

Formulation Of A Multipurpose Herbal Nourishing Hair Oil

Vaishnavi Bhanudas Navghare¹, Vaishnavi Ishwar Amrute², Sakshi Janardhan Kakde³, Raj Sudhakar Shinde⁴, Prof. Shivaji Solunkhe⁵

^{1,2,3,4,5}Rajesh Bhaiyya Tope College of Pharmacy, Aurangabad, Maharashtra

ABSTRACT

This study focuses on the formulation and evaluation of a multipurpose herbal hair oil using natural ingredients known for their hair care benefits. The primary aim is to develop a stable, effective, and consumer-friendly oil that promotes hair growth, prevents dandruff, strengthens hair shafts, and improves overall scalp and hair health. The formulation incorporates coconut oil, almond oil, hibiscus, amla, and brahmi, enhanced with Vitamin E and lavender essential oil. The final product was evaluated for physicochemical properties, stability, organoleptic characteristics. Results indicated a stable and aesthetically acceptable product suitable for topical application, showing promising results in hair nourishment and scalp conditioning.

Keywords: Herbal hair oil, amla, hibiscus, brahmi, hair growth, dandruff, natural formulation.

INTRODUCTION

Hair is an important part of how we look and feel about ourselves. It can affect our confidence and personality. When hair is healthy and well-groomed, it is often seen as a sign of good health. However, many people today face problems like hair fall, dandruff, split ends, thinning hair, and early graying. These issues are often caused by poor diet, stress, pollution, harmful hair products, and not taking proper care of hair.

Because of these problems, more people are turning to natural and herbal hair care products. Herbal products are becoming popular because they are made from natural ingredients, are generally safe, and have been used for centuries in traditional medicine. These ingredients are full of nutrients like vitamins, antioxidants, and natural oils that can help keep the scalp and hair healthy.

In India, many herbs have been traditionally used to care for hair:

- **Amla (Indian gooseberry):** Amla is rich in Vitamin C and helps make hair stronger, prevents early graying, and supports hair growth.
- **Hibiscus:** This flower helps thicken hair, reduce hair fall, and encourages new hair to grow.
- **Brahmi:** Known for its calming effects, Brahmi also nourishes the scalp, reduces dandruff, and prevents hair thinning.

When these herbs are mixed into a hair oil, they can offer many benefits such as promoting hair growth, keeping the scalp healthy, reducing hair fall, and improving the shine and strength of the hair. Oils like coconut and almond oil are good base oils because they help the herbs go deep into the scalp. Adding ingredients like Vitamin E and lavender essential oil makes the oil even better by improving its smell, shelf life, and effectiveness.

Overall, creating a herbal hair oil using a mix of traditional and proven natural ingredients is a gentle, safe, and effective way to take care of hair naturally.

2. Aim and Objectives:

To formulate a multipurpose herbal nourishing hair oil.

To evaluate its organoleptic and physicochemical properties.

To provide a safe, effective, and consumer-friendly alternative to synthetic hair care products

To address multiple hair concerns such as dandruff, split ends, dryness, and premature graying with one holistic formulation.

To harness the synergistic effects of medicinal plants and oils that possess antimicrobial, antioxidant, and anti-inflammatory properties beneficial for scalp health.

3. Hair Anatomy Overview

Hair is composed of two main parts:

1. **Hair Shaft** – The visible part above the scalp, made of keratinized proteins.
2. **Hair Follicle** – The living part embedded in the dermis of the scalp, responsible for hair growth.

Supporting structures:

Sebaceous Glands: Produce sebum to lubricate hair and skin.

Dermal Papilla: Supplies nutrients and hormones critical for hair growth.

Arrector Pili Muscle: Contracts to cause “goosebumps.”

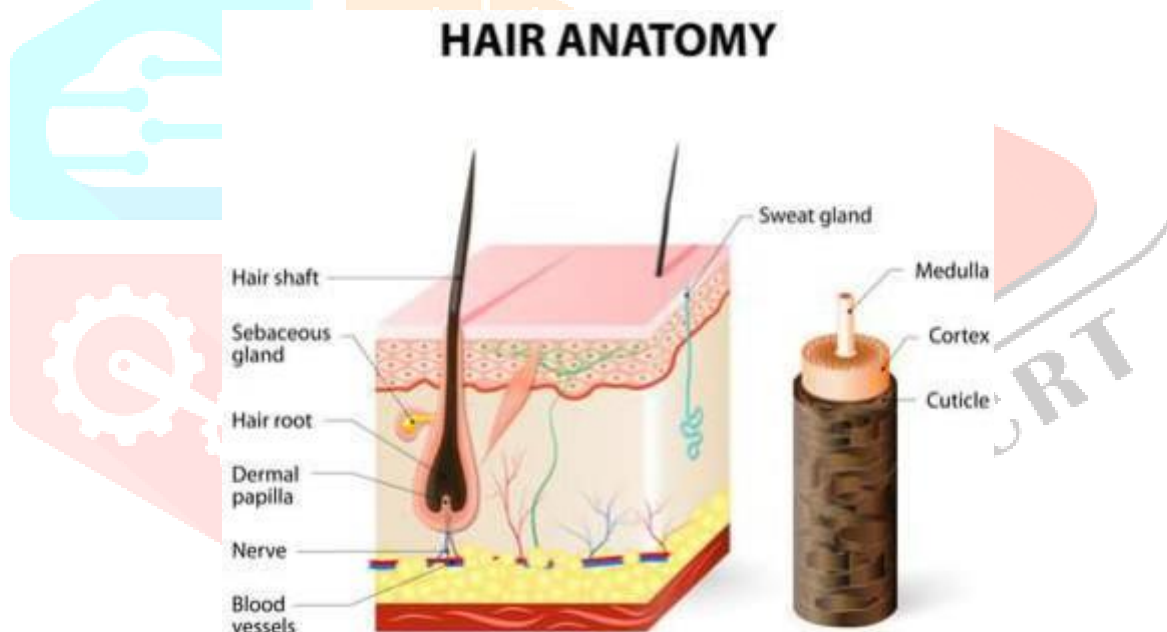


Fig 1. Hair Anatomy

4. Common Hair and Scalp Problems Hair Fall

Description:

Hair fall or hair loss refers to the excessive shedding of hair from the scalp, which can lead to visible thinning or bald patches.

Common Causes:

- **Stress:** Physical or emotional stress can push hair follicles into a resting phase (telogen effluvium), causing hair to fall out.
- **Hormonal Imbalance:** Conditions such as thyroid disorders, PCOS, or menopause can disrupt hair growth cycles.
- **Nutritional Deficiencies:** Lack of proteins, iron, biotin, zinc, and essential fatty acids weakens hair structure and impairs growth.
- **Use of harsh products:** Chemical-laden shampoos, styling gels, and excessive heat treatments can

damage hair roots.

2. Dandruff (Seborrheic Dermatitis)

Description:

Dandruff is characterized by flaking of the scalp, often accompanied by itching, irritation, and redness.

Common Causes:

- **Fungal Infection:** Overgrowth of **Malassezia** yeast on the scalp leads to inflammation and flaking.
- **Dry Scalp:** Lack of moisture can cause the scalp skin to become dry and flaky.
- **Poor Hygiene:** Infrequent washing allows buildup of dead cells and oil, promoting dandruff.
- **Sensitivity to Hair Products:** Certain ingredients can irritate the scalp and trigger dandruff-like symptoms.

3. Premature Graying

Description:

Graying of hair before the age of 30 is considered premature. It is a cosmetic concern with psychological impacts for many.

Common Causes:

- **Oxidative Stress:** Free radicals damage melanocytes (cells that produce hair pigment), leading to loss of color.
- **Genetics:** Hereditary factors often predetermine the age at which graying begins.
- **Vitamin Deficiencies:** Inadequate levels of Vitamin B12, folic acid, and copper can accelerate graying.
- **Smoking & Pollution:** Toxins contribute to oxidative damage and aging of hair follicles.

4. Dryness and Frizz

Description:

Dry, frizzy hair lacks moisture and is often difficult to manage. It appears rough, tangled, and lacks shine.

Common Causes:

- **Environmental Factors:** Exposure to sunlight, dust, wind, and low humidity can strip moisture from hair.
- **Chemical Treatments:** Regular use of dyes, bleaches, perms, and straighteners damages the cuticle layer.
- **Overwashing:** Frequent washing with harsh shampoos can remove natural oils, making hair brittle.
- **Inadequate Conditioning:** Skipping conditioners or using poor-quality products fails to lock in moisture.

5. Split Ends (Trichoptilosis)

Description:

Split ends occur when the protective outer layer of the hair strand becomes damaged, causing the hair shaft to split into two or more strands.

Common Causes:

- **Mechanical Damage:** Excessive brushing, tight hairstyles, and rough towel drying weaken hair ends.
- **Heat Styling:** Frequent use of hair dryers, straighteners, and curling irons dehydrates the hair shaft.
- **Chemical Damage:** Hair coloring and rebonding can weaken hair, making ends prone to splitting.
- **Lack of Nourishment:** Poor scalp and hair nutrition limits keratin regeneration, leading to structural damage.

6. Hair Thinning

Description:

Hair thinning is the gradual reduction in hair density and volume, often observed as a wider parting or decreased fullness.

Common Causes:

- **Aging:** As we age, hair follicles shrink and produce finer hair strands.
- **Poor Scalp Circulation:** Inadequate blood flow to follicles reduces oxygen and nutrient delivery.
- **Medical Conditions:** Autoimmune diseases like alopecia areata, and iron-deficiency anemia can contribute to thinning.
- **Lifestyle Factors:** Smoking, alcohol, sleep deprivation, and stress play a significant role in reducing hair thickness.

5. How Herbal Hair Oil Helps

Herbal hair oils are formulated using natural plant-based ingredients that are traditionally known and scientifically proven to nourish, protect, and repair the hair and scalp. These oils are rich in phytochemical/bioactive plant compounds such as flavonoids, alkaloids, tannins, saponins, phenolics, and essential oils which play a crucial role in maintaining healthy hair and scalp. Below is an expanded view of the key benefits:

1. Strengthening Hair Follicles and Promoting Growth

Herbal ingredients like Amla (*Emblica officinalis*), Hibiscus (*Hibiscus rosa-sinensis*), and Brahmi (*Bacopa monnieri*) are known to enhance the strength and resilience of hair follicles.

- **Mechanism:** These herbs stimulate the anagen (growth) phase of the hair cycle by nourishing the dermal papilla cells at the base of the follicle.
- **Result:** This leads to stronger hair roots, reduced hair breakage, and improved hair volume and density over time.

2. Conditioning the Scalp and Reducing Dandruff and Inflammation

Many herbal oils contain anti-inflammatory, antifungal, and soothing agents that help maintain scalp health.

Examples: Lavender oil has antimicrobial properties; coconut oil and almond oil deeply condition the scalp.

Benefits:

- Reduces dryness and flaking associated with dandruff
- Calms scalp irritation, redness, and itchiness
- Improves the integrity of the scalp's lipid barrier

This creates an ideal environment for hair growth and prevents recurring scalp infections like seborrheic dermatitis.

3. Improving Blood Circulation to Hair Roots

Scalp massage with herbal hair oils enhances microcirculation, increasing the flow of oxygen and nutrients to hair follicles.

- **Ingredient Action:** Herbs like Brahmi have vasodilatory effects that enhance blood vessel dilation, while oils like almond and coconut act as carriers that facilitate deeper penetration of active compounds.
- **Outcome:** Improved nutrient delivery strengthens follicles, prolongs the hair's growing phase, and accelerates new hair regeneration.

4. Acting as Natural Antioxidants and Antimicrobials

Herbal oils are naturally enriched with antioxidant compounds like Vitamin E, polyphenols, and flavonoids, which protect the hair from damage caused by free radicals.

Function:

- Prevent oxidative stress to the scalp and hair cells
- Protect hair proteins (like keratin) from damage
- Inhibit growth of pathogens such as fungi and bacteria

This dual function prevents both microbial-induced scalp issues and premature aging of hair.

5. Reducing Oxidative Stress to Prevent Graying and Hair Loss

Premature graying and hair thinning are often caused by oxidative damage to melanocytes the pigment-producing cells in hair follicles.

- Amla, being a rich source of Vitamin C and tannins, neutralizes free radicals and maintains melanin production.
- Brahmi and Hibiscus are also known to combat stress-induced hair fall by reducing cortisol levels and supporting follicle health.

By limiting oxidative damage, herbal oils preserve natural hair color and help delay the onset of gray hairs.

6. Providing Moisture and Shine Without Synthetic Chemicals

Unlike commercial products that often contain silicones, parabens, or sulfates, herbal oils offer natural moisturizing agents that enhance hair quality without side effects.

Fatty acids in coconut oil and almond oil penetrate the hair shaft and prevent protein loss. Oils help to seal the hair cuticle, locking in moisture, which reduces frizz and enhances shine.

6. Materials and Methods:

6.1 Materials:

Coconut oil: Acts as a carrier oil and deeply penetrates the hair shaft to prevent protein loss and strengthen hair.



Fig 2. Coconut oil

Almond oil: Rich in Vitamin E, fatty acids, and antioxidants, it nourishes the scalp, adds shine, and reduces dryness.



Fig 3. Almond oil

Hibiscus flower powder: Contains amino acids and Vitamin C that stimulate hair growth, prevent hair fall, and add volume.



Fig 4. Hibiscus flower powder

Amla powder (Indian gooseberry): A rich source of Vitamin C and tannins; strengthens roots, prevents premature graying, and conditions the scalp.



Fig 5. Amla powder

Brahmi powder: Has alkaloids that bind to hair proteins, strengthening the roots, reducing dandruff, and promoting hair density.



Fig 6. Brahmi powder

Vitamin E oil: Acts as a powerful antioxidant that prevents oxidative damage, prolongs shelf-life, and moisturizes the scalp.



Fig 7. Vitamin- E oil

Lavender essential oil: Provides a soothing fragrance and has antifungal and antimicrobial properties that help maintain scalp health.



Fig 8. Lavender essential oil

Ingredients Used (For 100 mL Batch)

Ingredient	Quantity	Purpose
Coconut oil	50 mL	Base oil; moisturizes and nourishes
Almond oil	30 mL	Carrier oil; rich in vitamin E
Hibiscus flower powder	5 g	Promotes hair growth, prevents graying
Amla powder	5 g	Strengthens roots, conditions scalp
Brahmi powder	5 g	Reduces stress, improves blood flow
Vitamin E oil	2 mL	Antioxidant; prevents rancidity
Lavender essential oil*	6–8 drops	Optional; soothing, anti-inflammatory

6.2 Method of Preparation:

1. Measure 50 mL of coconut oil and 30 mL of almond oil accurately.
2. Heat the oil mixture to 60°C in a water bath to avoid direct heat exposure.
3. Add 5 g each of hibiscus, amla, and brahmi powders to the heated oil.
4. Stir continuously for 45 minutes while maintaining the temperature between 55°C and 60°C.
5. Allow the mixture to cool to around 40°C.
6. Add 2 mL of Vitamin E oil and 6-8 drops of lavender essential oil.
7. Filter the oil using muslin cloth to remove coarse particles.

8. Store the prepared oil in sterilized, amber-colored bottles to protect from light degradation.

7. Evaluation Parameters:

Organoleptic Properties: colour, fragrance, texture, appearance can be observed visually

pH of the oil: Since oils are non-aqueous, pH cannot be measured directly hence 10% of solution was prepared in distilled water by mixing 1 ml of oil and 9 ml of water. pH meter was calibrated using standard buffer solution.

Spreadability: A drop of oil was applied on the skin or scalp and spreaded gently.

Greasiness: small amount of oil is applied on the scalp and the greasiness or heaviness of the oil is observed

Irritancy: Small amount of oil was applied on the left hand dorsal surface skin and the time was noted. Then it is checked for irritancy, erythema, and edema upto 24 h and reported.

Washability: Small amount of oil was applied on the forearm and gently rubbed. Leave for 15-20 min for absorption. The area was washed with a standard mild shampoo and water and results are observed.

RESULTS AND DISCUSSION

Organoleptic properties:

Sr no	Parameter	Result
1	Colour	Reddish-brown colored
2	Fragrance	Pleasant herbal and floral fragrance
3	Texture	Smooth, non-sticky
4	Appearance	Clear

pH : According to the results the pH of the oil was found near to the skin pH hence it can be safely used on skin and scalp.

Sr no	Formulation	pH
1	Hair oil	5.6

Spreadability: After the observation the results show oil is easily spreadable without clumping

Greasiness: After the application of oil the greasiness of the oil is checked and found that it is minimal greasy and quickly absorbs.

Sr no	Formulation	Greasiness
1	Hair oil	Minimal greasy

Irritancy:oil was applied on the skin and the time was noted then it is checked for irritancy, erythema, and edema up to 24 h and reported. According to the results oil showed no sign of irritancy, erythema and edema.

Sr no	Formulation	Irritant effect	Erythema	Edema
1	Hair oil	No irritant effect observed	Nil	Nil

Sr no	Formulation	Spreadability
1	Hair	Easily spreadable

Washability:Small amount of oil was applied on the forearm and washed with a standard mild shampoo and water and observed that it is easily washable without leaving any greasy effect.

Sr no	Formulation	Washability
1	Hair oil	Easily washable

The formulation offers multifunctional hair and scalp benefits due to the combined effects of its natural ingredients:

- Amla (*Emblca officinalis*) is rich in vitamin C and antioxidants, which help strengthen hair roots, improve texture, and reduce dandruff and scalp irritation.
- Hibiscus (*Hibiscus rosa-sinensis*) promotes hair growth, enhances shine, and contains mucilage that acts as a natural conditioner.
- Brahmi (*Bacopa monnieri*) improves blood circulation in the scalp, has a calming effect, and helps reduce stress-induced hair fall.

Together, these ingredients make the oil effective for nourishing the scalp, reducing common hair issues, and promoting overall hair health. Its stable formulation and user-friendly characteristics make it suitable for regular, long- term use.

CONCLUSION

The formulation is safe, stable, and effective as a multipurpose herbal nourishing oil. The selected herbs synergize to promote hair growth, reduce scalp irritation, and enhance hair quality. With further refinement and larger-scale testing, this product can be developed commercially or used as a home remedy.

REFERENCES

1. Khare, C.P. (2007). *Indian Medicinal Plants: An Illustrated Dictionary*. Springer. Indian Pharmacopoeia (2018).
2. Pandey, M.M., Rastogi, S., & Rawat, A.K.S. (2013). *Indian Herbal Drug for General Healthcare: An Overview*. Internet Journal of Alternative Medicine.
3. Bairy, K.L., Rao, C.M. (2001). *Natural Products in Hair Care: Scientific Basis and Clinical Relevance*. Journal of Cosmetic Science.
4. Rathi, V., Rathi, J.C., & Tamizharasi, S. (2009). *Plants Used for Hair Growth Promotion: A Review*. Pharmacognosy Reviews.
5. Raut, S., Karuppayil, S.M. (2014). *A Status Review on the Medicinal Properties of Essential Oils*. Industrial Crops and Products.
6. Dweck, A.C. (2005). *Natural Ingredients for Cosmetic Industry*. International Journal of Cosmetic Science. Shobha, R. et al. (2012). *Formulation and Evaluation of Polyherbal Hair Oil*. International Journal of Pharma and Bio Sciences.
7. Ahmad, F. et al. (2010). *Evaluation of Medicinal Plants Used in Hair Care*. African Journal of Pharmacy and Pharmacology.
8. Kapoor, V.P. (2000). *Herbal Cosmetics for Skin and Hair Care*. Natural Product Radiance.
9. Dahanukar, S.A., Kulkarni, R.A., Rege, N.N. (2000). *Pharmacology of Medicinal Plants and Natural Products*. Indian Journal of Pharmacology.
10. Sharma, P.C., Yelne, M.B., Dennis, T.J. (2002). *Database on Medicinal Plants Used in Ayurveda*. CCRAS. Gediya, S.K. et al. (2011). *Herbal Plants: Used as a Cosmetics*. Journal of Natural Products and Plant Resources. Tiwari, S. et al. (2015). *Formulation and Evaluation of Herbal Hair Oil*. Research Journal of Topical and Cosmetic Sciences.
11. Bhattacharya, S. (2011). *Phytochemicals from Traditional Medicinal Plants*. The Open Natural Products Journal.
12. Jadhav, V.M. et al. (2009). *Hair Growth Potential of Indian Medicinal Plants*. Pharmacognosy Reviews. Kumar, N. et al. (2011). *Formulation and Evaluation of Herbal Hair Oil*. Journal of Chemical and Pharmaceutical Research.
13. Saha, S. et al. (2010). *Evaluation of Hair Growth Activity of Herbal Formulations*. International Journal of Pharmaceutical Sciences.
14. Singh, R. et al. (2010). *Ethnomedicinal Plants Used for Hair Disorders*. Journal of Ethnopharmacology. Rao, V. (2011). *Effect of Natural Oils on Hair*. Indian Journal of Dermatology.
15. Mondal, S. et al. (2009). *Plant-Derived Compounds for Hair and Skin*. Journal of Medicinal Plants Research. Ahmed, M. et al. (2003). *Cosmeceuticals and Herbal Drugs: Current Challenges*. Drug Development Research. Patel, R.P. et al. (2009). *Herbal Cosmetics: Trends and Market Demand*. Pharmacognosy Reviews.
16. Gulati, M. et al. (2016). *Mechanistic Insight into Herbal Remedies for Hair Loss*. Clinical Research in Dermatology.
17. Pawar, S. N., & Khairnar, V. A. (2013). *Herbal Hair Cosmetics: A Review*. International Journal of PharmTech Research, 5(1), 36–43.
18. Gupta, M., & Sharma, R. (2010). *Cosmeceuticals: An Emerging Concept in Personal Care Products*. International Journal of Pharmaceutical Sciences Review and Research, 5(1), 50–54.
19. Bhalla, T.N. (1990). *Medicinal Plants and Cosmetics*. Journal of Ethnopharmacology, 28(1), 1–5.
20. Mishra, A. K., & Singh, R. (2009). *Potential Hair Growth Promoters from Plants*. International Journal of Research in Pharmaceutical and Biomedical Sciences, 2(2), 710–717.
21. Chattopadhyay, R.R., & Bhattacharyya, S.K. (2007). *Herbal Hair Tonic: A Natural Approach for Hair Loss*. Journal of Ayurveda and Integrative Medicine.
22. Shivakumar, H.G., Basavaraj, K.H., & Darshan, C. (2011). *Evaluation of Herbal Hair Oil Containing Essential Oils*. International Journal of Research in Ayurveda and Pharmacy, 2(5), 1622–1624.
23. Saha, R., Mazumder, R., & Das, S. (2011). *Development and Evaluation of Herbal Hair Oil Formulation Using Punica granatum Seed Extract*. Journal of Pharmacy Research, 4(8), 2763–2765.
24. Saikia, A.P., Ryakala, V.K., Sharma, P., Goswami, P., Bora, U. (2006). *Ethnobotany of Medicinal Plants Used by the People of Northeast India for Hair Care*. Journal of Ethnopharmacology, 107(3), 362–368.
25. Saharan, V.A., & Kukkar, V. (2012). *Modern Herbal Hair Formulation Techniques and Their*

- Evaluation Methods. Asian Journal of Pharmaceutical and Clinical Research, 5(Suppl 1), 129–134.
26. Maurya, S.D., & Singh, V. (2017). Evaluation of Herbal Hair Oil Containing Datura metel and its Antidandruff Activity. World Journal of Pharmaceutical Research, 6(4), 1152–1161.
 27. Sharma, A., & Singh, R. (2016). Ayurvedic Herbs for Hair Care: A Review. Journal of Drug Delivery and Therapeutics, 6(2), 40–43.
 28. Agrawal, S.S., & Paridhavi, M. (2007). Herbal Drug Technology. Universities Press.
 29. Singh, R.P., Gangadharappa, H.V., & Mruthunjaya, K. (2013). Natural Remedies for Dandruff – A Review. Research Journal of Pharmacognosy and Phytochemistry, 5(6), 319–324.
 30. Rathi, A.N. (2013). Formulation and Evaluation of Herbal Hair Oil Using Different Herbal Extracts for Hair Growth and Anti-Dandruff Activity. International Journal of Pharmacognosy and Phytochemical Research, 5(4), 302–307.
 31. Saha, L., Sadhukhan, D., & Dey, S. (2014). Evaluation of Antimicrobial and Antioxidant Activity of Polyherbal Hair Oil. International Journal of Pharmaceutical Sciences and Research, 5(10), 4237–4242.
 32. Ali, M. (2008). Textbook of Pharmacognosy. CBS Publishers & Distributors.
 33. Dureja, H., Kaushik, D., & Kumar, V. (2005). Cosmeceuticals: An Emerging Concept. Indian Journal of Pharmacology, 37(3), 155–159.
 34. Raghavendra, M., Naik, P.K., & Nema, R.K. (2010). Herbal Cosmeceuticals for Hair Care: An Overview. Research Journal of Topical and Cosmetic Sciences, 1(1), 1–6.
 35. Singh, P.K., & Mishra, G. (2013). Formulation and Evaluation of Herbal Hair Oil for Hair Growth Properties. Journal of Global Trends in Pharmaceutical Sciences, 4(4), 1361–1366.
 36. Tiwari, A.K., & Rana, A.C. (2009). Herbal Drugs: A Remedy to Hair Problems. The Pharma Review, 7(42), 91–94.

