WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Formulation And Evaluation Of Herbal Hair Dye Shampoo

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ABSTRACT:

The increasing demand for natural and chemical-free hair care products has led to the development of herbal hair dye formulations. This study focuses on formulating an herbal hair dye in shampoo form, utilizing natural ingredients known for their hair-nourishing and coloring properties. The key herbal components include Henna (Lawsonia inermis), Indigo Powder (Indigo era tinctoria), Amla (Emblica officinalis), Reetha (Sapindus mukorossi), Hibiscus (Hibiscus rosa-sinensis), Bhringraj (Eclipta alba), Brahmi (Bacopa monnieri), Sandalwood (Santalum album), and Shikakai (Acacia concinna).

Henna and Indigo serve as the primary natural colorants, imparting various shades from brown to black based on their ratio and application time. Amla, rich in vitamin C and antioxidants, enhances hair texture and boosts the longevity of the dye. Reetha and Shikakai act as natural cleansing and foaming agents, making the formulation effective as a shampoo while maintaining scalp health. Hibiscus conditions the hair, preventing dryness and breakage, while Bhringraj and Brahmi promote hair growth and reduce premature graying. Sandalwood adds a soothing fragrance and provides a cooling effect on the scalp.

The herbal hair dye shampoo is formulated by finely powdering the ingredients, creating an aqueous or hydroalcoholic extract, and incorporating it into a gentle surfactant base. The final product is assessed for pH, stability, dyeing efficacy, and cleansing properties. This formulation offers a natural, non-toxic alternative to synthetic hair dyes while ensuring scalp nourishment and hair health.

This study highlights the potential of herbal ingredients in sustainable hair care and provides a natural solution for individuals seeking effective hair dyeing with additional therapeutic benefits.

KEYWORDS: Herbal Hair Dye Shampoo, Henna, Indigo Powder, Amla, Coffee, Shikakai, Reetha, Hibiscus, Bhringraj, Red Sandal Wood, Brahmi, Antimicrobial.

INTRODUCTION:

For generations, people have dyed their hair with both natural and artificial substances. However, the need for herbal substitutes has increased as a result of growing knowledge of the negative effects of chemical dyes, including allergic responses, scalp irritation, and long-term hair damage. Without sacrificing efficacy, herbal hair dyes provide a more secure, environmentally responsible, and healthy alternative.(1)

To give a comprehensive hair care solution, this study focuses on the formulation of a herbal hair coloring shampoo that combines natural colorants with hair-nourishing herbs. In addition to Amla (Emblica officinalis), Reetha (Sapindus mukorossi), Hibiscus (Hibiscus rosa-sinensis), Bhringraj (Eclipta alba), Brahmi (Bacopa monnieri), Sandalwood (Santalum album), and Shikakai (Acacia concinna) for their cleansing, conditioning, and hair-strengthening properties, the main ingredients include Henna (Lawsonia inermis) and Indigo (Indigofera tinctoria) as natural hair colorants. Common plant-based colors that condition hair and add natural shades from brown to black are henna and indigo. The combination works well as a shampoo because Reetha and Shikakai are natural foaming and washing ingredients. Amla, Hibiscus, Bhringraj, and Brahmi are beneficial for hair development, scalp nourishment, and delaying the onset of graying. Sandalwood's calming and fragrant qualities improve the composition.

The goal of this research Is to create a natural hair dye that works well as shampoo, guaranteeing benefits for hair care and color enhancement. The recipe is safe, non-toxic, and appropriate for frequent use; it provides a substitute for traditional chemical hair dyes and supports the health of the scalp and the vitality of the hair.(2)

Objectives:

1. Effective Hair Coloring: To develop a shampoo that delivers vibrant, long-lasting color to hair with a user-friendly application process. It should be able to dye hair evenly and seamlessly while maintaining natural hair texture.
2. Gentle and Safe for Hair and Scalp: The shampoo should be formulated to be gentle on the hair and scalp, minimizing potential irritation or damage. It should be free from harsh chemicals that could cause adverse reactions, such as parabens, sulfates, or ammonia.
3. Moisturizing and Conditioning: To ensure the hair remains soft, healthy, and hydrated post-dyeing. The shampoo should include nourishing ingredients like oils, proteins, or vitamins that help maintain the hair's natural moisture balance and prevent dryness.
4. Ease of Use: The product should be simple to apply as part of the regular shampoo routine. Ideally, it should combine both washing and dyeing in one step, saving time and effort for the user.
5. Long-lasting Results: To ensure the color stays vibrant and does not fade quickly. This could involve incorporating color-locking agents that prolong the vibrancy of the color after each wash.
6. Color Variety: To provide a wide range of shades to cater to different consumer preferences, ensuring versatility and choice in the market.
7. Non-Transfer and Stain-Free: The formula should prevent the dye from transferring to towels, clothing, or skin, ensuring a mess-free experience for the user.
8. Eco-friendly and Sustainable: The shampoo should be formulated with eco-conscious ingredients and packaging, catering to growing consumer demand for environmentally friendly products.(3)

DRUG PROFILE:

Henna:

Botanical Name: Lawsonia inermis L.
Biological Source: Henna is obtained from the leaves of the Lawsonia inermis plant.
Family: Lythraceae (Loosestrife family)
Uses:
1. **Natural Hair Colorant:** Henna is a natural hair colorant that gives a reddish-brown color to hair.
2. **Conditions and Nourishes Hair:** Henna conditions and nourishes hair, leaving it soft, smooth, and manageable.
3. **Covers Gray Hair:** Henna can help cover gray hair, giving it a natural-looking color.
4. **Strengthens Hair Roots:** Henna can help strengthen hair roots, reducing hair fall and promoting hair growth.
5. **Soothes Scalp:** Henna can help soothe an itchy scalp, reducing dandruff and other scalp irritations.(4)

Indigo Powder:

Botanical Name: Indigofera tinctoria L.
Biological Source: Indigo Powder is obtained from the leaves of the Indigofera tinctoria plant.
Family: Fabaceae (Legume family)
Uses:
1. Natural Dye: Indigo Powder is used as a natural dye for fabrics, giving a blue color.
2. Hair Dye: Indigo Powder is used as a natural hair dye, giving a dark blue or black color.
3. Medicinal Uses: Indigo Powder is used in traditional medicine to treat various ailments, such as fever, rheumatism, and skin conditions.(5)

Amla:

Botanical Name: Emblica officinalis Gaertn.
Biological Source: Amla is obtained from the fruit of the Emblica officinalis tree.
Family: Euphorbiaceae (Spurge family)

Uses:
1. Ayurvedic Medicine: Amla is used in Ayurvedic medicine to treat various ailments, such as digestive issues, respiratory problems, and skin conditions.
2. Hair Care: Amla is used to promote hair growth, improve hair texture, and prevent hair loss.
3. Skin Care: Amla is used to improve skin tone, reduce wrinkles, and treat skin conditions such as acne and eczema.(6)

Coffee:

Botanical Name: Coffea arabica L. or Coffea canephora Pierre ex A.Froehner (Robusta coffee)
Biological Source: Coffee is obtained from the seeds of the Coffea arabica or Coffea canephora plant.
Family: Rubiaceae (Madder family)
Uses:
1. Skin Care: Coffee is used in skin care products to reduce the appearance of cellulite, improve circulation, and provide antioxidant benefits.
2. Hair Care: Coffee is used in hair care products to darken hair color, improve hair growth, and reduce dandruff.(7)

Shikakai:

Botanical Name: Acacia concinna (Willd.) DC.
Biological Source: Shikakai is obtained from the pods of the Acacia concinna tree.
Family: Fabaceae (Legume family)
Uses:
1. Hair Care: Shikakai is used in traditional hair care practices to promote hair growth, improve hair texture, and reduce dandruff.
2. Skin Care: Shikakai is used in traditional skin care practices to treat various skin conditions, such as acne, eczema, and psoriasis.
3. Medicinal Uses: Shikakai is used in traditional medicine to treat various ailments, such as fever, cough, and digestive issues.(8)

Reetha:

Botanical Name: Sapindus mukorossi Gaertn.
Biological Source: Reetha is obtained from the fruit of the Sapindus mukorossi tree.
Family: Sapindaceae (Soapberry family)
Uses:
1. Hair Care: Reetha is used in traditional hair care practices to promote hair growth, improve hair texture, and reduce dandruff.
2. Skin Care: Reetha is used in traditional skin care practices to treat various skin conditions, such as acne, eczema, and psoriasis.
3. Medicinal Uses: Reetha is used in traditional medicine to treat various ailments, such as fever, cough, and digestive issues.(9)

Hibiscus:

Botanical Name: Hibiscus sabdariffa L.
Biological Source: Hibiscus is obtained from the flowers, leaves, and stems of the Hibiscus sabdariffa plant.
Family: Malvaceae (Mallow family)

Uses:

1. Hair Care: Hibiscus is used in traditional hair care practices to promote hair growth, improve hair texture, and reduce dandruff.
2. Skin Care: Hibiscus is used in traditional skin care practices to treat various skin conditions, such as acne, eczema, and psoriasis.
3. Medicinal Uses: Hibiscus is used in traditional medicine to treat various ailments, such as fever, cough, and digestive issues.(11)

Bhringraj:

Botanical Name: Eclipta alba (L.) Hassk.
Biological Source: Bhringraj is obtained from the leaves and roots of the Eclipta alba plant.
Family: Asteraceae (Sunflower family)
Uses:

1. Hair Care: Bhringraj is used in traditional hair care practices to promote hair growth, improve hair texture, and reduce dandruff.
2. Skin Care: Bhringraj is used in traditional skin care practices to treat various skin conditions, such as acne, eczema, and psoriasis.
3. Medicinal Uses: Bhringraj is used in traditional medicine to treat various ailments, such as fever, cough, and digestive issues.(10)

Red Sandal Wood:

Botanical Name: Pterocarpus santalinus L.
Biological Source: Red Sandalwood is obtained from the heartwood of the Pterocarpus santalinus tree.
Family: Fabaceae (Legume family)
Uses:

1. Religious and Cultural Significance: Red Sandalwood is considered sacred in Hinduism and Buddhism and is used in various rituals and ceremonies.
2. Medicinal Uses: Red Sandalwood is used in traditional medicine to treat various ailments, such as fever, cough, and digestive issues.
3. Cosmetic Uses: Red Sandalwood is used in traditional cosmetics to promote skin health and beauty.(12)

Brahmi:

Botanical Name: Bacopa monnieri (L.) Pennell
Biological Source: Brahmi is obtained from the whole plant of Bacopa monnieri, including the leaves, stems, and roots.

Family: Plantaginaceae (Plantain family)

Uses:

1. Ayurvedic Medicine: Brahmi is used in Ayurvedic medicine to enhance memory, cognitive function, and mental clarity.

2. Medicinal Uses: Brahmi is used in traditional medicine to treat various ailments, such as anxiety, stress, and insomnia.

3. Hair Care: Brahmi is used in traditional hair care practices to promote hair growth, improve hair texture, and reduce dandruff.(13)

Formulation Table:

Sr No.	Ingredients	Quantity (50 gm)	Uses
1	Henna	5 gm	Hair dyes, Hair care products
2	Indigo Powder	4 gm	Improve hair colour, soothes hair scalp and follicles
3	Amla	2.5 gm	A great conditioner for the hair, giving a soft and shiny look
4	Coffee	1 gm	Stimulate hair follicles.
5	Shikakai	1.5 gm	A natural foaming agent that gently cleanses the scalp
6	Reetha	8.5 gm	Used as a cleanser and to remove lice from hair
7	Hibiscus	1 gm	Add volume, treat dandruff
8	Bhringraj	0.5 gm	Increases blood circulation to the scalp and roots
9	Red Sandalwood	0.5 gm	Keep the scalp hydrated
10	Brahmi	0.5 gm	Reduce inflammation hair loss by treating dandruff
11	Glycerine	2.71 ml	Moisturizer
12	Coconut oil	5.43 ml	Moisturize and nourish the hair
13	Distilled Water	q.s	Vehicle

Formulation of Herbal hair dye Shampoo:

1. **Weighing and Mixing:** Weigh the ingredients accurately and mix them in a specific order.
2. **Henna and Indigo Powder Mixing:** Mix Henna and Indigo Powder in a separate container to create a uniform blend.
3. **Amla, Coffee, Shikakai, Reetha, Hibiscus, Bhringraj, Red Sandalwood, and Brahmi Mixing:** Mix the remaining herbal ingredients in a separate container to create a uniform blend.
4. **Glycerine and Coconut Oil Mixing:** Mix Glycerine and Coconut Oil in a separate container to create a uniform blend.
5. **Combining the Mixtures:** Combine the Henna-Indigo mixture, herbal mixture, and Glycerine-Coconut Oil mixture in a large mixing tank.
6. **Adding Reetha and Distilled Water:** Add Reetha and Distilled Water to the mixture and stir well to create a uniform shampoo formulation.
7. **pH Adjustment:** Adjust the pH of the formulation to 5.5 using a pH adjuster.
8. **Filtration:** Filter the formulation to remove any impurities.
9. **Packaging:** Package the formulation in a suitable container, such as a jar or bottle.(14)

Evaluation Test for Herbal Hair Dye Shampoo:

a.Appearance

- **Test:** Examine the color, clarity, and consistency of the shampoo.
- **Parameters:** The shampoo should be clear or slightly opaque, depending on the herbs used, with no separation, visible particles, or floating impurities.
- **Standard:** The shampoo should have a uniform and visually appealing appearance.(15)

b. pH Level

- **Test:** Measure the pH of the shampoo using a pH meter or pH indicator strips.

- **Parameters:** The pH of the shampoo should be between 4.5–5.5, suitable for the scalp and hair, as it is mildly acidic to match the natural pH of hair and skin.
- **Standard:** Ensure the pH is within the acceptable range for scalp care.(16)

c. Viscosity

- **Test:** Measure the viscosity of the shampoo using a viscometer.
- **Parameters:** The shampoo should have an appropriate viscosity to provide ease of application but should not be too runny or too thick.
- **Standard:** Viscosity should be within a range that ensures ease of use and proper distribution on hair.(17)

d. Foaming Capacity

- **Test:** Evaluate the foaming ability of the shampoo by agitating a fixed amount of shampoo in a set amount of water.
- **Parameters:** The shampoo should produce enough foam for cleansing, but excessive foaming should be avoided.(18)

Result:

Herbal Hair Dye Where Prepared By Containing Ingredients Like Henna, Indigo Powder, Amla, Coffee, Shikakai, Reetha, Hibiscus, Bhrinjraj, Red Sandalwood, and Brahmi.

Evaluation Of Herbal Hair Dye:

Organoleptic Evaluation:

Organoleptic characteristics for various sensory characters like color, taste, odour, and special features, like touch, texture, appearance, etc., was carefully identified.

Sr No.	Parameters	F1
1	Colour	Greenish
2	Odour	Characteristic
3	Texture	Fine
4	Apparance	Paste

Physiochemical Evaluation:

All these findings are mentioned in the table below.

1. pH: The pH of formulated herbal hair dye was determined using a pH meter.
2. Moisture content: A method commonly used for moisture content determination is the loss on drying method or LOD.

Sr No.	Parameters	F1
1	pH	5.5
2	Ash value	2% to 8%
3	Irritancy Test	Nil

Discussion:

The formulation of herbal hair dye represents a growing trend toward natural alternatives in the cosmetics industry. Consumers are increasingly seeking products that are free from synthetic chemicals, which can cause allergic reactions and long-term damage to hair and the scalp. This discussion explores the formulation process, benefits, challenges, and implications of herbal hair dye, highlighting its physicochemical properties and potential market impact. The primary ingredients in herbal hair dye formulations, such as henna, indigo amla, and other botanical extracts, are known for their natural coloring properties and beneficial effects on hair health. Henna provides a rich red tone and has conditioning properties, promoting hair strength and shine. Indigo is used to achieve darker shades, creating a balanced color when mixed with henna. Amla not only enhances the colour but also contributes to scalp health and hair thickness

Conclusion:

In conclusion, herbal hair dye shampoos are an excellent option for individuals seeking a more natural, eco-friendly, and less harmful alternative to traditional hair dyes. While they may not provide the same immediate or vibrant results as synthetic dyes, their long-term benefits to hair health and overall scalp well-being make them a popular choice for those with sensitive skin or those looking to avoid harsh chemicals. As with any cosmetic product, it is essential to consider individual hair needs and desired results when choosing a formulation.

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