IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Formulation and Evaluation of Herbal Hair Dye

Ms. Komal A. Dongare, Dr. K. P. Surwase, Mr. Umesh E. Sarkate
Aditya Institute of Pharmaceutical, Beed, Maharashtra, India

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 squamosa) 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: hair dye, temporay, semipermanent, permanent, Annona squamosa, Antioxidant

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.[1]

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 modem dyes.There are three type of hair.[2]

dye. This is temporary, 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 hai.The need of herbal based natural medicine is increasing fastly due to their natural goodness and lack of side effects.[3]

In comparison to natural hair dyes, synthetic hair dyes are reported to cause skin and other skin related diseases. The manufacturing process is hazardous to health of the people involved in the process and its applications leads to environmental pollution and also causes potential side effects to the consumers of the product. The fear of side effects from the synthetic dyes has limited its use by health conscious customers throughout the world and has to overcome various regulatory barriers before it reaches its destination. A dye can generally be described as a colored substance that has an affinity to the fiber, fur or hair. The dye is generally applied as aqueous solution, and may require a mordant to improve the fastness of the dye on the fiber, fur or hair. Natural dyes also referred as mordant dyes. Different mordant will give different hue color with the same dye. A mordant is thus an agent which allows a reaction to occur between the dye and the fiber, hair or fur [1]. Hair dyes include dyes modifiers, antioxidants, alkalizers, soaps, ammonia, wetting agents, fragrance, and a variety of other chemicals used in small amounts that impart special qualities to hair such as softening the texture or give a desired action to the dye. The chemicals that are normally used in the dye are amino compounds (4-amino-2-hydroxytoluene and m-Aminophenol). Metal oxides, such as titanium dioxide and iron oxide,

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

are also often used as colorants in the process. Colorants are classified as being temporary or permanent. In temporary coloring the color can be washed from hair easily.

Continuous usage of such compounds containing dye on natural hair causes so many side effects such as skin irritation, erythrema, loss or damage of hair and skin cancer. Other chemicals used in hair dyes act as modifiers, which stabilize the dye pigments or otherwise act to modify the shade.

Graying of hair is attributed to reasons like genetics, stress, nutritional deficiency and disease. The primary reason of premature graying is hereditary and it is reported that by the age of fifty, half of the world's population will have fifty percent gray hair. Hence there is a huge demand for hair dyes in the market. Natural dyes are the colors derived from plant, animal or insect matter without any chemical processing. In the past natural organic substances were mixed with metals such as copper and iron, to produce more lasting or richer shades. Many plants like Lawsonia inermis, Acacia arabica, Eclipta alba, Juglans regia, Pterocarpus indicus, Pilocarpus jaborandi, Nardostachys jatamansi, Phyllanthus emblica, Saussurea lappa, Tinospora cordifolia, Terminalia bellirica, Uncaria gambir, Aloe barbadensis, Cinnamomum zeylanicum, Hibiscus rosasinensis, Centella asiatica etc. are used as main ingredients in hair care preparations mainly for coloring the hair. Natural dyes also act as mordants because they contain tannins. Tannins create affinity between dyes and hair and thus improve color and fastness of dye. Natural hair colorants that are currently marketed mainly contain henna along with plant components that need to be used in the paste form. However, such preparations have several disadvantages like lengthy preparation time, messy application, poor rinsability, lack of a standard coloring and limited color shades.

Formulations promoted as natural hair colorants also contain synthetic dyes and chemicals.

Synthetic hair colorants involve the use of chemicals like 1-3% phenylenediamine, ammonia, peroxide and coal tar dyes that are capable of removing and replacing or covering the natural hair color. Inorganic salts like aluminum sulphate, copper sulphate, lead acetate and potassium dichromate act as mordants are also added to improve and protect the color produced by the dye. Use of these chemicals can result in unpleasant side effects, including temporary skin irritation and allergy, hair breakage, skin discoloration, unexpected hair color and cancer. Since the conventional methods of hair coloring by the use of natural or synthetic colorants has limitations, an attempt has been made in this study to formulate a gel for hair dye using herbal extracts and other additives from plant source having good coloring property that is safe and ready to use. Antioxidants protect the dye from oxidizing with air. Most commonly used is sodium sulfite.

Alkalizers are added to alter the pH of the dye formula, because the dye works best in a highly alkaline milieu. Ammonium hydroxide is a common alkalizer. Apart from these basic chemicals, many other chemicals are used to impart special qualities to a manufacturer's formulala. In order to color human hair by oxidative dye technology, the hair is generally treated with a mixture of oxidative hair coloring agents and an oxidizing agent. Hydrogen peroxide is the most commonly used oxidizing agent. However, in addition to oxidizing the oxidative coloring agents, hydrogen peroxide treatment of the hair can also solubilise and decolorize the colored melanin component in the hair, which can lead to undesirable hair qualities, such as brittleness and hair damage.

Composition of herbal dyes and hair coloring mordant can be used to deliver a variety of hair colors to the hair. However, substantial improvement is needed in the areas of color saturation, color development, precise initial color consistency, improved wash fastness, improved hair conditioning without causing hair damage and skin irritation.

Because of the manufacturing hazards, environmental pollution, its side and toxic effects there is a vital need for an alternative to the existing black dye. These limitations of the chemically derived dye can only be overcome by replacing the constituents in the composition, by non toxic ingredients derived from herbal resources. The black dye produced from herbal resources may be used in wide variety of context including hair color products. At this juncture, there is enormous need for a method to increase the yield of such dyes from herbal products.[4]

Advantage

1. Natural appearance of use of real human hair fibre.
2. Able to color and perm.
3. Moves like natural hair.
4. Less susceptible to heat damage.

DOI: 10.48175/IJARSCT-27263

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 11, May 2025 Impact Factor: 7.67

Disadvantages

1. More expensive.
2. Need more maintenance and care.
3 Requires styling.
4.May be heavier in weight than synthetic wigs, which may be lead to itching.

TYPES OF HAIR DYES:

Temporary:

1. These type of hair colours used to colour the hair for temporarity.
2. The colorants which are used doesn't penetrate into the hair or surrounding.
3. Can be easily rinsed off water one shampooing.
4. Temporary hair coloring some time used to apply finely ground metals by means of a Puffer Spray.
5. Such metals, which include orassse, bronze and aluminum, both untreated and anodized in various colors, it provide metallic effect when applied to hair, mainly used for high lighting.
6. Powders, setting lotions, crayons are used for temporary color.
7. Temporary hair coloring may also achieved by using yhe leuco derivative of a basic dye like crystal violet.
8. The various type of products used for temporary coloring of hair include rinse, lotion, aerosols, crayons etc.
9. In rinse aqueous or hydro alcoholic solution of simple dye stuffs are used.
10. In lotions dye in solution with a transparent polymer, such as 3% polyvinyl pyrolidone in water or aqueous alcohol.
11. Crayons are used either directly rubbed on to the wet hair or applied with the help of hair brus[5].

Semipermanent

1. Most of them are basic dye stuffis, whose cationic character gives them a natural affinity for the hair. 2.Metalized dye stuffs in combination with nitro derivatives of aromatic diamines or aminophenols.[6]
2. Performance of colorants can be enhanced by the inclusion of solvent.
3. Shampoo is the most commonly used base.
4. Semipermanent dye contains mainly either Nirtophenylene diamines either Nitroaminophenes or either Aminoanthraquinones[7].

Permanent:

1. Most popular hair dye products.
2. The dyes are formed during the dyeing process and are not present, as such in the solution before application.
3. Consists of two parts
. Dye intermediate
. Oxiding agent
4. Dye intermediates are blends of primary intermediates and coupling agent or modifier, in a suitable base.
5. During dying of hair, the intermediate solutions are mixed and applied to the hair.
6. The primary intermediates are gradually oxidized and then undergo coupling reaction with modifiers. 7.Permanent dye systems are able to dye hair a lighter shade than the original.
7. These dye are capable of confusing the difference in color between individual hair.
8. Very effective on mixed colored white hair and black hair.[8]

II. LITERATURE SURVEY

1. Bhatia, S.C. (2016)
Title: Perfumes, Soaps, Detergents and Cosmetics
Summary: This book gives a comprehensive overview of cosmetic formulation including shampoos. It highlights surfactants, herbal additives, and natural oils used in cosmetic products. It discusses the benefits of herbal ingredients in

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

reducing side effects and improving hair health. It also explains different evaluation techniques for shampoo. The role of preservatives, pH stabilizers, and fragrances is discussed. It lays the groundwork for formulation understanding.

2. Kumar, D. et al. (2018)
Title: Formulation and evaluation of herbal hair dye
Summary: This study involved preparing herbal shampoo using Reetha, Shikakai, amla, and neem. Evaluation parameters included pH, foam volume, solid content, and conditioning effect. The shampoo was found to be stable and effective in cleansing. The herbal combination showed antifungal and antibacterial properties. Foam stability and mildness were significant. The study proved herbal shampoos can replace chemical ones.

3. Patel, R.P. et al. (2019)
Title: Formulation and evaluation of hair dye containing extract of Allium cepa and Hibiscus rosa- smens1s
Summary: This paper discusses onion and hibiscus extracts in shampoo for promoting hair growth. The shampoo was evaluated for cleansing action and hair smoothness. The extract combination reduced hair fall. The pH was found to be compatible with scalp. The formulation Kishori College of Pharmacy, Beed Page 9 Formulation and Evaluation of a Phytochemical- Enriched Shampoo for Hair Therapy exhibited excellent lathering properties. The authors emphasize the role of plant phytochemicals.

4. Rao, B.G. et al. (2017)
Title: Formulation and evaluation of hair dye
Summary: Focused on powdered herbal shampoo using dry plant materials. Ingredients included neem, Shikakai, and Reetha. Evaluation included wetting time, foam, and cleansing ability. Herbal powders retained active components longer. The formula was cost-effective. Powder form extended shelf life.

5. Ahmad, I. et al. (2020)
Title: Phytochemical screening and evaluation of hair growth potential of herbal hair dye
Summary: The study screened phytochemicals like flavonoids, tannins, and saponins. The shampoo showed good hair growth potential in in-vivo studies. It had low toxicity. Scalp compatibility was confirmed. Herbal ingredients enhanced circulation and follicle stimulation. They recommended further standardization.

6. Mandal, A. et al. (2015)
Title: Evaluation of cleansing and conditioning effects of herbal hair dye
Summary: Emphasized conditioning agents like aloe vera, amla, and neem. The shampoo improved hair texture and shine. Detangling effect was observed. The herbal base reduced dandruff. Stability studies supported long-term use. Herbal conditioners outperformed synthetic ones.

7. Jain, P. et al. (2018)
Title: Herbal hair dye as natural therapy: A review
Summary: This review compiles various herbs used in shampoos and their roles. Tulsi, brahmi, hibiscus, and neem were discussed. Hair strengthening and dandruff control were common features. The article highlighted safety, biocompatibility, and eco-friendliness. It suggested using locally available herbs. Shampoo formulations need standardization.

7. Sharma, N. et al. (2021)
Title: Pharmacognostic evaluation of some herbs used in herbal hair dye
Summary: Evaluated raw materials used in shampoo formulations. Microscopy and TLC used for identification. Pharmacognostic data helped detect adulteration. Ensured consistency in formulations. Helped in validating raw materials. Important for industrial production.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

III. AIM AND OBJECTIVE

AIM

To Formulate And evalute a herbal hair dye using medicinal plant extract known for their therapeutic properties with the goal of providing an effective and ecofriendly alternative to synthetic hair dye

OBJECTIVE

1. Natural coloring: Providing a natural alternative to synthetic hair dyes.
2. Chemical-free: Avoiding harsh chemicals that can damage hair or scalp.
3. Nourishment: Many herbal hair dyes contain ingredients that nourish and condition hair.
4. Safety: Reducing the risk of allergic reactions or side effects.
5. Sustainability: Often made from natural, plant-based ingredients, which can be more environmentally friendly.
6. Customization: Offering unique, natural shades and tones.[9]

IV. PLAN OF WORK

A plan for formulating and evaluating a herbal hair dye involves several key steps: selecting ingredients, creating different formulations, evaluating their efficacy and safety, and conducting stability tests. This process ensures a safe and effective herbal hair dye.

1 .Ingredient Selection and Sourcing:
Identify potential herbal ingredients:
Research and select herbs known for their coloring properties, hair conditioning benefits, and safety profiles. Examples include henna, indigo, amla, bhringraj, and hibiscus.
Sourcing:
Obtain ingredients from reliable suppliers, ensuring quality and purity. Consider factors like authentication, morphological characteristics, and testing for contaminants.

2. Formulation and Preparation:
Design formulations:
Create different combinations of herbal ingredients to achieve desired color shades and hair health benefits. For example, a formulation could combine henna for red tones with indigo for

Weigh and mix ingredients:
Accurately weigh and mix ingredients according to the chosen formulations. Ensure uniform mixing for a consistent product.
Paste preparation:
Mix the powder mixture with water or other suitable liquid to form a paste with the desired consistency for hair application.

3. Evaluation of Hair Dye Formulations:
Color grade evaluation:
Apply the formulations to white hair samples and observe the resulting color grade, noting the intensity and shade achieved.
Safety evaluation:
Conduct patch tests and toxicological studies to assess the safety of the formulations. Organoleptic evaluation:
Assess sensory characteristics like color, odor, and taste of the prepared hair dye. Physio-chemical evaluation:
Determine pH, density, and other physical properties of the hair dye. Phytochemical screening:
Identify and quantify the presence of various phytochemicals like alkaloids, flavonoids, and terpenoids.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

4. Stability Testing:
Storage conditions:
Store the prepared hair dye under different temperature conditions (room temperature, 35°C) for a specific period (e.g., one month) to evaluate stability.
Evaluation parameters:
Assess physical parameters like color, odor, pH, texture, and smoothness after storage to identify any changes or degradation.

5. Optimization and Refinement:
Analyze results:
Review the data collected from all evaluation steps to identify the most promising formulations and optimize the preparation process.
Iterate and refine:
Based on the analysis, modify formulations and preparation techniques to enhance efficacy, safety, and stability.
By following this plan, you can develop a safe, effective, and stable herbal hair dye that provides a natural alternative to traditional chemical-based hair dyes.[10]

V. MATERIAL AND METHOD

1. Weighing:
Next a worker weigh out of the ingredient for the batch. For some ingredients, only a small mount of is necessary in the batch. But if a very large batch is being made, and several ingredients are needed in large amounts.

2. Mixing:
In a formula in which no pre mixing is required, after checking and weighing,the ingredients are simply mixemixture.The xture.The ingredients are completely mixed with each other.[6]

3. Filling:
The finished batch of hair dye products formed place in the filling area. Then the measured amount of hair dye on the weighing balance..

4. Packaging:
From the filling area, the plastic bag are taken to the packaging line. The packaging complete and the labelling of the product write the with full information. Then the product are them taken to the warehouse to await distribution.. [11]

Role of ingredients used in the formulation :

A. Henna:
its principle coloring ingredient of is lawsone, a red orange colored compound present in dried leaves of the plant in a concentration of 1 1.5% w/w. Lawsone acts as a non oxidizing hair coloring agent at a maximum concentration of 1.5% in the hair dyeing product. Other constituents in henna such as flavonoids and gallic acid act as organic mordants to the process of colouring. Carbohydrates give the henna paste a suitable consistency for adherence to the hair [7,8]. Natural henna is usually hypoallergenic but allergic reactions occurred in mixed types including black henna.

Fig.I Henna

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

B. Amla:

Berries obtained from amla enhances the absorption of calcium, helping to make healthier bones, teeth, nails, and hair. It maintains the hair color and prevents premature graying, strengthens the hair follicles [9].

Amla is the most rich and concentrated form of Vitamin C along with tannins found among the plants.Whole fruit is used as an active ingredient of the hair care preparations. The Vitamin C found in the fruit binds with tannins that protect it from being lost by heat or light [1O]. This fruit is also rich in tannins, minerals such as Calcium, Phosphorus, Fe and amino acid. The fruit extract is useful for hair growth and reduce hair loss Amla has antibacterial and antioxidant properties that can help promote the growth of healthy and lustrous hair [12].

Fig.2 Amla

C. Reetha:

Its fruit is rich in vitamin A, D, E, K, saponin, sugars,, fatty acids and mucilage. Reetha extract is useful for the promotion of hair growth and reduced dandruff . Extract of fruit coat acts as a natural shampoo, therefore is used in herbal shampoos in the form of hair cleanser . Reetha as soapnuts or washing nuts, play an important role as natural hair care products since older times. This plant is enriched with saponins, which makes the hair healthy, shiny, and lustrous when used on regular basis [13].

Fig.3 Reetha

D. Shikakai:

It contains Lupeol, Spinasterol, Lactone, Hexacosanol, Spinasterone, Calyctomine, Racimase-A Oleanolic acid, Lupenone, Betulin, Betulinic acid, Betulonic acid. The extract obtained from its pods is used as a hair cleanser and for the control of dandruff . Shikakai or acacia concinna, has rich amount of vitamin C, which is beneficial for hair. Shikakai naturally lowers the pH value and retains the natural oils of the hair and keeps them lustrous and healthy. It is also effective in strengthening and conditioning hair.Amla, reetha and shikakai compliments each other, therefore, they are mixed together to have healthy and lustrous hair. All of these ingredients come in two forms, one as a dried fruit and other in powdered form. Amla, Reetha and Shikakai suit all hair types and help prevent split ends, hair fall, dandruff, greying of hair and other hair related problems, to make hair soft and silky [14].

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Fig.4 Shikakai

E. Coffee:

In hair colorants, herbs can be used in the form of powder , aqueous extract or their seed oil to impart shades of different colour varying from reddish brown to blackish brown . The herbal drugs like coffee powder obtained from its seeds are used as hair colorants .[15]

Fig.5 Coffee

F. Tea:

Being rich in polyphenols, selenium, copper, phytoestrogens, melatonin tea also has been used in traditional Chinese medicine and in Ayurvedic medicine has been used since long as hair colourant [16].

Fig.6 Tea

G. Hibiscus:

It is excellent for increase in hair growth activity. Hibiscus is naturally enriched with Calcium, Phosphorus, Iron, Vitamin B1, Vitamin C; Riboflavin and Niacin, which help to promote thicker hair growth and decreases premature graying of hair . This flower is used for controlling dandruff. Hibiscus exhibits antioxidant properties by producing flavonoids such as anthocyanins and other phenolic compounds. It can be used to rejuvenate the hair by conditioning it [17].

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Fig.7 Hibiscu

H. Bhringraj:

Treatment with 5% of petroleum ether extract of bhringraj initiates greater number of hair follicles . The oil based extract of leaves has been used traditionally for improving hair growth and for imparting natural colour to grey hair. Neelibhringaadi Tailam, mentioned in Ayurveda is suitable for promoting hair growth and for providing natural colour to grey hair . Bhringraj is used in the preparation of various oil, shampoo, hair dye etc. [18].

Fig.8 Bhringraj

I. Jatamansi:

Nardostachys jatamansi is an important drug of Ayurveda and is used in different traditional systems of medicine such as Ayurveda, Unani, Siddha, etc. [18]. Its rhizomes and roots are used as a tranquilizer, laxative, cardiac tonic, for curing vertigo, nervous headache, low and high blood pressure, etc.. The rhizomes as well as roots of the plant are medicinally rich and therefore, have been the focus of chemical studies [19].

Fig.9 Jatamansi

5.1 MATERIALS

For the preparation of herbal hair dye, we have selected nine important ingredients such as Henna, Reetha, Coffee, Tea, Shikakai, Amla, Hibiscus, Bhringraj and Jatamansi. Henna leaves and flowers of hibiscus were collected from the herbal garden of PSIT. They were authenticated for their quality in the Pharmacognosy lab of the Institute. Reetha, coffee, tea, shikakai, amla, bhringraj and jatamansi all in the powdered forms were procured from the authorized stores of the local market in the powdered form. Henna leaves and the flowers of Hibiscus were shade dried and coarsely

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

powdered. Then all the ingredients were mixed uniformly to prepare a homogenous formulation [20].The composition of the formulation is reflected in the Table 1.

Table 1. Ingredients of the prepared herbal hair dye.

S.No	Ingredient	Quantity
1.	Henna	100 gms
2.	Amla	60gms
3.	Reetha	20gms
4.	Shikakai	20gms
5.	Hibiscus	20gms
6.	Coffee	20gms
7.	Jatamansi	20gms
8.	Bhringraj	20gms
9.	Tea	20gms

Fig. (1). Ingredients of the herbal hair dye.

Formulation of herbal hair dye:

S. No	Ingredient	Quantity
1.	Henna	100 gms
2.	Amla	60gms
3.	Reetha	20gms
4.	Shikakai	20gms
5.	Hibiscus	20gms
6.	Coffee	20gms
7.	Jatamansi	20gms
8.	Bhringraj	20gms
9.	Tea	20gms

DOI: 10.48175/IJARSCT-27263

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

VI. RESULT

6.1 EVALUATION OF 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.

Organoleptic evaluation :

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.[21]

Organoleptic evaluation of herbal hair dye :

S.No.	Parameters	Results
1.	Colour	Greenish brown
2.	Odur	Characteristics
3.	Texture.	Fine
4.	Appearance	Powder

Physic-chemical evaluation:

The physical and chemical features of the herbal hair dye were evaluated to determine the pH,its moisture content andits ash value for the purpose of stability, compatibility and the amount of inorganic matter present in it[22]. Table 2 reflect the above findings.

Physico- chemical evaluation of herbal dye:

S.No.	Parameter	Results
1.	pH	6.5
2.	L.O.D.	1.7 %
3.	Ash value	0.17

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[23].

The result of Pytochemical screening are highlighted in Table 3.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Pytochemical evaluation of herbal hair dye:

S. No.	Parameter	Results
1.	Foam tes.	Present
2.	Molisch test	Present
3.	Fehling test	Absent
4.	Hager test	Present
5.	Volatile oil	Absent

Rehological evaluation:

Physical parameter like untapped or bulk density, tapped density, the angle of repose, Haursner ratio and carrs index were observed and calculated for the inhouse formulation.Bulk density symbolizes the adjustment of particle or granules collectively in the packed form.The formula for the determination of bulk density,(D) D=MN where Mis the mass of the particle and Vis the total volume accupied them. This is determined taking graduated cylinder.

Weighing the formulation was added to the cylinder with the help of a funnle. 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 is noticed, from which tapped density was calculated. The angle of repose quantify the flow properties of powder as it's affects cohesion among the different particle. The fixed cone funnle method empolyes the calculation height

(H) above the paper that is placed on a flat surface. The pack was carefully poured through the funnle till the formation of the peak. Here R denotes radius of the conical heap. tan a=H

/R where a is angle of repose. Hauseners ratio is linked with the interparticle friction and influences the powder flow properties. The hasuners ratio is calculated as DID where D isthe tapped density and Dis the bulk density.Carrs index helpto measure powder flow from the bulk density asshown namaste[24,25]Table4.

S.No.	Parameters	Results
1.	Bulk density	0.33
2.	Tapped density	0.461
3.	Angleof repose	1.03
4.	Carrs index	34.1
5.	Hauseners ratio	1.32

Rehological evaluation of herbal dye:

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. The result of tests for the sign of irritation are displaced in Table[27,26].

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

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, texture and smoothness as highlighted in Table 6 [28,29].

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Stability testing :

S. No.	Parameters	Room Temperature	35°c
1.	Colour	No change	No change
2.	Odur	No change	No chang e
3.	pH	6.5	6.7
4.	Texture	Fine	Fine
5.	Smoothness	Smooth	Smooth

The prepared herbal hair dye contains all the goodness of natural ingredients. Shikakai is packed with vitamin A, C, D and K, which together form a powerful antioxidant.This antioxidant is probably the only thing your hair needs to cleans the scalp of the sebum buildup unclog pores, and hair growth. Coffee for hair strengthens hair by improving the overall quality and texture of it. Hibiscus is excellent for hair growth activity. Custard apple pulp powder is help with premature greying of hair.

Custard apple is a great natural source of copper and gives hair the dark melanin colour. Organoleptic evaluation finding revealed that the pack is smooth and pleasant smelling powder. Phytoconstitients, which acts as true nourisher for the scalp as well as hair. The protein of hair stability tests performed at different temperature. The formulation was found to be stable.

VII. 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 haircare.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.

REFERENCES

[1]. Polar M. Dikilitas M. Oztas P, Ali N. Allergic contact dermatitis to pure henna. Dermatol Online J 2009: IS (l):15.(PMID:19281720)

[2]. Mac Dougall Color in food woodhead publishing Ltd 1st Ed. 2002

[3]. 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:(2)

[4]. Chandhary G, Lawsonia inermis Linnaus :A phytopharmacological review. Int J Pharm Pharm Sci. 2016 :(6) :630-48.

[5]. 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.

[6]. Natural colorants and dye In : Pharmacognosy and pytochemistry 1st Ed. India :Career publication 2004 98-117.

[7]. Alali, F. Q., Liu, X. X. and Mclaughlin, J. L. (1999).Annonaceous acetagennis:recent progress. Journal of Natural. Product. 62:504-540. 8)Bhakuni,D.S.Tewari, S. and Dhar, M. M. (1972).Aporphine alkaloids of Annona Squamosa. Phytochemistry. H (5):1819-1822.

[8]. Janick, J. and Paull, R. (2006).The Encyclopedia of Fruit and Nuts. Publisher. CABI.

[9]. Wylie, S., Cook,D.,Brophy, J. and Richter, K. (1987).Volatile flavour component, of Annona atemoya (Custard apple) Journal of Agricultural Food Chemistry 35 :768- 770.

[10]. Khare CP. Encyclopedia of Indian medicinal plants 12)Willamson EM. Major herbs of ayurveda 2002 :1268.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

[11]. Lachman L, Lieberman HA,Kanig JL-The Theory and practice of industrial pharmacy 3rd edl987.
[12]. Khandelwal KR. Practical pharmacognosy 12th Ed. 2004.
[13]. Upadhyay VP. Mishra A. K. Workshop on selected medicinal plants. 1985. In:Ministry of Commerce, Chemexcil :Bombay 1985.
[14]. Fatima A, Alok S, Agrawal P, Singh P, Verma A,. Benefits of herbal extract in cosmetics :A review. Int J Pharm Sci Res 2013:4(10):3746-60. I7)Dahanukar S, Thatte U. Ayurveda Revisita 3rd Ed. 2000.
[15]. Tuner DM. Natural product source material used in the pharmaceutical industry :The Galxo experience J.Ethanopharmaco11996:51(1-3):39-43.
[16]. Gopalan C,Sastri BV,Balasubraminam SC.Nutritive value oflndian foods1991.
[17]. AmbastaST.useful of plant of India 1986.
[18]. Porwal P, Sharma A, Gupta SP. Henna based cream preparation, characterization and its comparison with marketed hair dyes. J Herbal Med Tech 2011; 5(1): 55-61.
[19]. Banerjee P, Sharma M. Preparation, evaluation and hair growth stimulating activity of herbal oil. J Chem Pharm Res 2009; 1(1): 261-7.
[20]. Baziga KA, Heyan SA. Formulation and evaluation of herbal shampoo from zizyphus spine leaves extract. Int J Res Ayurveda Pharm 2011; 2(6): 1802-6.
[21]. Subedi BP, Shrestha R. Plant profile: Jatamansi (nardostachys grandiflora). Himalayan Bioresources 1999; 3: 14-5.
[22]. Chaudhary S, Chandrashekar KS, Pai KS, et al. Evaluation of antioxidant and anticancer activity of extract and fractions of Nardostachys jatamansi DC in breast carcinoma. BMC Complement Altern Med 2015; 15: 50.
[23]. Purnima BM. Kothiyal P. A review article on phytochemistry and pharmacological profiles of Nardostachys jatamansi DC-medicinal herb. Journal of pharmacognosy and phytochemistry 2015; 3(5): 102-6.
[24]. Pal RS, Pal Y, Wal P. In-house preparation and standardization of herbal face pack. Open Dermatol J 2017; 11: 72-80. [http://dx.doi.org/10.2174/1874372201711010072]
[25]. Wallis TE. Text book of Pharmacognosy. 5th Ed.. New Delhi: CBS publishers & distributors, 2002; 123: pp. (132)210-5