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# Formulation and Evaluation of Herbal Hair Dye

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Abstract: The medicinal plants are considered to be effective and for most important for the human health. Some of the natural medicinal plants are so common that we use them in daily life without Knowing their medicinal important .Custard apple(Annona squamosal) is a great natural source of Copper and gives hair the dark melanin colour and that it lack.Therefore if you are dealing with Too many greys consume custard apple to stop your hair from losing colour further.Hair color Change by dye application is a common procedure among women.Hair dye cosmetic products are Used for colouring hair. Hair dye classified according to color resistance, into classified, according To color, resistant, into temporary, semipermanent, and permanent. In oxidation system, there is An intense diffusion of the molecule into the cortex, what promotes a longer color resistance.Dye And color precursors present difference related to chromophore groups.

Keywords: medicinal plants

### I. INTRODUCTION

Hair colouring or dying, practices of changing of the hair color. The main reason for this are cosmetic to recover white and grey hair, to change the regarded as more fashionable or desirable, or to restore the original color after it has been decoloured by hair dressing or sun bleaching. The prepared herbal dye contain all the goodness of natural ingredients. Apart from acting as a hair dye, this formulation, because of the perfect blend of herbal, also act as a hair growth promoter, hair nourisher. French researchers have found that Egyptians,Greek and Roman were using to dye their hair several thousand years ago.Many different extracts form plant were used for the purpose of hair dyeing in Europe and Asia before the invention of modern dyes.There are three type of hair dye.Thisistemporary,semipermanent,permanent hair color etc. The dyeing of the hair is an ancient art that involves treatment of the hair with various chemicals compound.Hair dye has been used Ancient Egyptian times when Rameses reinforced red hair color usinghenn.In Ancient Greece,the hair was bleached with a rinse of potassium solution and rubbed with a type of ointment made of yellow flower petals and polle.As compered to the chemical based hair dye, which cause skin and other skin related disease, natural herbal dye are being preferred nowadays.Herbal drugs without any adverse effect are used from healthy hair.

The need of herbal based natural medicine is increasing fastly due to their natural goodness and lack of side effects. 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.

In India, henna has been used traditionally for colouring palms and hairs. There are so many herbs like Kikar, Bihi, Bhringraj, Patnag, Akhrot, Narra, Jaborandi, Jatamansi, Amla, Kuth, Giloe, Behera which are used as a major constituents in hair care preparations mainly meant for dyeing hair Henna has been used traditionally for colouring women's bodies during marriage and other social celebrations since the times of Bronze Age.

The need of herbal based natural medicines is increasing fastly due to their natural goodness and lack of side effects. Amla, Bhringraj, Henna, Mandara, Jatamansi, Reetha, Sariva, Curry leaves and Methi seeds are well - known ayurvedic herbal drugs traditionally used as hair colorant and for hair growth [5]. 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,

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could be mixed with henna to make different light brown to black shades of hair dye [6]. Use of these chemicals can result in unpleasant side effects, such as skin irritation, allergy, hair breakage, skin discoloration, unexpected hair color etc. [7 - 9]. Continuous application of such compounds on natural hair causes multiple side effects such as skin irritation, allergy, hair fall, dry scalp, erythrema and also skin cancer [10, 11]. In India, henna has been used traditionally for colouring palms and hairs. Antioxidants protect the dye from oxidizing with air. Most commonly used is sodium sulfite.

This gives a look of thicker, voluminous hair. In this situation it's miles continually an awesome concept to head for semi-everlasting hair color, it provides strength in your hair and makes them look more healthy. Our tresses are uncovered to exclusive environmental factors each day which includes polluted air, dirt, dirt, immoderate heat and temperature modifications among others

### **Aim And Objective**

o AIM: Formulation and evaluation herbal hair dye

### **OBJECTIVES:**

- A list of justifications for hair coloring.
- Describe how the porosity of the hair influences its color.
- Comprehend the many forms of melanin present in hair.
- Describe and distinguish levels as well as their function in creating hair color.
- Recognize colors that are primary, secondary, and tertiary.
- Understand how tone and intensity affect the color of your hair.
- Enumerate and explain the many types of hair color.

#### Literature Review

1) Kumar KS. Begum A, Shashidhar B, et al. Formulation and evaluation of 100% herbal hair dye. International Journal of Advanced Research In Medicinal and Pharmaceutical Science 2016:

The word herbal is a symbol of safety in contrast to the synthetic one which has adverse effects on human health. Herbal preparations viz., herbal tablets, herbal tonics, herbal paste, herbal shampoo, herbal contraceptives and herbal dyes has become popular among the consumer herbal medicines represent the fastest growing segment to heal the various ailments. A dye can generally be described as a colored substance that has an affinity to the fiber, fur or hair. Melanin is what gives color to human skin, eyes, and hair. It's the ratio of two types of melanin Eumelanin and Pheomelanin that determines your natural hair color.

2) Mac Dougall Color in food woodhead publishing Ltd 1st Ed. 2002 2016 :(6) :630-48

literature review in Colour in Food: Improving Quality by Douglas B. MacDougall explores the significance of color in food products, its impact on consumer perception, and the scientific principles behind color measurement and stability. It discusses instrumental techniques for assessing food color, including models of color appearance, color reflectance measurement, and sorting by color

3) Haircare : Include amala, reetha and Shikakai and healthy hair NDTV FOOD. Anusha Singh uptated :May 10,2018 Available from http:// food ndtv. com /beauty /haircare - include

- amala - reetha and - shikakai - for healthy - hair - 1848507

The literature review on haircare ingredients like amla, reetha, and shikakai explores their

traditional and scientific significance in promoting healthy hair. These natural ingredients have been widely used in Ayurvedic and herbal formulations due to their cleansing, conditioning, and strengthening properties

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4) Natural colorants and dye In : Pharmacognosy and pytochemistry 1st Ed. India :Career publication 2004 :1:PP 98-117.

The literature review on natural colorants and dyes in Pharmacognosy and Phytochemistry explores the historical, chemical, and practical applications of plant-based dyes. It discusses increasing preference for natural over synthetic dyes due to concerns about toxicity, environmental impact, and sustainability.

5) Madhusudan RY, Sujatha P. Formulation and evaluation of commonly used natural hair colorants. Nat Prod Rad 2008; 7(1):

the literature review in Formulation and Evaluation of Commonly Used Natural Hair Colorants by Madhusudan RY and Sujatha P explores the traditional and scientific aspects of natural hair dyes. It discusses the increasing preference for plant-based hair colorants over synthetic dyes due to concerns about toxicity, allergic reactions, and environmental impact

6) Haircare: Include amla, reetha and Shikakai for healthy and happy hair. NDTV FOOD. Anusha Singh updated: May 10, 2018 Available from:

https://food.ndtv.com/beauty/haircare-include-amla-reetha-and-shikakai

-for-healthy-andhappy-hair-1848507

the article Haircare: Include Amla, Reetha And Shikakai For Healthy And Happy Hair discusses the benefits of these natural ingredients in maintaining strong, lustrous hair. It highlights how modern shampoos often contain harmful chemicals that can damage hair, whereas amla, reetha, and shikakai offer a safer, herbal alternative.

a. Amla (Indian Gooseberry): Rich in antioxidants, it helps repair damaged hair cells, prevents hair loss, and protects against premature graying.

b. Reetha (Soapnut): Contains iron and antioxidants that cleanse the scalp, remove infections, and promote hair health.

c. Shikakai (Acacia concinna): Acts as a natural conditioner, retaining hair's natural oils, strengthening strands, and enhancing shine.

7) Pawnesh Patni, Archana Gahtori\*, Pankaj Bhandari, Taniya Dimri, Mobeen Ahmad

The plant henna has a natural coloring pigment that is used to dye skin, fingernails,

hair, and textiles like leather, silk, and wool. It may also be utilized for impermanent body art.

An active ingredient in henna plants identified as "lawsone" is an orange-reddish dye that combines to the protein keratin of human skin to color it.

### **Materials And Method**

- a. AMLA (Emblica officinalis)
- b. COFFEE (Coffee arabica Linn.)
- c. HENNA (Lawsonia inermis.)
- d. HIBISCUS (Hibiscus rosa.).
- e. SHIKAKAI (Acacia concina)

### Drug's Profile A.Amla

• Synonyms: Emblica, Indian goose berry, Amla.

• Biological Source-- This consists of dried, as well as fresh fruits of the plant "Emblica officinalis" Family: Euphorbiaceae.

• Geographical source-- It is a small or medium-sized tree found in all deciduous forests of India. It is also found in Srilanka and Myanmar.

• Chemical constituents--• Vitamin C (Ascorbic acid), • Alkaloids (Phyllanthin), • Carbohydrates(Pectin), • Hydrolysable Tannis (Emblicanin A & B).





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• Uses-Condition your scalp



Fig 1-Amla

### **B.Coffee**

- Synonyms: Coffee bean, Coffee seed, Arabica coffee, Abyssinian coffee, Brazilian coffee.
- Biological source : It is the dried ripe seeds of "Coffee arabica Linn.
- Family: Rubiaceae.

• Geographical source- It is indigenous to Ethiopia, Brazil, India, Vietnam, Mexico, Guatemala, Indonesia and Sri Lanka.

- Chemical constituents Caffeine Tannin Fixed oil Proteins Uses -
- Applying coffee topically to hair and the scalp might stop hair loss and promote regrowth.
- Reuse coffee grounds to exfoliate our scalp to unclog hair follicles.
- Create a vintage look on clothes or napkins by using coffee.
- Make coffee oil to lighten and brighten the eye area.



Fig 2. Coffee

C. Henna (Lawsonia inermis.)

• Synonyms: Alcanna spinosa, Casearia multiflora, Lawsonia alba, Lawsonia speciosa, Lawsoniaspinosa, Lawsonia and Rotantha combretoides.

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• Biological source The plant "Lawsonia inermis", well known for its cosmetic and therapeutic virtues. Henna leaves are natural sources of colour for hand, feet, fingers, nail and hair.

- Family: Lythraceae
- Geographical sources: The henna plant is native to Northern Africa and it is also found in Western and Southern Asia.
- Chemical constituents Lawsone (2-hydroxy 1,4-naphthoquinone) Sugars (glycosides) Tannins (gallic acids).
- Uses
- Henna is best to colour hair and has no chemicals, toxins and ammonia.

It is also used for protecting hair from sun and dust. Henna can also make hair strong. It can be used to the dandruff and scalp infections effectively.



Fig 3. Henna

D.Hibiscus (Hibiscus rosa)

• Synonyms: Shoeblack plant, Mahagua, Mahoe, Cotton rose, Roselie, Jamaica sorrel, China rose.

- Biological sources- It is obtained from flowers of "Hibiscus rosa sinensis Linn." Family: Malvaceae
- Geographical sources- The hibiscus plant is Native to tropical Asia, China and Philippines.
- Chemical constituents Ascorbic acid Thiamine Citric acid Glucose Fructose Oxalic acid
- Uses

• Leaves and flowers can be used as a hair growth promoter and to prevent premature graying and to treat scalp disorders.

• The flowers of "Hibiscus rosa sinensis" can be used to control high blood pressure, stomach pain, liver diseases, etc.

• Hibiscus rosa sinensis can be used as a diuretic.



Fig 4. Hibiscus

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E.SHIKAKAI (Acacia concina)

• Synonyms: Soap -pod, Acacia concinna.

• Biological source Shikakai, is a shrub-like tree native to Central India. Acacia concinna (Leguminosae), a climbing shrub with oblong-shaped dark brown pods, bipinnate leaves, and pink flowers. It is typically found in the Indian subcontinent's tropical woods.

• Family: Mimosaceae

• Geographical Source: Acacia concinna (Hindi name - Shikakai) is a climbing shrub native to Asia, common in the warm plains of central and south India. The plants are medium fast growing and which is bushy cum creepe.

• Chemical Constutients- • Arabin, • L-arabinose, • L-rhamnose, • D-galactose • Dglucuronic acid.

- Uses
- · Cleansing, promote hair growth and reduce Dandruff
- For hundreds of years, Shikakai has been used in India for hair treatment.
- To nourish and speed up the growth of hair



Fig .5 shikakai

### **Methods of Hair Dye Preparation**

i. Weighing After that, a worker weighs out the batch's ingredients. There are some components that the batch needs very little of. However, if a sizable batch is being prepared and a substantial quantity of multiple ingredients are required.

ii. Mixing When using a formula that doesn't call for pre mixing, the ingredients are just combined after being checked and weighed. All of the ingredients are thoroughly combined. iii. Completing The completed hair coloring product batch was placed in the filling section. Subsequently, the hair dye measurement on the balance.

iv. Presentation The plastic bags are transported to the packaging line from the filling area. The product is fully packaged, and its label provides comprehensive information. After that, the product is brought to the warehouse where it will be distributed [7].

### Experimental Work

Formulation of Herbal Hair Dye

Sr. No	Ingredients	Quantity	Uses
1	Amla	8gm	To reduce Dandurff
2	Coffee	3gm	To stop hair loss
3	Henna	8gm	Make hair strong
4	Hibiscus	3gm	To promote hair growth
5	Shikakai	3gm	Speed up of growth of hair
6	Water	Sufficient amount	Used as a solvent (for applying the hair dye)

Table .1 Formulation of Herbal Hair Dye

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## How To Apply

1.Mix  $1\frac{1}{2}$  cup (50g) of herbal hair Dye with  $\frac{1}{4}$  cup (59 ml) of warm water. Stir to combine. Once you've mixed the powder and water, cover the bowl with plastic and let it develop at room temperature for about 15-20 minutes.

2 Apply this paste uniformly on hair with the help of a brush.

3 Cover hair with a plastic cap and leave it for 60 to 90 mins depending on the desired shade.

4 Rinse off hair with plain water.

## Evaluation of the herbal hair dye

The prepared herbal hair dye was evaluated for it's various parameter such as organoleptic, physio- chemical, phytoconstitients and the rehological aspect.

A. Organoleptic evaluation

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Organoleptic chaterictics for various sensory characters like colour, odur, taste etc. was carefully noted down as illustered in Table 1. The raw drugs and powders were seperately studies by organoleptic and morphological characters like colour, odur, texture and appearance.

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Table 2				
Sr. No	Parameter	Formulation		
1	Colour	Greenish brown		
2	Odour	Characteristic		
3	Texture	Fine		
4	Apperence	Powder		

B. Physio - 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. reflect the above findings

Sr. No	Parameters	Results	
1	pН	6.5	
2	L.O.D.	1.7%	
3	Ash Value	0.17	

### C. Phytochemical evaluation

Prepared herbal hair dye was subjected to Pytochemical screening to reveal the presence or absence of various phytoconstitients as Carbohydrate, Lipids, alkaloids, Sugar etc. The formulation when dissolved individually in 5 ml of water and filtered were used to the presence of carbohydrates. The aqueous extract of formulated herbal face pack was evaluated for the presence or absence of different phytoconstitients as pre standard procedure and norms

Table 4		
Sr. No	Parameter	Results
1	Foam Test	Present
2	Molisch test	Present
3	Fehling test	Absent
4	Hager test	Present
5	Volatile test	Absent

## D. Patch test

This usually involve dabbing the small amount of aqueous solution of hair dye behind the ear on or inner elbow in an area 1sq.cm and leaving it to dry. The sign of irritation or feeing of non wellness is noted, if any. Measured and small quantities of the prepered hair pack was applied to the specific area for the fixed time. Irritancy. redness and swelling were checked and notice for regular interval up to 24 hours if any.

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# Table 5

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

### E. Stability test

Stability testing for the prepared formulation was preformed by storing at different temperature condition for the time of period of one month. The packed glass vials of formulation were stored at different temperature condition for the physical parameters like colour, odur, pH.

Table 6					
Sr. No	Parameters	<b>Room Temperature</b>	35°C		
1	Colour	No Change	No Change		
2	Odour	No Change	No Change		
3	pН	6.5	6.5		
4	Texture	Fine	Fine		
5	Smoothness	Smooth	Smooth		

### Advantage

- Natural appearance of use of real human hair fibre.
- May be styled as a natural hair.
- Able to color and perm.
- Moves like natural hair.
- Less susceptible to heat damage.
- Gentle on Hair and Scalp
- Improved Hair Health Over Time
- free from Harsh Chemicals
- Eco-Friendly and Sustainable
- Rich, Long-Lasting Color

### **II. CONCLUSION**

Herbal based hair dye has been prepared. It offers a natural alternate, which can be used. A herbal hair pack colour the hair in a almost gentale manner. The advantage of herbal based cosmetics are their non toxic nature. It helps to treat dandruff by removal of excess oil from scalp. The herbal formulation hair pack containing the goodness of powder of different plants, which excellent for hair care.Natural remidies are widely accepted with open hands nowadays as they are safer with minimal side effects as compared to the chemical based products.In this research we found effective properties of the herbal hair pack and further studies are needed to the preformed to explore more useful benifits ofthis herbal hair pack.



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#### RESULT

Herbal hair packs colour the hair in the most gentle manner. The advantage of herbal-based cosmetics is their nontoxic nature. It nourishes the skin of the scalp and hair. Hair formulations provide vital nourishment for the skin. It helps to treat dandruff by removing excess oil from the scalp. Pollution, ageing, stress, and harsh climates badly affect the quality of hair. In this exploration, we found powerful properties of home grown hair packs, and further examinations are required to investigate more helpful advantages of this natural hair pack. Natural cures are generally acknowledged with open hands these days as they are more secure and have negligible secondary effects when compared with synthetic-based items. Homegrown plants are extremely popular to satisfy the temperaments of the developing market. It is an observable endeavour to figure out the natural hair dye containing the decency of powders of various plants, which are incredible for hair care

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