



A Review On Development And Assessments Of Natural Hair Dye

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Abstract : Traditional hair coloring techniques use chemicals that have unpleasant side effects, such as skin discoloration, cancer, hair breakage, and inflammation. Commercially available hair dyes that contain unrefined plant powders must be processed before use, which is cumbersome for the customer and makes the product difficult to rinse. Therefore, a plant- based color extract-based hair dye formulation that is ready to use and has good rinsability had to be developed. Hair color loss can be caused by a variety of factors, including genetics, environmental factors, alcohol usage, and social factors. Although long-lasting synthetic hair colors come in a range of shades and retain their natural brightness, their primary drawback is that they can cause easily influenced reactions in some individuals. Traditional hair coloring techniques use chemicals that have unpleasant side effects, such as skin discoloration, cancer, hair breakage, and inflammation. Commercial hair dyes that use unrefined plant powders must be processed before use, which is difficult for the customer. These products are also not very rinsable. The benefits of herbal products outweigh those of synthetic ones, which have negative health effects due to harsh ingredients like paraphenylenediamine. "Herbal" is a word that connotes security. Therefore, the goal of our current study was to create a herbal hair dye by extracting the plants from various powders, including Lawsonia inermis, Aloe vera, Phyllanthus emblica, Thea sinensis, Trigonella foenum-graecum, Eclipta alba, Acacia catechu, Indigofera tinctoria, Terminalia bellirica, and Phyllanthus emblica. Three distinct formulations were created by combining different amounts of indigo and henna extract in the following ratios: 1:1, 2:1, and 1:2, respectively. One of the main concerns is the rise of health and environmental risks associated with dye production and use worldwide. Investigating alternatives to synthetic and semi-synthetic colors made this work possible. The 100% herbal hair dye is made up of 40% aloe vera gel, which acts as a natural mordant and contains 0.3% polysaccharide and 98.5% water, 30% aqueous extract of Tagetes, which contains 20% carotenoid, and 30% aqueous extract of Cymphomandra betacea, which contains 35% flavonoids and 10% tannins. Our pharmaceutical evaluation studies showed that, in comparison to commercially available synthetic dye formulations, the formulation had a better dyeing effect, was free of skin irritation and offensive odors, had a great retention capacity, promoted hair growth, was appropriate for all age groups, and was environmentally friendly.

Key Terms - Herbal hair dye, Hair Care Plant, Hair dye formulation, Dye Yielding Plants..

INTRODUCTION

In the past, many plant-based coloring agents, such as henna, chamomile, indigo, and others, were used to give silver hair a typical dark hue. However, instead of achieving this, people's hair turned red to copper. Hair loss can be caused by a multitude of factors, including genetics, the influence of environmental factors, the use of alcohol, and more. Even though long-lasting manufactured hair colors come in a variety of shades and maintain their brilliance, their main drawback is that some people may react excessively sensitively to them.

Some hair colors that are marketed as ordinary contain 13% phenylenediamine, a manufactured hair color that stains skin and clothing when used. An object made entirely of plant materials was deemed necessary.

This is safe to use and doesn't have the problems of leaving skin discolored while being used or influencing reactions easily. Using a combination of different plant materials, the details in the current study are made to obtain a regular dark variety. The creation of safe and natural hair colorants is the primary goal of the current study. There are two ways to change the color of one's hair: coloring and dying. Restoring the natural color of hair that has been darkened by sun exposure or cosmetics, or recoloring grey and white hair, is the primary driving force behind this. All of the advantages of natural materials are present in herbal dyes. Because of the proper combination of herbs, these formulations not only dye hair but also stimulate and nourish hair development.

Synthetic hair dyes have been linked to skin and other skin-related conditions compared to natural hair dyes. In addition to causing environmental contamination and possible adverse effects for product users, the manufacturing process poses a health risk to those who participate in it. Health conscious consumers around the world have limited its use because to concerns about the synthetic dyes' potential adverse effects, and it must pass several regulatory obstacles before it can be used. In general, a dye is defined as a colored material that has a strong affinity for the fiber, fur, or hair. Usually applied as an aqueous solution, the dye may need a mordant to increase its fastness on the fiber, fur, or hair. Mordant dyes are another name for natural dyes. With the same dye, different mordants will produce distinct hues. Therefore, a mordant is a substance that permits a reaction between the color and the hair fiber. Genetics, stress, malnutrition, and illness are some of the causes of graying hair.

According to reports, half of the world's population will have 50% gray hair by the age of fifty, with genetics being the main cause of premature graying. According to reports, half of the world's population will have 50% gray hair by the age of fifty, genetics being the main cause of premature graying. As a result, the market for hair dyes is Booming. Colors obtained from plant, animal, or insect material without the of chemicals are known as natural dyes. In the past, metals like copper and iron were used with natural organic materials to create richer or more durable hues. *Phyllanthus emblica*, *Saussurea lappa*, *Tinospora cordifolia*, *Terminalia bellirica*, *Uncaria gambir*, *Aloe barbadensis*, *Cinnamomum zeylanicum*, *Hibiscus rosasinensis*, *Centella asiatica*, and many other plants, including *Lawsonia inermis*, *Acacia arabica*, *Eclipta alba*, *Juglans regia*,



Pterocarpus indicus, *Pilocarpus jaborandi*, and *Nardostachys jatamansi* are utilized as key components in hair care products, mostly for hair coloring. Because they include tannins, natural dyes also have mordant properties. Tannins improve the color and fastness of dyes by fostering an affinity between them and hair.

Fig. 1

1. ROLE OF INGREDIENTS USED IN THE FORMULATION OF HERBAL HAIR DYE

1.1 Henna: It also prevents premature graying of hair because it contains tannins, a plant ingredient that gives tea its rich shade. Vitamin E, which helps with hair mellowing, is found in henna. and antioxidants included



in the plant's natural leaves promote the health of hair.

Fig. 2

Different Types of Henna :

Henna usually comes in three different varieties.

a. Organic Henna: The initial application of natural henna (*Lawsonia inermis*) leaves skin with a deep brown-red stain that lasts for about a week. It comes from the leaves of the *Lawsonia* plant.

b. Henna That Is Neutral: Pure henna powder and neutral henna, also called *Cassia obovate*, are not the same thing. Actually, *Senna italica* is a completely distinct plant. Although natural and neutral henna plants look similar, they differ in their molecular consistency and other characteristics. Irwin's research revealed that neutral henna did not immediately change the color of hair.

c. Henna in Black: The constituents of black henna include indigo, natural henna, and other unlisted compounds or pigments such as para-phenylenediamine (PPD). Although this dye's main use is to color some manufacturers also use it to create hair dye and henna tattoo cones.

1.2. AMLA: Amla powder improves calcium retention, which helps to strengthen bones, teeth, nails, and hair. It strengthens the hair follicles, maintains the hair's natural color, and prevents premature graying. The most expensive and potent form of vitamin C and tannins among the plants is amla.

The natural product's vitamin C combines with tannins to prevent it from being destroyed by light or intensity. It keeps hair color vibrant, stops premature graying, and fortifies hair follicles among the plants. amla contains the highest concentration of vitamin C and tannins. The active component of the hair care products is whole fruit. The fruit's vitamin C combines with tannins to prevent it from being destroyed by heat or light.



Fig. 3

1.3. REETHA: Reetha is rich in sugars, unsaturated fats, adhesive, saponin, vitamin A, D, E, and K. Decreased dandruff and improved hair growth are two benefits of Reetha. Because it functions as distinctive cleanser, the concentrate of organic product coat is used as a hair chemical in homemade shampoos. Since earlier times, reetha, also known as soap nuts or washing nuts, have played a crucial role as standard hair



care products. Saponins, which are enhanced by this plant, give hair a firm, glossy, and shining appearance when used as prescribed.

Fig. 4

1.4. SHIKAKAI: Shikakai is a remarkable spice that is typically found in India's tropical forests. Shikakai is a everyday homegrown herb that is used by people of all ages. Because of its many natural qualities, It also known as "Acacia Concinna," has been used as a hair care ingredient for a long time to clean people's hair.



Fig. 5

1.5. TEA POWDER: Tea has long been employed as a hair colorant in Ayurvedic medicine and traditional Chinese medicine due to its high content of phytoestrogens, copper, selenium, polyphenols, and melatonin.



It is well known that the tannins in tea intensify the color of hair.

Fig. 6

1.6. HIBISCUS: It is great for increasing the activity of premature graying of the hair. Calcium, phosphorus, iron, vitamin B1, vitamin C, riboflavin, and niacin are all naturally present in hibiscus, Hibiscus produces flavonoids, including anthocyanins and other phenolic chemicals, which give it antioxidant qualities. It is amazing for the growth and movement of hair. This flower is used to suppress dandruff. By



supplying flavonoids, such as anthocyanins and other phenolic components, hibiscus has cancer-preventive agent qualities.

Fig. 7

1.7. JATAMANSI: Jatamansi roots is applied to the scalp to encourage hair growth. Hair oil extracted from jatamansi decreases bald spots and promotes hair growth. Additionally, the jatamansi hair oils are utilized as a natural dye and give the hair a black hue. In many ancient medical systems, including Ayurveda, Unani, Siddha, and others, jatamansi is a key medication. Because of their medicinal value, the plant's roots and rhizomes have been the subject of chemical research.



Fig. 8

1.8. LAVENDER OIL: Lavender oil has been discovered to invigorate hair development and give a thicker hair than predicted. As per studies, lavender oil is acknowledged to boost conditions like example hair sparseness or alopecia. Because of its antibacterial properties, lavender oil prevents the growth of parasites and germs. When applied to the scalp, lavender oil can aid in the treatment of microbiological illnesses. It may also be used to treat dandruff, a troublesome scalp condition, and other emerging infections.



Fig. 9

1.9. BRAHMI: Regular application of Brahmi strengthens and maintains your hair roots. There are numerous vitamins in this spice that might benefit your hair. Its molecular structure makes it effective in treating temporary baldness. Brahmi's ability to strengthen cells ensures that the scalp stays clean. Including Brahmi in your washing solution will ensure that your scalp is healthy and free of irritations.



Fig.10

1.10. ROSEMARY: Rosemary is a very common and useful open spice. With sparse, needle-like leaves and strong, acrid scent, it has a green look. According to all reports, it is generally helpful in terms of its promises to hair.

Here is a brief summary of Its benefits and uses for hair and Promotes hair growth by stimulating and enhancing circulation to the scalp .



Fig. 11

NEED OF THE STUDY

The creation of herbal hair dye and the assessment of its many criteria, including organoleptic, Physico-chemical, phytoconstituent, rheological, patch, and stability testing for its effectiveness and shelf life, were

the goals of the current study. Commercial hair dyes that use unrefined plant powders must be processed before use, which is difficult for the customer.

MATERIALS AND PROCEDURE:

1. MATERIALS:

S.no	Ingredients	Quantity
1	Heena	26gm
2	Amla	5gm
3	Reetha	2gm
4	Shikakai	2gm
5	Bhrinjraj	2gm
6	Tea powder	2gm
7	Rosemary	2gm
8	Gulvel	2gm
9	Brahmi	2gm
10	Jatamansi	2gm
11	Lavender oil	5drops
12	Peppermint	1gm
13	Hibiscus powder	2gm
14	Indigo powder	2gm

Table 1: The composition of formulation is reflected in the following table.

A darker black natural hair dye without any dangerous chemicals is achieved by preparing a herbal hair dye mixture. Henna is the primary ingredient that gives hair its orange hue. In order to protect the hair and get a darker hue, many other natural components were combined. Additionally, the composition stops premature graying, hair loss, dandruff, and other hair problems. In addition to encouraging hair growth, the formulation helps to keep the environment conducive to hair growth. Henna (50%), Indigo (30%), Tea (4%), and Amla (4%), which also encourages hair development, were the four primary coloring ingredients. To give hair a natural color, Shikakai(2%), Reetha(2%), Brahmi (2%), RedSandalwood(2%), Hibiscus(2%), and Bhringraj(2%) were combined.

2. PROCEDURE:

We have chosen a variety of herbal components, including henna, Reetha, Amal, Shikakai, Bhringraj, Tea powder, lavender oil, rosemary, Gulvel, indigo powder, Brahmi, Jatamansi, pepper mint, and hibiscus powder, among others, to make the herbal hair dye. 1. All of the ingredients were gathered in powdered form from the local market's approved retailers.

2. Every ingredient was weighed before being run through Sieve No. 24.

3. Next, a homogenous combination of a powdered pigment was created by evenly mixing all the elements.

4. After being weighed, the uniform mixture was placed in a plastic bag.

2.1 Using Hair Dye

The powdered pack should be applied once a week to damp hair to create a paste with the right consistency. Using a brush, evenly apply the pack to the hair, covering the roots to the tip, covering the scalp, and leave it on for two to three hours to completely dry before washing it off with plain water.

3. METHODS:

3.1 ASSESSMENTS PARAMETERS:

The organoleptic, physico-chemical, phytoconstituent, and rheological characteristics of the manufactured herbal hair dye were among the many factors that were assessed.

3.1.1 Organoleptic Assessments: Organoleptic properties for several sensory attributes, such as color, taste, odor, etc., were meticulously recorded as shown in Table 2. Organoleptic and morphological characteristics, such as color, texture, odor, and appearance, were used to independently examine the raw medications and powders.

S.no	Parameters	Result
1	Colour	Greenish brown
2	Odour	Characteristic
3	Texture	Fine
4	Appearance	Powder

Table 2. Organoleptic Evaluation of the Herbal Hair Dye

3.1.2 Physio-Chemical Assessments: In order to assess the herbal hair dye's durability, compatibility, and amount of inorganic matter, its physical and chemical characteristics were examined in order to calculate its pH, moisture content, and ash value. The findings above are shown in Table 3.

S.no	Parameters	Result
1	Ph	6.7
2	L.O.D	1.9%
3	Ash value	0.19%

Table 3. Physio-chemical evaluation of the Herbal Hair Dye

3.1.3 Stability Test: To confirm the stability of the developed formulation, it was stored at different temperatures for a month. As indicated in Table 6, the formulations of packed glass vials were tested for physical attributes such as color, pH, texture, odor, and smoothness while being kept at temperature at 35°C.

S.no	Parameters	Room Temperature	35 ⁰ C
1.	Colour	No Change	No Change
2.	Odor	No Change	No Change
3.	pH	6.5	6.7
4.	Texture	Fine	Fine
5.	Smooth	Smooth	Smooth

Table 4. Stability testing of the Herbal Hair Dye

RESULT AND DISCUSSION

Ten grams of powder (Henna, Indigo, were combined to create a slurry, which was then used to create four distinct mixes. For 24 hours, keep that slurry. Next, apply paste to a blond hair. After an hour, wash it. Indigo is blue- black in color, whereas henna is reddish-orange in appearance. All of the healthy natural ingredients that go into making the herbal hair dye are there.

In addition to being a hair dye, this composition's perfect herbal blend also makes it a conditioner, anti-dandruff agent, and hair growth stimulant. A patch test demonstrated that the hair dye kit was inactive. It is stable between 20 and 35 degrees Celsius and easy to keep. The observed hair color darkens after washing when 50% henna is combined with 30% Indigo, 4% Amla, 4% Coffee, 2% Shikakai, 2% Reetha, 2% Brahmi, 2% Red sandalwood, 2% Hibiscus, and 2% Bhringraj. It is a composition manufactured from natural herbs, therefore it does not have the negative effects of chemical colors based on ammonia. On the other hand, thick, silky, and gorgeously colored hair is the result of regular use.

CONCLUSION

A herbal hair pack is the most gentle way to color hair. The harmless nature of cosmetics made from herbs is one of their benefits. It nourishes the hair and scalp's skin. The skin receives essential nutrients from this hair mixture. By eliminating extra oil from the scalp, it aids in the treatment of dandruff. Regular usage of this pack results in color hair that is manageable and frizz-free. Stress, aging, pollution, and severe weather all negatively impact hair quality. We discovered strong qualities of the home-grown hair pack throughout this investigation, and more research is necessary to find out more beneficial benefits of this natural hair pack. Nowadays, most people accept natural remedies with open arms because they are safer and have less side effects than synthetic alternative products. To cater to the tastes of the emerging scene market, homegrown ideas are very popular. The search for a natural hair pack that contains healthy plant powders that are amazing for hair care is an obvious endeavor.

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