fall prevention

INTRODUCTION

Like common shampoo, herbal shampoo is a cosmetic product extracted from plant-based herbs that serves to clean the hair and scalp [1]. It serves as a substitute for the commercially sold synthetic shampoo [1]. Several medicinal herbs have been incorporated into shampoo formulas through history in efforts to improve hair health. Such therapeutic plants can be applied in the form of mixes, extracts, powders, or unprocessed forms. It is difficult to create a safer and gentler shampoo than supermarket shampoo using just one organic component [2]. Synthetic surfactants are added to synthetic shampoos mainly for their cleaning and foaming abilities, but long-term use of these surfactants has negative effects such as drying of the hair, irritation of the eyes, and scalp irritation [3]. The ideal characteristics of herbal shampoo are as follows:

1. It should thoroughly and successfully cleanse the hair of loose corneal cells, excess sebum, or other fatty materials, as well as dust or dirt.
2. It should generate a sufficient amount of foam to meet the user's psychological needs.
3. Rinsing with water should make it easy to remove.
4. The hair should be left non-dry, shiny, silky, manageable, and with little flyaway.
5. It should give the hair a pleasing scent.
6. It shouldn't irritate the skin or eyes or create any negative effects.
7. It shouldn't cause the hand to become rough and dry. [4]

Cuscuta: *Cuscuta reflexa Roxb*., Convolvulaceae family, is a leafless, twinning, parasitic dodder which is found on thin, elongated yellow stems that are profuse throughout tropical and temperate India. It's often called amarbel [5] Antitumor, antimicrobial, hepatoprotective, anticonvulsant, immunostimulatory, antioxidant, α-glucosidase inhibition, Psychopharmacological, hair-growth-promoting, anti-steroidogenic, anti-inflammatory,

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diuretic, analgesic, antipyretic, anti-HIV, antidiabetic, neuroprotective, antiulcer, antispasmodi, heldynamic, bradycardia1, antihypertensive, cardiotonic, and muscle relaxant activities of various Cuscuta species were disclosed by pharmacological examination. [6]
Reetha: It belongs to a position to the Sapindaceae family and may be a massive deciduous tree with the rational name Sapindus mukorossi. It has common names that include aritha, dodan, dodani, soapberry, soapnut, and washnut.[7] Reetha is prepared from these dried natural product species, S. trifoliatus, which are members of the Sapindus family. Trifoliate II, hederagenin, oleanolic, saponin, sapindus corrosive, saponin A, and saponin B They are all sesquiterpenes. It is fair to use as a cleanser, astringent and soother. [8] Hair growth promoting action. The findings of the study depicted the possible anagen/telogen ratio, follicular density, and skin characteristics of Cuscuta reflexa extricate. Portion outcomes in relation to promoting hair growth. Perhaps the extricate has been enhanced. hair loss caused by androgen by inhibiting the conversion of testosterone dihydro testosterone to as indicated by the 5reductase movement is prevented by extricate and separate. [9] Because of its ability to create hair shining, firm, and sparkling, reetha is often utilized in typical hair care products. It is appropriate for regular use to support the hair scalp and stimulate hair growth. [10].

MATERIAL AND METHODS

Collection

All the required plant materials were collected from Nashik India's local market, and some were collected from Malegaon farms. The collected plant material was washed, dried, and powdered and stored for use in future experiments in an air-tight container. The Cascuta plant was washed with running water to remove impurities. The plant was dried in the sun, coarsely powdered, and then was exposed to extraction via decoction. After decoction, it was left to stand for 24 hours. The remaining material was pressed and filtered out. Boil the Reetha powder in a specified amount of water for 30 mins, reduce the volume to 1/4th of the original, cool the mixture and then filter For approximately ten minutes, flaxseeds boil with water by stirring continuously to avoid the flaxseeds sticking to the bottom of the utensil. When the consistency is gel-like and not too thin or too thick, switch off the stove. Let the gel cool for about one hour so that it can thicken.

Preparation of Shampoo

The formula given in the table can be employed to prepare the herbal shampoo using the primary emulsion method. The water phase consists of methyl paraben, glycerine, and polyethylene glycol (PEG), whereas the oil phase consists of caster oil and herb extract. Mix the extracts, water phase, and oil phase with constant stirring. Acacia and tragacanth facilitate the creation of an oil-in-water (o/w) emulsion. Then, use glycerine and PEG 400 to bring the volume to 100 ml. Add sufficient 1% citric acid solution to the solution to make its pH adjustable. add a few drops of perfume judiciously to give fragrance. [11]

Experimental work

Table 1: Shampoo Batches

Sr. No	Ingredients	F1 [100ml]	F2 [100ml]	F3 [100ml]	F4 [100ml]	F5 [100ml]
1.	CuscutaExtract	25ml	25ml	25ml	20ml	25ml
2.	Reetha extract	25ml	15ml	25ml	10ml	30ml
3.	Caster Oil	3gm	7gm	5gm	10gm	5gm
4.	Polyethylene Glycol	10ml	15ml	8ml	10ml	6ml
5.	Glycerin	3gm	5gm	2gm	10gm	5gm
6.	Methyl Paraben	4gm	3gm	6gm	4gm	3gm
7.	Acacia	5gm	5gm	7gm	8gm	3gm
8.	Tragacanth	5gm	5gm	7gm	8gm	3gm
9.	Flaxseed extract	20ml	20ml	15ml	20ml	20ml
10.	Essential Oil	qs	qs	qs	qs	qs
11.	Citric Acid Solution	qs	qs	qs	qs	qs

Step 1: Plant dried and converted into powder

Fig.1.Cuscuta herb

Fig.2.Powder form

Step 2: Powder was boiled with sufficient amount of water

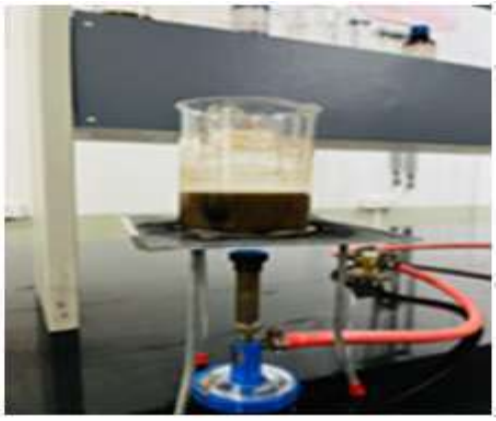

Fig.3.Extraction

Step 3: Keep aside for 24 hr

Fig.4.Extract

Step 4: Filtration of Cuscuta and reetha

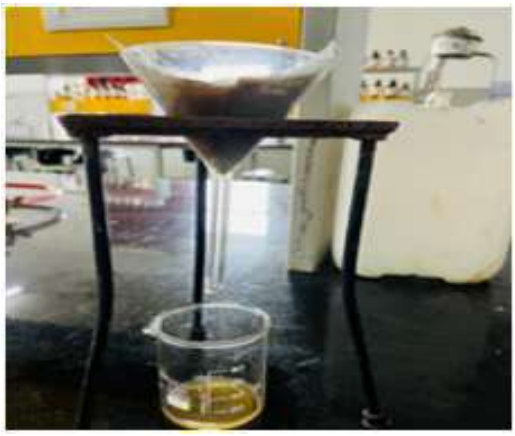

Fig.6.Filter the extract

Step 5: Preparation

Fig.7.Ingredients

Table 2: Role of Ingredients

Sr.No	Ingredients	Use
1	Cuscuta	Hair growth promoter
2	Reetha	Foaming agent
3	Caster oil	Conditioner
4	Polyethylene Glycol	Surfactant,Thickener
5	Glycerin	Humectants,Conditioner
6	Methyl paraben	Preservative
7	Acetia	Emulsifier
8	Tragacanth	Emulsifier
9	Flaxseed	Nourishing agent
10	Essential oil	Perfume
11	Citric acid solution	pH modifier

Evaluation Test

1] Physical appearance

The detailing arranged was assessed for the clarity, color, odor and froth creating capacity.

2] Determine percent of solids contents

A dry clean evaporating dish was weighed and added 4 grams of cleanser to the vanishing dish. The dish and the cleanser was weighed. The exact weight of the cleanser was determined, the vanishing dish with cleanser was placed on the hot plate until the fluid parcel was evaporated. The weight of the cleanser as it were (solids) after evaporation was determined [13]

3] Dirt dispersion

1 percentage (1%) formulation of every cleanser (1 g of test in 100 mL of water) was taken and one drop of India ink was added; the test tube was stoppered and shaken ten times. The amount of ink present in the froth was analyzed as none, light, direct, or overpowering. Shampoos causing the ink to be

concentrated within the froth are of poor quality. The soil should still be within the water package. Soil that is still within the froth will be difficult to clean away without and will be redeposited on the hair [14]

4] Wetting action

The canvas was sliced to 1-inch diameter plates with an average weight of 0.44g. The circle was floated on the surface of cleaning agent solution 1%w/v and the stopwatch started. The time it took for the circle to begin to sink was recorded accurately and renowned as wetting time. [15]

5] Determination of surface tension

The surface pressure of pure water should be reduced to typically 40 dynes/cm by using the appropriate shampoo. [16] A 10% cleaner dilution in refined water at room temperature was used for the measurements. Because grease or other oils can fundamentally alter surface pressure, the stalagmometer was purified using chromic acid and filtered water. The taking after condition was utilized to calculate the information:

R2 = (W3-W1) N1 x R 1 (W2 -W1) N 2

Where,

W 1 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 [16]

6] Determination of pH: blend 01gm of cleanser with 09ml of water and decide the pH utilizing pH meter at 27Â°C. [17]

7] Stability studies: All through the capacity term, the formulations organoleptic qualities (colour and smell) appeared stability and adequacy, showing their chemical and physical stability. [18]

8] Skin irritation: Volunteers' skin was treated with the herbal cleanser mixture and cleaned out for five minutes. Five minutes later, the skin area where cleanser was administered is examined. The redness or skin disruption was noted. [19]

9] Foam stability: Frothing, or better referred to as lathering, is among the most crucial elements when a cleanser is being judged. A dense, consistent, small-to-medium froth in shape as a product of the home brewed cleanser description. For five minutes, the volume of froth remained constant, demonstrating that the froths formed are of excellent stability. [20]

RESULT AND DISCUSSION

1] Physical inspection of Cuscuta herbal shampoos

Table 3: Organoleptic Properties

Formulation	Color	Clarity	Odour	Consistency	Spreadability	pH	Temp[c]
F1	Brown	Turbid	Characteristics	Thin	Good	5.52	26
F2	Brown	Turbid	Characteristics	Slightly Thick	Good	5.54	26
F3	Brown	Turbid	Characteristics	Thin	Good	5.53	26
F4	Brown	Turbid	Characteristics	Slightly Thick	Best	5.53	26
F5	Brown	Turbid	Characteristics	Slightly Thick	Best	5.52	26

2] Solid content: As incredible shampoos are simple to use and clean out of the hair, they typically contain 20% to 30% solid content. It'll be too watery and soapy if there is not enough strong. Additionally, too much solids will be difficult to knead into the hair or flush out with water. All of the attempted shampoos contained high substance rates ranging from 22 to 25 percent, which should be easily washed off.

Fig.8.Solid content

3] Dirt dispersion: A cleaner that revives the deposition of ink in the froth is of poor quality. It'll be hard to cause discharged of any filth that's left in the foam, even in spite of the fact that it should remain in the water. It'll deposit again onto hair on the chance that it remains in the froth. All of the cleaner tests we examined provided favorable comes about, as shown in Fig.9

Fig.9.Dirt dispersion

4] Wetting ability

Wetting time was determined by measuring the time taken for the canvas paper to sink fully. A 0.44-gram canvas paper was cut into a circle of diameter 1 inch. The plate of canvas paper was placed above the cleanser (1% v/v) surface, and the clock was used to measure how long it took for the paper to sink.

5] Surface tension

One of the types associated with detergency is the reduction of surface pressure. estimation As already stated, an effective cleanser should be capable of reducing pure water's surface pressure to approximately 40 dynes/cm12. One of the types associated with deterrency is the reduction of surface pressure. The homegrown shampoos' effective cleanser activity is demonstrated by the reduction of water's surface pressure from 72.8 dynes/cm to 34.70 dynes/cm.

6] Stability: Table no.4 is a list of the stability outcomes. The formulations are both chemically and physically stable, according to organoleptic properties assessed in stability experiments.

Table 4: Stability Studies for Formulations

Parameters	1 month	2 months	3 months
Odour	No change	No change	No change
Colour	Brown	Brown	Brown
Foam stability and ability	No change	No change	No change
ph	5.52	5.54	5.53

7] Skin irritation: Lack of harmful man-made chemicals makes the resultant shampoo not cause any adverse effects to the skin. Almost all the components in this composition are obtained organically, but most man-made chemicals irritate the skin and result in inflammation.

8] Foam stability: Cylinder shake technique was employed for the determination of foaming capacity in 3 different test tube, take 1ml, 5ml, 9ml shampoo respectively and add water up to 10ml and shake the test tube 10 times. The volume of the foam content after 1 min shaking were noted. The foam volume was calculated alone. After shaking the volume of foam at 1 min interval for 4 mins were noted.

Fig.10.Foaming ability

CONCLUSION

A home-grown shampoo was formulated on the basis of theoretical data and Aim of this study was to formulate a successful and consistent product.it was determined to be secure and feasible formula. The awareness and the need of shampoo is on demand nowadays because less side effects, fetched low and more persuasive than artificial cleanser. In the current study, we formulated an herbal shampoo with cuscuta extract which is traditionally used for hair wash. All of the fixings used to determine the cleanser are safer compared to generic commercial shampoos and the physicochemical evaluation seemed flawless ensues.

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