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FORMULATION AND EVALUATION OF HERBAL HAIR DYE

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Abstract:

Due to the numerous benefits that these herbal-based hair dyes offer over chemical-based ones, they are becoming increasingly popular. We have made an effort to prepare and standardize this preparation in order to guarantee both its stability and quality. Goal 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. Materials and Procedures All natural materials were used in the in-house preparation of the herbal dye, which followed the suggested composition. The dye's stability, physico-chemical, and organoleptic properties were assessed. Findings It was discovered that the parameters were adequate and similar for assessing herbal dye. The results of many analyses supported the use of the hair dye. In conclusion Hair dye made from herbs has been made and assessed based on a number of criteria. Regardless of any negative consequences, it provides a natural substitute that can be used. When creating the pharmacopoeial standards, the findings can be taken into consideration.

KEYWORDS: natural herbal, hair dye, gray hair, herbal, dye, and organoleptic

INTRODUCTIONS:

There are two ways to change the color of one's hair coloring and dying. Recoloring grey and white hair or restoring the natural color of hair that has been affected by sun exposure or makeup is the primary driving force behind this. The advantages of natural chemicals are all present in herbal dyes. Natural and herbal substitutes for synthetic cosmetics have gained popularity in recent years, especially in the hair care industry. Chemical dyes that provide quick and durable color have essentially supplanted the traditional art of hair coloring, which was formerly mostly accomplished using plant-based solutions. With components derived from plants, herbal hair dyes offer a safer and more environmentally responsible option that offers color, nourishment, and conditioning advantages without the harsh side effects of synthetic alternatives. Many cultures have long employed common herbs like shikakai, amla, bhringraj, and indigo to naturally strengthen and color hair. The purpose of this research is to create a herbal hair dye recipe with natural substances that are

well-known for their coloring and hair-nourishing qualities. The formulation will then be assessed for safety, stability, efficacy, and physical characteristics. This strategy fits with the growing consumer desire for sustainable and eco-friendly personal care products in addition to promoting the revival of traditional herbal knowledge. Plant-based medications are widely accessible, less costly, safe, effective, and rarely cause adverse effects. The usage of natural dyes in the current eco-conservation era. One important characteristic that is crucial to one's sense of self is one's hair. It occasionally conveys a person's personality as well. Cosmetics such as hair conditioning, hair straightening, hair waving, and hair coloring can be used to produce and alter hairstyles. About 50% of adults over 50 experience hair graying, which is a normal aspect of aging.

WHAT IS DYE

A dye is natural or synthetic substance used to add a colour to or change the colour of something. ‘blond hair dye’.

DEFINATION OF DYE

Natural dyes are dyes or colorants derived from plants, invertebrates, or minerals. The majority of natural dyes and from plant sources -roots, leaves etc.

Advantages of Herbal Hair Dye

Colour your hair who no chemical and more natural ingredients.

- Deeply conditions Natural hair colour covers the gray hair with no side effects.
- and nourishes hair strands from the core.
- Cure the existing hair problems.
- Natural appearance because of use of real human hair fibers.
- May be styled as natural hair.
- Less susceptible to heat damage.
- Able to colour and perm.
- Moves like natural hair.

Disadvantages of Herbal Hair Dye

- More expensive.
- Needs more maintenance and care.
- Requires styling.
- More susceptible to sunlight fading and environment damage.
- May be heavier in weight than synthetic wigs, which may lead to itching.

Side Effects of Hair Dye

- Asthma.
- Hair fall.
- Allergic reaction.
- If you are not cautious enough,hair dyeing can have a negative impact on your eye too.
- Skin redness.
- Skin itching.

- Rashes.
- Ears and scalp and face problems.

Aim*:*

To develop and evaluate a safe, effective, and stable herbal hair dye using

natural ingredients, providing a sustainable and healthier alternative to conventional hair dyes.

Objectives of the herbal dye*:*

- To bring more natural dye extraction process together on singl paper
- To show the fastness properties of many types of natural dye.
- To show different method of extraction suitable for different sources.
- The evaluation of its various parameters as organoleptic physico-chemical, phytoconstituents, rheological aspects, patch test and stability testing for its efficacy and shelf life.

Materials & Methods:

Using only natural components and the suggested compost, the herbal dye was made in-house. The dye's stability, physic, chemical, and organoleptic properties were assessed. The local herbal market in Lahore, known as the Shah Alam Market, is where the plant materials used in this study program were gathered. Curry leaves, henna, amla, bhringraj, beetroot juice, lemon juice, and honey. were gathered and allowed to dry for ten days in the shade. After being powdered, the shade-dried plant components were once more allowed to dry for five days. For additional processing, the dry powdered components have been kept in a desiccator.

METHADOLOGY :

Herb selection: fresh henna leaves were gathered, dried completely, and their other surfaces were gathered. and leaves of curry leaves (Murraya koenigii), henna (Lawsonia innermis), bhringraj (Eclipta prostrata), amla
(Phyllanthus emblica), and beer root juice were gathered. The entire herd was then dried under bshadevvan and ground into powder, with all of the powdered components going through a sieve (No. 80).All of the aforementioned materials were examined for identity and physiology, and the results were reported. gathering of plant components from a garden dedicated to therapeutic plants. Using physical and chemical methods, raw materials' quality and purity are assessed. Every component was ground into a powder and weighed in accordance with the recipe. made a natural hair coloring. Additionally, human white hair was gathered from
people. The hair was left in the aforesaid paste for 30 minutes, 1 hour, and 2 hours to imbibe the dye pastes that had been prepared.After that, it was rinsed with water and tested for safe dying parameters (black color) across all formulations.

2. ROLE OF INGREDIENTS USED IN THE FORMULATION:

2.1. *Henna*

Lawsone, a reddish-orange substance found in dried plant leaves at a concentration of 1.5% w/w, is its main coloring element. At a maximum dosage of 1.5% in the hair dying product, Lawsone functions as a non-oxidizing hair coloring ingredient. Gallic acid and flavonoids, among other henna ingredients, function as organic mordants during the coloring process. The henna paste's appropriate consistency for adhesion to the hair is provided by carbohydrates. Although natural henna is mostly hypoallergenic, mixed varieties, notably black henna, have been known to cause allergic reactions. Chemical substances include para-phenylenediamine, 2-nitro-4-phenylenediamine, 4-aminophenol, and 3-aminophenol are responsible for this. Additionally, henna has antifungal properties against the dandruff-causing Malassezia species.

USES OF HENNA :

- ❖ Henna improves hair growth.
- ❖ It reduces the hair fall.
- ❖ Henna is a natural hair dye, henna controls scalp itchiness.
- ❖ Dandruff, when applied to the scalp

SIDE EFFECTS:

- ❖ Henna seems to be safe for most adult when used on the skin or hai
- ❖ It can cause some side effects such as inflammation of skin including redness itching burning sweeling broken skin ect.
- ❖ Henna is unsafe of children especially infants.

2.1. AMLA

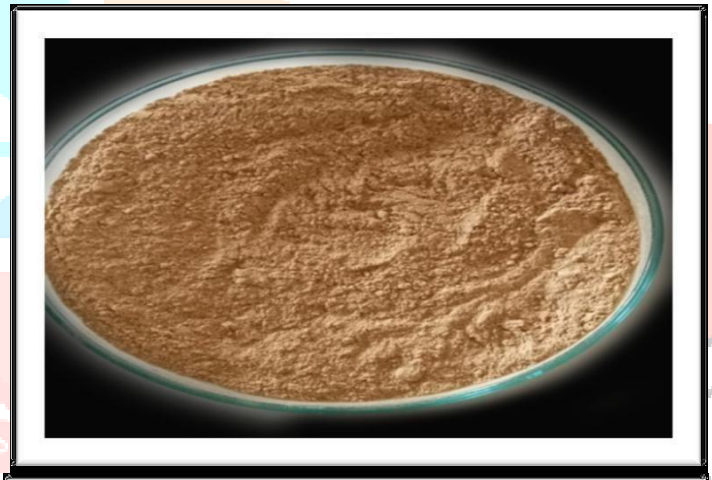
Amla-derived berries improve calcium absorption, promoting stronger bones, teeth, nails, and hair. It fortifies the hair follicles, keeps the hair color vibrant, and delays the onset of graying. Among the plants, amla contains the highest concentration of vitamin C and tannins.The active component of the hair care products is whole fruit. The fruit's vitamin C binds with tannins to prevent it from being destroyed by light or heat. Tannins, minerals like calcium, phosphorus, iron, and amino acids are also abundant in this fruit. The fruit extract promotes hair growth.
lessen the loss of hair. Amla's antimicrobial and antioxidant qualities can support the development of robust and glossy.

USES OF AMLA

- ❖ Strengthen the scalp and hair.
- ❖ Reduce premature pigment loss from hair, or greying,
- ❖ Stimulate hair growth.
- ❖ Prevent or treat dandruff and dry scalp.

SIDE EFFECTS

- ❖ If you have a dry scalp or skin, eating too much amla can aggravate the problem.



TEA

Rich in phytoestrogens, copper, selenium, polyphenols, and melatonin, tea has long been utilized as a hair colorant in ayurveda and traditional Chinese medicine. Herbal teas can also be used into other recipes and mixtures to make hair products that are manufactured at home and have many health advantages for your hair. For instance, a beverage like reishi tea could be used as the base for a hair growth mask.

USES OF TEA

❑ Nutrients that can help make damaged hair soft and shiny again.

 It prevents split ends.
 Tea can stop hair loss. It is the use of tea it keeps soft and shiny.
 Tea is packed good for you.
 It help in hair growth.
 Applying black tea to your hair and scalp is considered safe.
 The caffeine in black tea may dry your hair shaft, potentially resulting in a dry, damaged appearance.

SIDE EFFECTS

❑ It may leads to the dryness if used too frequently. Irregular sleep.
 Reduced iron absorption.

 Increased anxiety, stress, and restlessness. Tea leaves naturally contain caffeine.
 Tea is a source of a class of compounds called tannins.

. Lemon juice

Citrus fruits like lemons are known to be high in minerals, vitamins C, and antioxidants. It offers the skin and body several worthwhile advantages. It should come as no surprise that lemon is also beneficial for hair. millennia, and it's renowned for producing highlights that are naturally sun-kissed. Hair is permanently stripped of its pigment by the acidity of
lemons, and the lightening effect that always results from sun exposure is intensified when paired with UV rays. The bleaching process is accelerated with citric acid, which breaks down the pigment in hair to reveal the lighter hues underlying. The lemon-juice approach works best when you spray it on your hair in large quantities, use a comb to
distribute it evenly, and then let it in the sun for at least an hour. One of the oldest tricks in the book will probably take a few sessions to see the desired results. Lemon juice has been used to lighten hair, but be aware that the more you expose your hair to citric acid, the more you're causing it to deteriorate and break down the cuticle, which will make your hair feel dry and brittle.

USES OF LEMON

- ❖ Remove scalp build up.
- ❖ Reduce the your body weight.
- ❖ Eliminate bad cholesterol.
- ❖ Boosts immune system.
- ❖ Suppresses appetite.

- The lemon citric acid in lemon can even address the root of your hair problems.
- Reduce the dandruff of our hair.

SIDE EFFECTS

- Lemon contain citric acid, which might make your hair more sun sensitive.
- Overuse of lemon on hair can cause irritation and itchiness on scalp due to its acidic nature.
- Many individuals use lemon right into their scalp to get rid of dandruff.
- Lemon might dry up your hair terribly.
- Hair will loss its original colour
- The protein layer from the hair base breaks and weakens the strands.
- The reaction disrupts the hair development process directly. The hair might lose its shine.

BEET JUICE

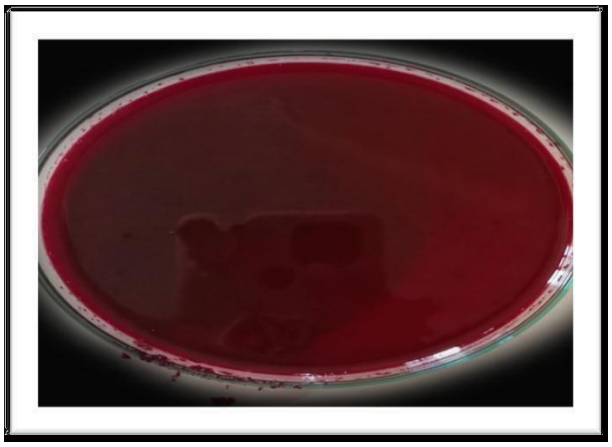
Beet root juice has a lot of nutrients for skin and hair. include scalp nutrition. Vitamins A, C, E, and electrolytes are abundant in beet root juice. which remove dryness and maintain the hair hydrated at all times. It should come as no surprise that beet juice is a fantastic choice for red hair coloring, since everyone who has ever sliced, boiled, or juiced beets knows how easily their deep red color stains. Its abundant natural pigments allow it to safely and quickly temporarily color hair, especially light hair, bright red. Simply combine beet juice with a carrier oil, such as coconut or olive oil, and apply the mixture to your entire head of hair before wrapping it Apply the juice all over your hair, cover it with plastic wrap, and let it sit for at least 30 minutes before rinsing it out. You may also use a carrier oil, such as coconut or olive oil.

USES OF BEET ROOT JUICE

- Beet root juice is a powerful source of nitrates.
- Nitrates dilate the blood vessels, lowering blood pressure.
- This is beneficial to the heart
- Promotes hair growth.
- Prevents hair loss.

SIDE EFFECTS

- Many cause kidney stone risk.
- May cause a stomach upset.
- May cause anaphylaxis.
- Might harm the liver.



HONEY

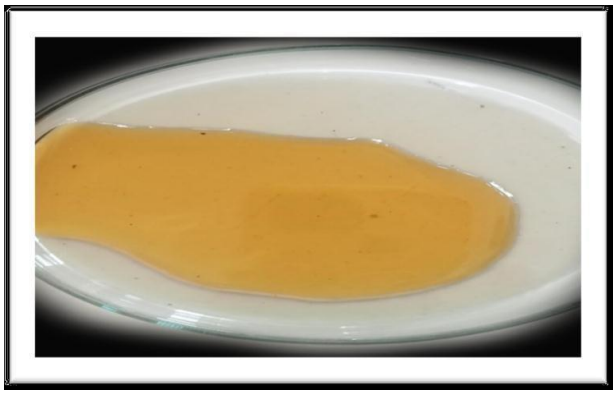
Honey is an excellent hair moisturizer since it possesses both emollient and humectant qualities. Emollients give dull hair a glossy finish by smoothing the hair follicles. By forming a link with water molecules, humectants give dry standards moisture. Honey can help bring back your hair's natural luster by hydrating and retaining shine. Honey can offer the same skin-regenerating qualities to the scalp's skin when it is applied to the hair and scalp. All things considered, it gives the hair and scalp a lot of hydration. It conditions the hair and scalp and acts as an emollient. Because honey contains humectant properties, once it has hydrated the hair and scalp, it also retains the moisture.

USES OF HONEY

- Honey has both emollient and humectant properties, making it a great hair moisturizer.
- Emollients smooth the hair follicles, adding shine to dull hair.
- Honey can help restore the natural luster of your hair.
- Moisturizes dry hair and scalp.
- Reduces hair breakage
- Restores shine.
- Softens of hair.

SIDE EFFECTS OF HONEY

- It can be lighten your hair colour but cannot turn it grey.
- Irregular heart rhythms.
- Excessive perspiration.



CURRY LEAVES

The curry leaves, also known as bergera koenigii or murraya koenigii, belong to the subtopical tree. Rutaceae family. Curry leaves' abundance of nutrients is said to help stop hair loss and thinning. Additionally, the leaves might aid in the removal of dead hair follicles, which can impede the creation of new hair. Kadi patta is a common name for curry leaves. Easily accessible in most Indian households, it is one of the most widely used household ingredients. It is merely an additional spice that gives dals, chutneys, soups, and stews their flavor.

However, they are much more than just a way to add flavor to your food.

USES OF CURRY LEAVES

- Curry leaves are rich in antioxidants, vitamins C, and iron.
- It can strengthen the hair roots and prevent hair leaves.
- Control the hair loss.
- Repair the frizzy damaged hair.
- Curry leaves can be used for treating upset stomach.
- Rich in folic acid
- Good for skin and hair.

SIDE EFFECTS

- They are natural and leaves no side effects.
- They use them to get a characteristic aroma in the cuisines.

Ingredient:

Sr.No.	Ingredient	Quantity
1	Henna	50gm
2	Amla	30gm
3	Fenugreek	20gm
4	Beet root juice	20gm
5	Lemon juice	20gm
6	Honey	20gm
7	Curry leaves	20gm
8	Tea	20gm

Table 1: Ingredients of the prepared herbal hair dye.

Table 2: Formulation

Sr.No	Henna	Amla	Tea	Lemon Juice	Beet Root Juice	Honey	Curry Leaves	Fenugreek	Total
1	50g	25g	10g	2.5g	10g	2.5g	25g	25.g	150g

Application of Hair Dye

The powdered pack should be applied to wet hair once a week to create a paste with the ideal consistency. Using a brush, evenly distribute it throughout the hair, from the roots to the tip. You should cover the scalp. For the scalp to
completely dry, it should be left on for two to three hours. After that, you should wash it off with ordinary water.

3.1. Evaluation of the Herbal Hair Dye

The prepared herbal hair dye was evaluated for its various parameters, such as organoleptic, physico-chemical, phytoconstituents and the rheological aspects.

3.1.1. *Organoleptic Evaluation*

Organoleptic characteristics for various sensory characters like color, taste, odour *etc*. was carefully noted dow. As illustrated in The raw drugs and powders were separately studied by organoleptic and morphological characters like colour, odour, texture and appearance.

Sr.No	**Parameter**
1	Color of Formulation
2	Odour of Formulation
3	Texture
4	Appearence

Organoleptic evaluation of herbal dye.

3.2 Physico-Chemical Evaluation

The physical and chemical features of the herbal hair dye were evaluated to determine the pH, its moisture content for the purpose of stability, compatibility and the amount of inorganic matter present in it. reflects the above findings.

Sr.No	Parameter
1	pH
2	L.O.D
3	Moisture content

Physico-chemical evaluation of herbal dye

Phytochemical Evaluation

Prepared herbal hair dye was subjected to Phytochemical screening to reveal the presence or absence of various phytoconstituents as Carbohydrates, Lipids, Alkaloids, Sugars *etc*. The results of phytochemical screening are highlighted .

Sr.No.	Parameter
1	Molisch Test
2	Volatile oil Test
3	Foam Test
4	Felhing Test

Phytochemical evaluation of herbal dye.

a. *Molisch's test*

- Take 1 gm of sample in dry test tube
- Take 2 ml of distilled water in a sample
- Add 2 to 3 drops of Molisch's reagent to solution
- Observe colour change at junction of two layers

b. *Volatile oil test:*

- Sample + alcoholic solution of Sudan III
- Observe the colour

c. *Felhing test :*

1. Take 1ml of sample in dry test tube
2) Add 1ml of distilled water in another tube as control
3) Add 1ml of felhing reagent (A+B) to all the tube
4. Keep in boing Water bath
5)look For the development of Red.

d. *Foam Test :*

1gm of Sample + 4ml water (vigorously Shaken)

e. *Hager test :*

sample + Hager reagent (Saturated solution of picric acid)

3.3 Patch Test

This usually involves dabbing a small amount of the aqueous solution of hair dye behind the ear or on inner elbow in an area of 1sq.cm and leaving it to dry. Signs of irritation or feeing of non wellness is noted, if any.Measured and small quantities of prepared hair pack were applied to the specified area for a fixed time. Irritancy, redness, and swelling were checked and noticed for regular intervals up to 24 hours if any. The results of tests for the signs of irritation are displayed in Table.

Sr .No	Parameter
1	Irritation
2	Swelling
3	Redness

Patch test.

3.5. Stability Test

Stability testing of the prepared formulation was performed by storing it atdifferent temperature conditions for the time period of one month. The packed glass *via*ls of formulation were stored at different temperature conditions *viz*., room temperature and 35°C and were evaluated for the physical parameters like colour, odour, pH, texture, and smoothness as highlighted in Table.

Sr.No	Parameter
1	colour
2	Odour
3	pH
4	Texture
5	Smoothness

Stability test.

RESULT AND DISCUSSIONS :

All the benefits of natural substances are present in the produced herbal hair coloring. Because of the ideal combination of herbal ingredients, this formulation not only works as a hair dye but also as a conditioner, hair nourisher, anti-dandruff agent, and growth promoter. Because of its ability to color hair, henna, which serves as the basic powder, is utilized all over the world. In addition to conditioning the hair, it helps remove extra oil from the scalp. By supplying additional nutrients to promote hair growth, Bhringraj helps to improve blood flow at the hair's root. This is a tried-and-true method for anyone who has been having trouble getting healthy hair free of gray hair. Additionally, it includes necessary fatty acids that give hair follicles strength, brightness, and vitality. Amla's adequate vitamin C content aids in preventing premature graying. It works well as a hair conditioner and dandruff remover.
When combined with other herbs, tea gives hair the ideal color. It helps prevent dandruff and promotes healthy hair development. Tea for hair strengthens hair by enhancing its general texture and quality.

Table 1: Organoleptic Evaluation.

Formulation code	Colour Result	Odour	Texture	Appearance
F1	Greenish Brown	Characteristic	Fine	Powder

Table 2: Physico-chemical evaluation of herbal dye.

Formulation Code	PARMETER		
	PH	**L.O.D**	**ASH VALUE**
F1	6.5	1.4%	0.16

Table 3: Phytochemical evaluation of herbal dye.

Formulation code	Foam test	Molisch test	Fehling test	Hager test	Volatile oil
F1	Present	Present	Absent	Present	Absent

Table 4: Patch Test.

Formulation code	Swelliing	Redness	Irritation
F1	Negative	Negative	Negative

Table 5: Stability test.

Formulation Code	Colour	Odour	Ph	Texture	Smoothness
F1	No Change	No Change	6.5	Fine	Smooth

CONCLUSION :

The dye formulation is good in terms of color, odor, and texture, according to the results. The formulation exhibited the necessary pH and Lod values, and the herbal dye produced positive results after a prolonged application. Every formulation undergoes phytochemical assessment. The formulas produced the best results in the rheological examination. According to the patch testing, there is no irritation, redness, or swelling of the scalp. Therefore, there is no change in the stability test.

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