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Formulation and Evaluation of Poly Herbal Anti Dandruff Hair Oil

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Abstract: *Dandroff is a daily scalp disease characterized through unchanged drop of dead pores and skin cells, itching, infection and occasional infection. It is usually connected to excessive growth of malasezia yeast, scalp dryness and sebaceous gland disorder. Although artificial anti-Casra shampoos and treatments are widely obtained, they regularly present along with chemical sensitivity, hair dryness or scalp irritation in the use of the long period. Herbal formulations, rooted in conventional drug systems such as Ayurveda, offer a promising natural alternative with minimal aspect effects. This study specializes in the method and assessment of a polyherbal anti-trial capillary oil, the use of elements fully based on plants recognized by their antifungal, antibacterial, anti-inflammatory and scalp-conditioned houses. Azadirachta extracts indicates (NIM), pink hibiscus (hibiscus), nigella sativa (black seed) and trigonella foenum-graecum (hay) were integrated into a coconut oil base, leveraging the synergistic action of these herbs. Prepared oil has become physical -chemical parameters, antimicrobial efficacy, antifungal interest against Malassezia Furfur, equilibrium below exceptional garage conditions and sensory reputation through voluntary research. The method has displayed an excellent physical -quimic balance with a safer pH (5. Eight) as met with scalp conditions, correct propagability, and no separation signal or segment rancidity over 3 months. In vitro antifungal tests discovered a tremendous inhibition sector (15 to 20 mm) against Malassezia Furfur, demonstrating the powerful antifungal houses of the natural mixture. Sensory criticism volunteered over a widespread confirmed reduction of four weeks in scalp peel (up to seventy -five%), itching (up to 70%) and dandruff seen, along with improvements in softness and management. No unfavorable results or hypersensitive reactions have been said, indicating impressive tolerability.These discoveries advise that polyherbal capillary oil formulated is a powerful, safe and eral alternative to standard chemical-based anti-calm products. More clinical investigations on a larger population are advocated to verify their therapeutic capacity and long -term benefits.*

Keywords: Polyherbal, anti -scasa system, hair oil, herbal extracts, scalp health, antifungal interest.

I. INTRODUCTION

Dandruff is one of the most frequent maximum scalp conditions that involve some 50% of adults across the world. Dandruff is distinguished by hyper-peeling (spill) of the scalp stratum, followed by itching (itching), peeling and irritation of the scalp. Though not always a life-threatening disorder, dandruff has royal psychosocial effects, generally predominantly mainly in terms of embarrassment, decreased superficiality and social distress. Dandruff pathogenesis is multifactorial, associated with an aggregate of factors including excess sebum production, colonization facilitated by lipophilic yeast (EM and often calasezia Furfur), susceptibility of the individual, lack of cleanliness, pressure, hormonal changes and environmental influences. Malasezia species overgrowth derails normal scalp microbiome, leading to infection of the scalp, fast regeneration of keratinocytes and peeling later. Traditional treatment strategies involve the application of synthetic antifungal shampoos (ketoconazole, zinc pyrithione, selenium sulfide), keratolytic marketing specialists (salicylic acid) and corticosteroids in serious situations. The treatments, however, have hindrances and they are short relief, recurrence upon cessation and the effects of skill factors like infection of the skin, dryness of the hair or chemical buildup on the scalp. Alongside, the increasing demand of consumers by herbal products and eco -friendly

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private care propelled the hobby into plant -based and natural options. Plant -based medicines have been employed for centuries in traditional systems consisting of Ayurveda, Unani and Chinese medicine to address scalp and hair -related, scalp issues. Plants that contain Azadirachta Indica (Neem) are antifungal, antibacterial and anti-inflammatory homes; Pink hibiscus (hibiscus) is known by consequences of stabilization and conditioning; Nigella sativa (black seed) renowned antimicrobial, antioxidant and scalp effects; Meanwhile Trigonella Foenum-Agecum (Fenugreek) provides moisturizing, anti-inflammatory and anti-phytizer benefits. When blended in one formula, these herbs are able to create synergistic effects, providing benefits with different aimed at the health of the scalp. Plant-based hair oils are not better as a remittance machine for bioactive herbal compounds, but they also enhance the bloodstream of the scalp, hydrate the scalp, prevent hair break and enhance the beauty of the shine of the hair. Coconut oil, a common carrier base used by people everywhere, is well recognized for its amazing penetration houses, moisturizers, and antimicrobials. This study proposes to develop and analyze a polyherbal anti-cloth hair oil with confirmed those of natural extracts to provide a potent and natural treatment to control dandruff.The procedure was tested by its physical -quimic characteristics, antifungal activity against compared to Malassezia Furfur, stability under different conditions and usability of the patron. It examines the aimed at completing the classical herbal experience with state -of -the -art clinical analysis to extend a safe, green and ecological personal care product.

II. DRUG PROFILE

Parameter	Neem	Hibiscus	Methi (Fenugreek)	Amla (Indian Gooseberry)	Lemon
Plant Name	Neema	Hibiscus	Methi	Amla	Lemon
Image					
Synonyms	Margosa, Nimba	Jaswand, China rose	Fenugreek, Greek hay	Indian gooseberry, Amalaka	Nimbu, Citron
Origin	India, Southeast Asia	Asia, tropical regions	India, Mediterranean region	India, Southeast Asia	India, Southeast Asia
Biological Source	Azadirachta indica A. Juss.	Hibiscus rosa-sinensis Linn.	Trigonella foenum-graecum Linn.	Emblica officinalis Gaertn.	Citrus limon Linn.
Family	Meliaceae	Malvaceae	Fabaceae	Phyllanthaceae	Rutaceae
Chemical Constituents	Azadirachtin, nimbin, nimbolide, quercetin	Anthocyanins, flavonoids, mucilage	Saponins, trigonelline, flavonoids	Ascorbic acid (Vit C), tannins, gallic acid	Limonene, citral, flavonoids, ascorbic acid
Uses	Antifungal, antibacterial,	Hair growth promoter,	Hair strengthener,	Antioxidant, rejuvenator,	Astringent, antiseptic,

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	anti-inflammatory	conditioner	anti-inflammatory	antimicrobial	antifungal
Kingdom	Plantae	Plantae	Plantae	Plantae	Plantae
Phylum	Magnoliophyta	Magnoliophyta	Magnoliophyta	Magnoliophyta	Magnoliophyta
Class	Magnoliopsida	Magnoliopsida	Magnoliopsida	Magnoliopsida	Magnoliopsida
Genus	Azadirachta	Hibiscus	Trigonella	Emblica	Citrus

Parameter	**Aloe Vera**	**Tulsi (Holy Basil)**	**Curry Leaves**
Plant Name	Aloe Vera	Tulsi	Curry Leaves
Images			
Synonyms	Ghritkumari	Holy Basil, Sacred Basil	Kadi Patta, Curry Leaf
Origin	Africa, India, Mediterranean	India, Southeast Asia	India, Sri Lanka
Biological Source	Aloe barbadensis Mill.	Ocimum sanctum Linn.	Murraya koenigii Linn.
Family	Asphodelaceae	Lamiaceae	Rutaceae
Chemical Constituents	Aloin, aloe-emodin, polysaccharides, vitamins	Eugenol, ursolic acid, rosmarinic acid	Carbazole alkaloids, essential oils, flavonoids
Uses	Moisturizing, wound healing, anti-inflammatory	Antimicrobial, antioxidant, adaptogenic	Hair strengthening, antioxidant, antifungal
Kingdom	Plantae	Plantae	Plantae
Phylum	Magnoliophyta	Magnoliophyta	Magnoliophyta
Class	Liliopsida	Magnoliopsida	Magnoliopsida
Genus	Aloe	Ocimum	Murraya

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III. MATERIAL AND METHODS

Selection of Plant Material-

In the present study, I have selected the Neem, Amla, Lemon, Aloe Vera, Tulsi, Curry Leaves, Coconut oil, Olive Oil, Mustard Oil, Kalonji Oil

Collection of plant Material-

Neem Leaves, Lemon, Aloe Vera, Tulsi Leaves, Curry Leaves form local Area, the local market in Alephata, Pune, provided the Coconut oil, Mustard Oil, And Amla powder from Amazon Shopping provided Olive Oil, Kalonji Oil

Formulation of Anti-dandruff Hair Oil -

Ingredients	Role
Neem Extract	Anti-bacterial, Anti-fungal.
Tulsi Extract	Antimicrobial,Antioxidant.
Aloe Vera Extract	Moisturizing, Soothing.
Coconut oil	Base oil, nourishes scalp
Olive oil	Emollient, antioxidant, scalp nourishment
Kalonji Oil (Black Seed)	Anti-inflammatory,antifungal, hair growth promoter
Tea Tree oil	Anti-inflammatory
Leamon	Anti-fungal, Antimicrobial
Mustard Oil	Antimicrobial, improves blood circulation
Curry Leaves Extract	Hair Strengthening, Antifungal.
Water (Purified)	Solvent
Camphor	Reducing hair fall, Combathaing dandurff

Trial Batches

SR.NO	Ingredient	Batch 1	Batch 2	Batch 3
1	Neem Extract (ml)	10	10	10
2	Tulsi Extract(ml)	10	10	10
3	Aloe Vera Extract(ml)	10	10	10
4	Coconut oil (ml)	30	30	50
5	Olive oil (ml)	10	10	10

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6	Kalonji Oil (ml)	10	10	10
7	Tea Tree oil (ml)	10	10	10
8	Leamon (ml)	4	4	4
9	Mustard Oil (ml)	10	10	10
10	Curry Leaves Extract (ml)	10	10	10
11	Water (Purified)(ml)	100	100	100
12	Camphor (gm)	2	4	7

Procedure-

1.Collection and Preparation of Plant Materials

Collect fresh Neem leaves, Hibiscus flowers, Fenugreek seeds, Amla fruits, Lemon peel, Aloe vera gel, Tulsi leaves, and Curry leaves. Wash thoroughly with water to remove dirt. Shade-dry the materials for 3–4 days until crisp.Grind each dried material into a coarse powder and store in airtight containers.

2. Selection of Oils

Prepare a blend of: Coconut oil, Sesame oil, Olive oil, Mustard oil, Kalonji oil

3.Extraction of Herbal Ingredients

Weigh \~20 g of each powdered herbal ingredient. Use maceration

For maceration: Soak powders in ethanol or water for 24–48 hours, shaking occasionally.

Filter and evaporate the extract to dryness (or reduce volume).

4. Preparation of Polyherbal Hair Oil

Take 100 ml of the selected base oil(s) in a beaker.

Add measured amounts of each herbal extract (or powder directly if preferred).

Heat the mixture at 60–70°C for 1 hour in a water bath, stirring continuously.

Cool the mixture to room temperature.

Filter through muslin cloth or Whatman filter paper to remove solid residues.

Transfer the clear oil to amber-colored glass bottles to prevent light degradation.

Label and store at room temperature.

Evaluation:

Physical Evaluation :

1.Appearance :

Colour - brownish

Odor - pleasant herbal aroma;

Appearance - Clear, free-flowing liquid without any suspended particles or sediment.

Consistency - Smooth and uniform; not too thick or watery.

Texture - Should feel light, non-sticky, and spread easily on the scalp.

Clarity - Clear or slightly translucent; no cloudiness or turbidity

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pH Measurement

Measure using a digital pH meter (5% oil in distilled water or ethanol mixture).

3. Viscosity Measure using Brookfield viscometer at room temperature. Moderate viscosity (not too thick or runny)

4. Refractive Index

Take a clean Abbe refractometer. Place a drop of the hair oil sample on the prism surface. Adjust the refractometer to get a clear reading. Record the refractive index at 25°C (standard temperature). Acceptance The herbal hair oil‘s RI should fall within this range, indicating no adulteration and maintaining expected oil characteristics.

5. Specific Gravity Test

Take a clean, dry pycnometer (or specific gravity bottle).Weigh the empty pycnometer (W_1).Fill the pycnometer with distilled water and weigh (W_2). Empty and dry the pycnometer, then fill it with the hair oil sample; weigh again (W_3). Calculate using the formula:

6. Spreadability

Place 1 g of the prepared herbal hair oil between two glass slides.lace a 500 g weight on the top slide for 5 minutes to allow uniform spreading. Remove the weight carefully.Measure the diameter or area of the spread oil using a ruler or caliper. Alternatively, apply a small force to move the upper slide and record the time taken for a specific distance.

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Stability Studies

1.Sample Preparation

Prepare hair oil samples and store them in amber-colored bottles to prevent light degradation.

2.Storage Conditions

Store samples under different conditions:

Room temperature (25 °C)

Refrigerated conditions (4–8°C)

Accelerated conditions (40 °C)

3.Observation Period

Monitor the samples for 3 months (or longer if desired).

4. Parameters Monitored

At specific intervals (0, 15, 30, 60, 90 days),

Acid Value

Weigh accurately 5 g of the hair oil sample into a conical flask. Add 50 ml of a neutral solvent mixture (ethanol + ether in 1:1 ratio). Add 1–2 drops of phenolphthalein indicator. Titrate with 0.1 N KOH solution until a faint pink color persists for at least 30 seconds

$$\text{Acid Value} = \frac{V \times N \times 56.1}{W}$$

Where:

V = volume of KOH used (ml)

N = normality of KOH

W = weight of oil sample (g)

56.1 = molecular weight of KOH

Anti-Dandruff Activity

Procedure

Prepare sterile SDA plates and inoculate evenly with the fungal culture using a sterile swab.

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Use a sterile cork borer to make wells (cups) in the agar.
Fill each well with:
Test sample: polyherbal hair oil
Positive control: standard antifungal
Negative control: solvent or base oil
Incubate the plates at 28–30°C for 48–72 hours.
After incubation, measure the zone of inhibition (clear area) around each well using a ruler or caliper.

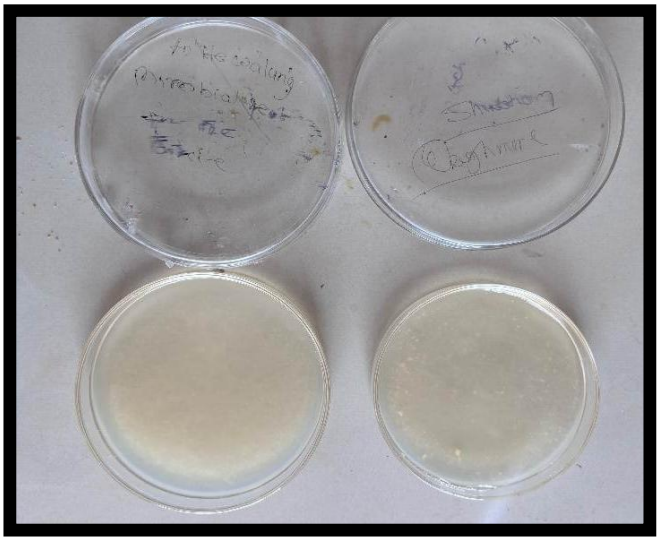
Calculation

Zone of Inhibition (mm)=Diameter of clear zone around the well
Compare the test sample‘s zone of inhibition to the positive and negative controls.

11. Microbial Test

The microbial load of the formulated herbal lozenges was evaluated using the spread plate method. Samples from both the control and test batches were serially diluted and spread onto nutrient agar plates, followed by incubation at 37 ± 1°C for 24–48 hours.

After the incubation period, no microbial growth was observed in either the control or test plates. This indicates that the lozenges are free from microbial contamination and comply with acceptable microbiological standards for Anti Dandruff formulations.



IV. RESULTS

The herbal antidandruff hair oil formulated using extracts/powders of Neem (Azdiracta Indica), Hibiscus flowers (Hibiscus rosa-sinensis), Amla fruit (Emblica officinalis), Lemon peel (Citrus limon), Coconut oil, Castor oil, Sesame oil (as base oils) and were successfully prepared by the molding method using suitable excipients

The optimized batch of hair oil was subjected to various evaluation parameters, and the following results were obtained:

· Appearance: Smooth, uniform, with greenish-yellow color and characteristic pleasant herbal aroma.
· pH: 5.6 (ideal for scalp application, matching scalp’s natural pH).
· Viscosity: Suitable for hair application, providing good spreadability.
· Spreadability: Easily spreadable without sticky or greasy feel.
· Stability Studies: No phase separation, rancidity, or microbial growth observed over 3 months at room temperature and accelerated conditions.

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· Anti-Dandruff Activity: Significant zone of inhibition observed against Malassezia species indicating strong anti-fungal properties

V. CONCLUSION

The polyherbal anti-dandruff hair oil prepared with neem, hibiscus, methi, amla, and lemon peel showed very good physicochemical properties, stability, and encouraging anti-dandruff activity. The product offers a natural, safe, alternative option to chemical-based anti-dandruff products, for which there is a growing tendency for herbal hair care products..

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