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Research Article

Formulation and Evaluation of Herbal Hair Scrub Gel

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ABSTRACT

The primary aim of this study was to formulate an herbal scrub in gel form. When natural elements are used to counter problems like dandruff, hair fall, frizziness, damage to hairs as well as oil control, and then the cosmetics made with such herbs are called natural cosmetics or herbal cosmetics. Usually, the cosmetic made with herbs contains only those parts of plants which have properties of anti-dandruff and antioxidant. Herbal cosmetics are the most safe cosmetics products to use on regular basis and they do not show any side effects. With the increasing interest in natural skincare products, herbal formulations have gained prominence. The focus of this particular study is on the formulation and evaluation of a herbal scrub with natural and exfoliating properties. For preparation of such scrub, some herbs were selected. Tamarind shell, Flaxseed Mucilage, Pumpkin seed Oil & Essential Oils were selected based on their therapeutic value as well as side effects. The scrub was formulated and analyzed for various parameters like pH, texture, spread ability, wash ability and stability. It was found that the scrub had good physical properties along with excellent properties of being non-irritating as well as effective exfoliating agent.

INTRODUCTION

1. Hair care:

Herbal Cosmetics plays an important role in the life of women as well as men for beautifying and altering the appearance of the body. Hairs are a crucial factor when talking about beauty. Now a days hair loss is one of the biggest problems of our generation especially for people of age between 20-40. It serves as a major headache during

thinking about appearance and beauty of our body. It is due to suffering from diseases like, alopecia areata, telogen effluvium and tinea capitis etc. which are very prevalent in people these days. Herbal hair scrub gel: It is an herbal cosmetic which applied, rubbed on hairs for beautifying, cleaning purpose. It provides conditioning to hairs, removes dead skin cells, cleans dusty matters, leads healthy making your hair look beautiful and charming.

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2. Scalp:

Scalp is the area of the head where head hair grows. scalp is made up of the skin, connective tissue, aponeurosis, loose areolar connective tissue, & pericranium. The scalp is bordered by the face at the front, and by the neck at the sides and back. The scientific study of hair and scalp is called trichology. The scalp plays an important role in the aesthetics of the face.

In recent years, the demand for herbal and natural cosmetic products has increased significantly due to growing awareness about the harmful effects of synthetic chemicals used in conventional hair care preparations. Modern consumers prefer herbal formulations because they are considered safer, biodegradable, eco-friendly, and less likely to cause irritation or adverse side effects. Herbal cosmetics not only enhance beauty but also help in maintaining the overall health of the skin and hair through the use of naturally derived ingredients rich in nutrients, antioxidants, and bioactive compounds.

Hair and scalp are constantly exposed to environmental pollution, dust, excess oil secretion, sweat, and chemical-based cosmetic products, which may lead to dandruff, scalp irritation, itching, hair fall, and weakening of hair roots. Proper scalp cleansing and exfoliation are therefore essential for maintaining healthy hair growth and scalp hygiene. A hair scrub gel is a specialized cosmetic preparation designed to remove dead skin cells, dirt, excess sebum, and product buildup from the scalp while improving blood circulation and promoting healthier hair follicles. Unlike ordinary shampoos, hair scrub gels provide deep cleansing and exfoliating action, thereby improving scalp condition and enhancing nutrient absorption.

The present study focuses on the formulation and evaluation of a herbal hair scrub gel using natural ingredients such as flaxseed, pumpkin seed oil, tamarind seed powder, and kaolin clay. Each ingredient has been selected based on its unique therapeutic and cosmetic properties that contribute to scalp nourishment and hair care.

Flaxseed is rich in omega-3 fatty acids, proteins, lignans, vitamins, and mucilage content. It acts as a natural conditioner and moisturizer that helps in improving hair texture, reducing dryness, strengthening hair strands, and providing smoothness and shine to the hair. Flaxseed gel also possesses antioxidant properties that help protect the scalp from oxidative damage.

Pumpkin seed oil contains essential fatty acids, zinc, vitamin E, phytosterols, and antioxidants that nourish the scalp and hair follicles. It is known for its potential role in reducing hair fall, improving scalp health, and promoting healthy hair growth by strengthening hair roots and maintaining moisture balance.

Tamarind seed powder serves as a natural exfoliating agent in the formulation. Its granular texture helps in gentle removal of dead skin cells, dirt, and impurities accumulated on the scalp. Tamarind seeds also contain polysaccharides and antioxidants that may provide soothing and protective effects.

Kaolin Clay is widely used in cosmetic preparations because of its excellent oil-absorbing and cleansing properties. It helps remove excess sebum, toxins, and impurities from the scalp without causing excessive dryness or irritation. Kaolin clay also improves the texture and consistency of the gel formulation.

The objective of this research work is to formulate a stable and effective herbal hair scrub gel using



these natural ingredients and to evaluate its physicochemical properties such as appearance, pH, spread ability, viscosity, washability, homogeneity, stability, and overall acceptability. The prepared formulation is expected to provide deep scalp cleansing, nourishment, exfoliation, and conditioning effects while minimizing the side effects commonly associated with synthetic hair care products.

Thus, this herbal hair scrub gel may serve as a safe, economical, and beneficial alternative to commercially available scalp cleansing products and contribute to the growing field of herbal cosmetic formulations.

follicle to work efficiently, and as a result can help with hair growth. Use of chemical based topical applications on hairs extends fast damaging and destruction of hair. This requires immediate and suitable procedure which can not only extend benefits to the hair but also helpful for long duration making your hair look beautiful and charming.

1.1 IDEAL PROPERTIES OF HERBAL HAIR SCRUB GEL:

1. It should be non-irritant and non-toxic.
2. It should possess non-stickiness.
3. It should not cause hair damage rather than preventing from it.
4. It should soften and moisturizes hairs.
5. It should clean sebum and dust from the scalp.
6. It should easily spreadable and washable.

This study may help in developing a safe, economical, and effective herbal alternative to commercially available hair care products while

promoting the use of natural ingredients in cosmetic formulations.

2. PLANT PROFILE:

1. FLAXSEED:

Flaxseed is the seed of *Linum usitatissimum*, a member of the Linaceae family known for its high fiber, omega-3, and lignan content. Primarily cultivated for its oil and fiber, it is used as a functional food.



2. TAMARIND SEED:

Tamarind seed is a by-product of the fruit of the *Tamarindus indica* tree, commonly used for medicinal and industrial purposes, particularly for extracting tamarind seed polysaccharide (TSP).



3. PUMPKIN SEED OIL:

Pumpkin seed oil is nutrient-rich oil extracted primarily from the seeds of the *Cucurbita pepo*

plant, although it can also be derived from Cucurbita maxima.



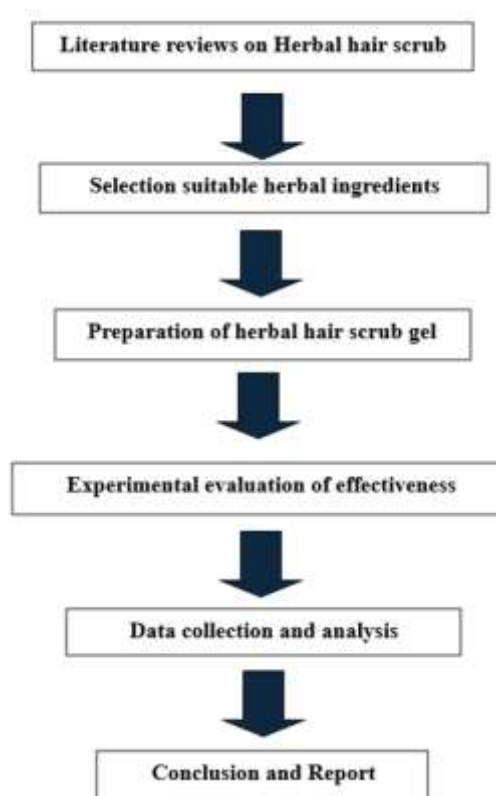
3. AIM & OBJECTIVES:

Aim: The main aim of an herbal hair scrub is to naturally cleanse, exfoliate and nourish the scalp and hair without harsh chemical.

Objectives:

1. To cleanse the scalp naturally by removing dirt, oil and impurities.
2. For removing dead skin cells that clog hair follicles.
3. For treating dandruff & reducing irritation on scalp.
4. For maintaining scalp health free from harmful chemicals.
5. To protect from damaging hair & prevent breakage of hair.

4. PLAN OF WORK:



5. MATERIAL & METHODS:

Materials

Apparatus: Measuring spoon, mixer, spatula, tripod stand, water bath, beaker, mortar pastel, China dish, Petri plate.

Ingredients: Flaxseed (*linium usitatissimum*), Pumpkin seed oil (*cucurbita pepol*), Tamarind (*tamarind indicus*), Kaolin clay, glycerin, triethanolamine work together for hair exfoliation & antidandruff.

Methods:

Extraction & formulation: collect and authenticate the herbal ingredients; prepare extract by boiling and filtering, blend the seeds and mix them with the oil & flaxseed mucilage in predetermined ratio.

Evaluation: Measure the spread ability & grittiness of the herbal hair scrub gel and conduct



sensory evaluation with volunteers to assess the effectiveness and acceptability of the herbal hair scrub gel.

6. EXPERIMENTAL WORK:

Sr no	Ingredients	Quantity Taken		
		B1	B2	B3
1	Flaxseed	30g	40g	35g
2	Pumpkin seed oil	6g	8g	7g
3	Tamarind seed powder	4g	5g	4g
4	Tamarind peel powder	2g	3g	2g
5	Kaolin clay	6g	10g	8g
6	Stearic Acid	3g	6g	4g
7	Cetyl Alcohol	1.5g	3g	2g
8	Polysorbate 80	0.8g	4g	3g
9	Triethanolamine	0.8g	1g	1g
10	Sodium Benzoate	0.5g	0.5g	0.5g
11	Water	q.s	q.s	q.s

PROCEDURE:



7. PREPARATION OF HERBAL HAIR SCRUB GEL:

To prepare the herbal hair scrub gel all selected ingredients – flaxseeds, tamarind seeds, Tamarind peel, Pumpkin seed oil, are carefully collected and measured according to required formulation. The Flaxseeds were soaked in the boiling water for few minutes until the gel/mucilage is formed in the beaker. Meanwhile the tamarind seeds were extracted from the brown pod like fruits of the tamarind tree, the seeds are separated from the tangy pulp inside the pods, washed, dried and the kernel were used for the further preparation of the powder with the help of the mixer, the tamarind peels were also used for the grittiness/ rough texture in the scrub. The seeds were broken down with the help of the mortar pastel & were further grinded in the mixer, which were then sieved from the #60 mesh size. The pumpkin seed oil was used from the marketed ones (BRM chemicals Pumpkin seed oil 25ml). After the boiling period, the gel/mucilage was filtered with the help of the muslin cloth to remove the remaining seeds from the gel/mucilage. Then the gel was combined with the stearic acid and cetyl alcohol this formed the gel base for the hair scrub gel, then the tamarind peel powder & tamarind seed powder were pre-dispersed in the glycerine and water to mix it well & to avoid the lumps in the formulation. The pumpkin seed oil was emulsified with the help of the polysorbate 80 to avoid the phase separation in the hair scrub gel. Kaolin clay was added in the formulation to form a scrub consistency in the formulation. At the end we added the triethanolamine & sodium benzoate as the pH adjuster & preservatives to avoid the microbial contamination.

Once prepared the herbal hair scrub gel can be used for the anti-dandruff, broken hair, frizz free hair, good scalp health & to avoid the scalp related



problems. It can be stored in the Plastic squeezable tube or hair scrub squeezable tube & can be kept at the room temperature. Proper hygiene & storage conditions are maintained to retain its therapeutic properties & prevent microbial contamination.

8. EVALUATION PARAMETERS:

1. Physical appearance evaluation:

The hair scrub gel has a uniform light brown herbal color with the pleasant odour smooth texture evenly distributed tamarind seed scrub particles with a semi-solid consistency. The homogeneity was good with no phase separation, with a mild grittiness suitable for exfoliation. The herbal hair scrub gel was easily washable & non-sticky. The hair gel scrub gave soothing feel on application.



2. pH Test (Using Digital pH meter):

The pH test is a method of measuring the acidic or basic level of a substance. The pH level of the herbal hair scrub gel may vary on depend on the specific formulation & ingredients used. Ideal pH of the hair scrub gel is said to be 5.5 -6 that is ideal for the scalp.



Method:

1. Sample Preparation: Take 10% solution of the herbal hair scrub in a clean beaker.

2. Calibration: Calibrate the digital pH meter using the buffer solution (pH 4.0, 7.0, & 10.0)

3. Measurement: Insert the pH meter probe into the sample and wait for the stable reading.

4. Recording: Note the pH value displayed on the meter.

5. pH of herbal hair scrub gel: The pH of the herbal hair scrub gel was found to be 6.

3. Microbial test & preservation efficacy:

Microbial growth test: To check the bacterial fungal contamination,

1. Agar medium prepared by dissolving it in the distilled water sterilizing at 121°C for 15 minutes.

2. Pour prepared medium in sterile petri plate and allow to solidify.

3. Inoculate microorganism and incubate the plates at 37°C for 24-28 hours.

4. Observe the bacterial growth and analyze zones of inhibition.



4. Spreadability testing:

Spreadability is done to assess how easily the substance spreads over the surface measured in

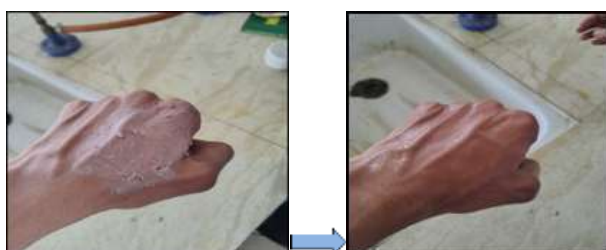
centimeters. A small quantity was placed on the glass slide; Time was taken to spread the hair scrub gel on slide was found to be 6.6 g.cm/s

It was calculated by formula:

$$S = m \times l / t = 100 \times 4 / 60(\text{sec}) = 6.6 \text{ g.cm/s.}$$



5. Washability Test:



How readily the herbal hair scrub gel may remove from the hairs & scalp after the application is

determined by the washability test. This guarantees that the product won't leave behind too much residue or an unpleasant greasy or oily feel. The formulation is applied on the skin and it is held with then held with running tap water. It is considered to have good washability if it can be removed with a gentle washing.

6. Skin irritation test:

The skin irritation test was assessed by applying the formulation to the skin and letting it set for 10 minutes. After 10 minutes of washing, any rashes or itching were observed by both visual and sensory examination.



9. OBSERVATION AND RESULT:

Sr. No	Parameters	Herbal Hair scrub gel		
		F1	F2	F3
1.	Color	Whitish Brown	Greysih lavender	Grey brown
2.	Odour	Aromatic	Pleasant Aromatic	Aromatic
3.	Consistency	Thin	Thick Paste like	Thick semi-solid
4.	pH test	5.9	6.0	6.2
5.	Texture	Fine	Granular	Coarse to smooth
6.	Satiability	Phase separation	No Major phase separation	Partial setting

10. RESULT:

Sr. no	Parameters	Herbal Hair scrub	Marketed Hair scrub
1.	Organoleptic test	Greyish Lavender	Grey Brown
2.	pH measurement	6	6.5
3.	Exfoliation efficiency	Good	Good
4.	Stability	Stable at room temperature	Stable at room temperature
5.	Scalp irritation test	No irritation	No irritation

10. CONCLUSION:

The study concluded that the formulated herbal hair scrub gel is a safe, effective, scalp-friendly, and eco-friendly alternative to synthetic hair care products with promising cleansing, exfoliating, and therapeutic benefits. The formulation exhibited satisfactory physicochemical properties, good stability, and excellent compatibility with the scalp and hair. The incorporation of herbal ingredients contributed to improved scalp health by helping in the removal of dirt, excess oil, and dandruff while promoting nourishment and soothing effects. The antimicrobial and anti-inflammatory properties of the ingredients further enhanced its effectiveness in maintaining healthy hair and scalp conditions

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