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PREPARATION AND EVALUATION OF HAIR DYE

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ABSTRACT

The herbal dye was formulated by using whole plant of aloe vera, leaves of henna, seeds of guava, flowers of nilika, amla, bhringraj,fenugreek, black catechu and reetha. The Ayurvedic cosmetics are very helpful and it is less prone any side effects. Ayurvedic cosmetics are also known as herbal cosmetics.All herbal ingredients are easily available in market ..This herbal hair dye not only colours the hair, prevents the hair fall but also prevents excess sebum secretion results in preventing scalp itchiness and hair damage due to any condition or problem occurred in hairs.

This hair dye is helpful in hair damage,hair fall,scalp problems and maintains integrity of hairs.The ingredient used in this hair dye guava stimulates the proper blood flow to scalp and the follicles and boosts melanin production.the nilika gives hair a glossy,black colour,can be mixed with plant leaves.Amla or indian gooseberry strengthens the hair roots and promotes hair growth.

The fenugreek treats a variety of scalp issues like dryness of hair,baldness and hair thinning.Katha powder has historically been used in hair care remedies to enhance the volume,shine,and color of the hair.Reetha is used due to its unique effects on scalp.With the help above ingredients i have prepared a homogeneous mixture of herbal hair dye in powdered form.To know the different parameters regarding this prepared dye i have perform some evaluation parameters
i.e.Organoleptic,physico-chemical,phytochemical.rheological evaluation. To know the any problem regarding swelling, redness and irritation because of applied hair dye patch test is performed,also irritancy , redness and swelling were checked for regular intervals upto 24 hr.
stability testing of prepared formulation was performed by storing it at different temperature condition for the time period of 1 week to know the the parameters like colour, odour, texture,p.H and smoothness of hair dye.

Introduction

As compared to the chemical based hair dyes, which cause skin and other skin related diseases, natural herbal dyes are being preferred nowadays. Today most of the human beings are very careful about their beauty and hairs play an important role in this. Herbal drugs without any adverse effects are used for healthy hair. Nearly 70% of human beings above 50 years struggle with the problem of balding and graying of hair. In few cases, these symptoms of ageing occur earlier. Graying starts on the skin of head at about 40 years, starting initially from the temples, followed by beard, moustache and finally up to the chest. The age at which graying starts is deeply influenced by heredity. But premature depigmentation in adults is mainly due to variety of other factors, as illness, some specific drugs, shock etc.. People have been using natural dyes since ancient times for the purpose of dyeing carpets, rugs and clothings by the use of roots, stems, barks, leaves, berries and flowers of various dye yielding plants. The need of herbal based natural medicines is increasing faster due to their natural goodness and lack of side effects. Amla, Bhringraj, Henna,Black catechu,Guava,

Nilika,Reetha,and Methi seeds are well - known ayurvedic herbal drugs traditionally used as hair colorant and for hair growth . Many different extracts from plant were used for the purpose of hair dyeing in Europe and Asia before the invention of modern dyes. Indigo, known as initial fabric dye, could be mixed with henna to make different light brown to black shades of hair dye . Use of these chemicals can result in unpleasant side effects, such as skin irritation, allergy, hair breakage, skin discoloration, unexpected hair color etc.. Continuous application of such compounds on natural hair causes multiple side effects such as skin irritation, allergy, hair fall, dry scalp, erythema and also skin cancer. In
India, henna has been used traditionally for colouring palms and hairs.
Henna has been used traditionally for colouring women's bodies during marriage and other social celebrations since the times of Bronze Age. It is a part of Islamic and Hindu cultures as a hair coloring and dyeing agent for the purpose of decorating the nails or for the formation of temporary skin tattoos . Drugs from the plant sources are easily available, are less expensive, safe, and efficient and rarely have side effects. In the present era of eco-conservation, the use of natural dyes has been revived and reviewed for the coloration of textiles and food materials
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ROLE OF INGREDIENTS

1] Aloe Vera –

Aloe Vera cleanses the hair shaft efficiently, stripping off extra sebum Trusted Source (oil) and residue from other hair products But aloe Vera doesn't hurt your hair strands while it cleans. Unlike other chemicals in hair products, aloe Vera is gentle and preserves the integrity of your hair. Using aloe Vera is a great way to get hair that looks healthier, shinier, and softer.

Aloe Vera contains vitamins A, C, and E. All three of these vitamins contribute to cell turnover, promoting healthy cell growth and shiny hair.

2] **Henna powder-**

It is originally grown in Asia and the Mediterranean region, but today, it can also be found in the tropical and semi-arid regions around the world. It requires temperatures of 35 to 45 degrees Celsius and grows on deep, sandy soil to ensure optimal production of pigment on the leaves. These leaves are dried and crushed to make a fine powder that provides the red-Ish brown dye. This powder is mixed with other natural ingredients like black tea to color the hair.

Black henna is derived from Indigo and can contain unlisted dyes and chemicals such as PPD (para-phenylenediamine). PPD stains skin black quickly but can cause severe allergic reactions and permanent scarring if left on for more than 2–3 days. If you don't like the red tint that comes with using henna and want to dye your hair black, we recommend that you use only pure indigo powder. You can dye your hair black naturally by using Indigo Powder and Henna Powder.

3]**Guava** -

Guava has a number of essential nutrients that are helpful in stimulating proper blood flow to scalp and the follicles and boosts melanin production, a pigment that gives the hair natural color. Though the natural color of the hair depends upon the genes which you received from the parents, premature graying caused by factors can be treated by using guava leaves, making them for hair graying the perfect solution.

4] **NIlika-**

Dye is obtained from the processing of the plant leaves. Nilika givers hair a glossy, black colour, can be mixed with henna and other natural ingredients to create various shades of browns for then hair.
All Nilika are natural. Nilika softens and conditions hair.

4]Amla and bhringraj - .

Amla or Indian Gooseberry strengthens the hair roots and promotes hair growth. Amla is abundant in Vitamin C, which is an essential nutrient for the synthesis of collagen. Collagen in hair helps in strengthens and helps in growing faster.

You can use Bringadi Intensive Hair Treatment to get combined benefits of Bhringraj and Amla for hair growth. Alternatively, you can add Amla powder to Bhringraj oil and warm them together before applying to scalp and hair.

Bhringraj (also known as Mahabhringraj hair oil) oil is an oil derived from the leaves of the Bhringraj plant that is cultivated in the humid tropical regions across the world. The oil has special significance in Ayurveda and medical science.

Enriched with the goodness of nature, Bhringraj oil is rich in nutrients such as Iron, Vitamin E, magnesium, polypeptides, steroids calcium, vitamin D.

The oil is also rich in proteins that make it even more beneficial for hair.

Fenugreek:-

Fenugreek seeds have high protein and nicotinic acid content, which are known to be beneficial against hair fall and dandruff, and in treating a variety of scalp issues like dryness of hair, baldness and hair thinning. ... The seeds also help in moisturizing the hair and bringing back the luster and bounce.

fenugreek seeds have high levels of potassium that helps prevent premature graying of hair. You can include fenugreek seeds in your diet or simply apply a methi seed mask by blending overnight soaked seeds with coconut milk to retain natural color of your hair.

Brown catechu:-

Katha Powder has historically been used in hair care remedies to enhance the volume, shine, and color of the hair. Unlike other hair conditioners, this product leaves a lasting impression. Regular use of Katha Powder conditioner will add volume and strength to your hair.

Reetha :-

- Reetha is majorly used in the preparation of hair supplements due to its unique effects on the scalp.
- Reetha infusion is used in ayurvedic hair care products. It acts as a natural ingredient-based alternative to chemically driven cleansing agents, which irritates the scalp.
- The dried powder prepared using the fruit of Reetha is an essential component in preparing shampoos, hair care products, and cleaning agents due to its potent antiseptic and antimicrobial properties.
- Saponin is a natural surfactant present in a rich amount of Reetha fruit, and this component acts as a perfect foaming agent that helps clean dust, dirt, and oil present in the hair.
- The vitamins present in Saponin improve the hair's lust and reduce scalp dryness, which helps make the hair look voluminous and silky.
- Reetha extracts also help in strengthening the hair roots.

Method of preparation: -

For the preparation of herbal hair dye, we have selected nine important ingredients such as Henna, Reetha,, Amla,, Bhringraj,black catechu, nilika Fenugreek, guava and. Henna leaves , reetha ,nilika and bhringraj were collected from the herbal garden of PSIT. They were authenticated for their quality in the Pharmacognosy lab of the Institute. Reetha, amla, bhringraj and all in the powdered forms were procured from the authorized stores of the local market in the powdered form. Henna leaves and the fenugreek seeds were shade dried and coarsely powdered. Then all the ingredients were mixed uniformly to prepare a homogenous formulation. The composition of the formulation is reflected in the Table After the preparation of homogeneous mixture i put that mixture on gas flame for dry heat to make mixture uniform and effective

Sr,No	Ingredients	Quantity
1	Aloe vera	25gm
2	Henna powder	50gm
3	Guava	10gm
4	Nilika	10gm
5	Amla	30gm
6	Bhringraj	10gm
7	Fenugreek	10gm
8	Brown catechu	10gm
9	Reetha	10gm

Aloe vera

Amla

Reetha

Henna

Herbal hair dye

Brown catechu

Nilika

Guava

Fenugreek

Bhringraj

Plants used in preparation of herbal hair dye

Common name ,biological source and family	Part used	Uses	Figure
Aloe Vera Aloe indica Royle family-Asphodelaceae,	Whole plant	Moisturizer, softening of hairs	
Amla amalaki family-Phyllanthaceae	Fruit	Antioxidant, treat the scalp ailments, hair growth	
Henna mehandi family-Lythraceae	Leaves	As hair dye	
Nilika Nyctanthes arbor-tristis “night-flowering	Flower	softens and conditions hair.	
from the Apocynaceae			

Bhringraj Eclipta prostrata family -Asteraceae	Whole plant	Promoting hair growth, hair nourishment, anti dandruff	
Fenugreek Trigonella foenum-graecum	Seeds	Help in moisturizing the hair and bringing back the luster and bounce.	
Family- Fabaceae			
Guava -Psidium Guajava Myrtaceae	Seeds	stimulating proper blood flow to scalp and the follicles	
Brown catechu Senegalia catechu Fabaceae	Fruit	Enhance the volume, shine, and color of the hair.	
Reetha Indian soapberry, washnut,	Fruit	used in ayurvedic hair care products	
Sapindaceae			

Application of Hair Dye

The pack, which is in the form of powder, should be used weekly on wet hair, forming a paste of in water with optimum consistency. It should be applied evenly on the hair with the help of a brush, covering the roots to the hair tip. The scalp should be covered. It should be left for 2-3 hours on the scalp for complete drying. Then it should be removed by washing with plain water

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.

Organoleptic Evaluation :-

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

Physico-Chemical Evaluation

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

Sr.No	Parameters	Results
1	Foam test	Present
2	Molisch test	Present
3	Fehling's test	Absent
4	Hager test	Present
5	volatile test	Absent

Sr. no	Parameters	Results
1	Colour	Greenish brown
2	Odour	characteristic
3	texture	fine
4	appearance	powder

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 formulation when dissolved individually in 5 ml of water and filtered; the filtrates were used to test the presence of carbohydrates . The aqueous extract of the formulated herbal face pack was evaluated for the presence or absence of different phytoconstituents as per the standard procedures and norms. The results of phytochemical screening are highlighted in table

Rheological Evaluation

Sr. no	Parameters	Results
1	p.H	6.8
2	L.O.D	1.9%
3	Ash value	0.19

Physical parameters like untapped or bulk density, tapped density, the angle of repose, Hausner's ratio, and carr's index were observed and calculated for the inhouse formulation. Bulk density symbolizes the adjustment of particles or granules collectively in the packed form. The formula for determination of bulk Density (D) is D = M/ V where M is the mass of particles and V the total volume occupied by them. This is determined by taking graduated cylinder. 100 grams of weighed formulation was added to the cylinder with the help of a funnel. The initial volume was noted and the sample was then tapped fully. The bulk density value was obtained from the initial volume and after tapping the volume noticed, from which tapped density was calculated. The angle of repose quantifies the flow properties of powder as it affects cohesion among the different particles. The fixed funnel cone method employs the calculation of Height (H) above the paper that is placed on a flat surface. The pack was carefully poured through the funnel till the formation of the peak. Here, R denotes the radius of the conical heap, tan a = H/R or a = arc tan H/R, where ‘a’ is the angle of repose. Hausner's ratio is linked with the interparticle friction and influences the powder flow properties. The
Hausner's ratio is calculated as D /D' where D' is the tapped density and D, the bulk density. Carr's index helps to measure powder flow from bulk density as shown in Table

Rheological evaluation of herbal dye.

Patch Test

This usually involves dabbing a small amount of the aqueous solution of hair dye behind the ear or

Sr.No	Parameters	Results
1	Bulk density	0.40
2	Tapped density	0.48
3	Angle of repose	1.06
4	Carr's index	34.5
5	Hausner's ratio	1.38

on inner elbow in an area of ısq.cm and leaving it to dry. Signs of irritation or feeling of unwellness 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	Parameters	Room temperature	35C
1	Colour	no change	no change
2	Odour	no change	no change
3	p.H	6.8	6.9
4	Texture	fine	Fine
5	Smoothness	Smooth	Smooth

Patch test :-

Sr.No	Parameter	Results
1	Swelling	Negative
2	Redness	Negative
3	Irritation	Negative

Stability Test :-

Stability testing of the prepared formulation was performed by storing it at different temperature conditions for the time period of one month. The packed glass vials 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