

# PREPARATION OF HAIR DYE (MADE BY USING NATURAL COLOURS)

**Miss.Kolekar Jyoti Anil, Dr. HINGANE L.D**

ADITYA PHARMACY COLLEGE, BEED



*Preparation of hair dye (using natural colors)*

*Project work*

# INDEX

**INDEX**

<b>Chapter No.</b>	<b>Content</b>	<b>Page No.</b>
<b>1</b>	<b>ABSTRACT</b>	<b>11</b>
<b>2</b>	<b>INTRODUCTION</b>	<b>13</b>
<b>2.1</b>	<b>INTRODUCTION OF HAIR</b>	<b>13</b>
<b>2.2</b>	<b>FUNCTION OF HAIR</b>	<b>13</b>
<b>2.3</b>	<b>STRUCTURE OF HAIR</b>	<b>14</b>
<b>2.4</b>	<b>INTRODUCTION TO GREY HAIR</b>	<b>16</b>
<b>2.5</b>	<b>INTRODUCTION TO HAIR DYE</b>	<b>17</b>
<b>2.6</b>	<b>CLASSIFICATION OF HAIR DYE</b>	<b>17</b>
<b>2.7</b>	<b>IDEAL CHARACTERISTIC OF HAIR DYE</b>	<b>22</b>
<b>2.8</b>	<b>ADVANTAGES &amp; DISADVANTAGES</b>	<b>22</b>
<b>2.9</b>	<b>NEED FOR STUDY</b>	<b>23</b>
<b>3</b>	<b>LITERATURE SURVEY</b>	<b>25</b>
	<b>REFERENCE</b>	<b>28</b>

*Preparation of hair dye (using natural colors)**Project work*

<b>4</b>	<b>SCOPE &amp; OBJECTIVE</b>	<b>30</b>
<b>5</b>	<b>PLANT &amp; EXCIPIENT PROFILE</b>	<b>32</b>
<b>6</b>	<b>MATERIAL&amp; METHODS</b>	<b>41</b>
<b>7</b>	<b>EVALUATION</b>	<b>47</b>
<b>8</b>	<b>RESULT AND DISCUSSION</b>	<b>50</b>
<b>9</b>	<b>CONCLUSION</b>	<b>55</b>
<b>10</b>	<b>REFERENCES</b>	<b>57</b>

## **1.1 ABSTRACT**

Hair color is one of the oldest and most well-known cosmetics that have been used by many ancient cultures in different parts of the world for not only women but also for men. Conventional methods of hair dyeing involve use of chemicals that result in unpleasant untoward effects which include irritation, breakage of hair, skin discoloration and cancer. Marketed hair colors containing crude plant powders require processing prior to use, which is inconvenient to the consumer and these products also have poor rinsability. Synthetic oxidative hair dyes available in the market contain combination of peroxide and ammonia which damage hair and causes allergic reactions. Also, Further the people using synthetic dyes are exposed the risk of breast cancer, urinary bladder cancer and non-Hodgkin's lymphoma. Hair dyes derived from plants to solve these problems and are safe to use. Hence, there was a need to develop a formulation of hair dye with colour extract from plant source which is ready to use with good rinsability. In the context of above objective, the attempt was made to formulate a gel for hair dye containing herbal extract and other additives from plant source. A few of these natural herbals are henna, chamomile, madder, beets, turmeric, walnuts, etc. The developed oil hair color may provide multifunctional effects such as softening, conditioning effect, promotion of growth and density of hair, etc.

keywords: Herbal hair dye formulation. [1]





# INTRODUCTION



**2. INTRODUCTION****2.1 INTRODUCTION OF HAIR :**

Hair is simple in structure, but has important functions in social functioning. Hair is made of a tough protein called keratin. A hair follicle anchors each hair into the skin. The hair bulb forms the base of the hair follicle. In the hair bulb, living cells divide and grow to build the hair shaft. Blood vessels nourish the cells in the hair bulb, and deliver hormones that modify hair growth and structure at different times of life.

- Hair growth occurs in cycles consisting of three phases:
    - Anagen (growth phase): Most hair is growing at any given time. Each hair spends several years in this phase.
    - Catagen (transitional phase): Over a few weeks, hair growth slows and the hair follicle shrinks.
    - Telogen (resting phase): Over months, hair growth stops and the old hair detaches from the hair follicle.
    - Exogen (shedding phase): A new hair begins the growth phase, pushing the old hair out.
- (<https://www.webmd.com/skin-problems-and-treatments/picture-of-the-hair#:~:text=Hair%20is%20simple%20in%20structure,to%20build%20the%20hair%20shaft.>)[2]

**2.2 FUNCTION OF HAIR:**

- Protect scalp from sunburn and injury.
- Prevent foreign particles from entering into eyes, ears, and nose.
- Assist in spread of body scent.
- Shield eyes from water, sweat, and light (i.e. eyelashes and eyebrows).
- Sensory function.
- Body hair.
  - too thin to provide warmth.
  - alert us to parasites crawling on skin.
- Scalp hair provides heat retention & sunburn cover, sex and individual recognition.
- Beard, pubic & axillary hair indicate sexual maturity & help distribute sexual scents.

(<https://www.google.com/amp/s/slideplayer.com/amp/7480815/>) [3]

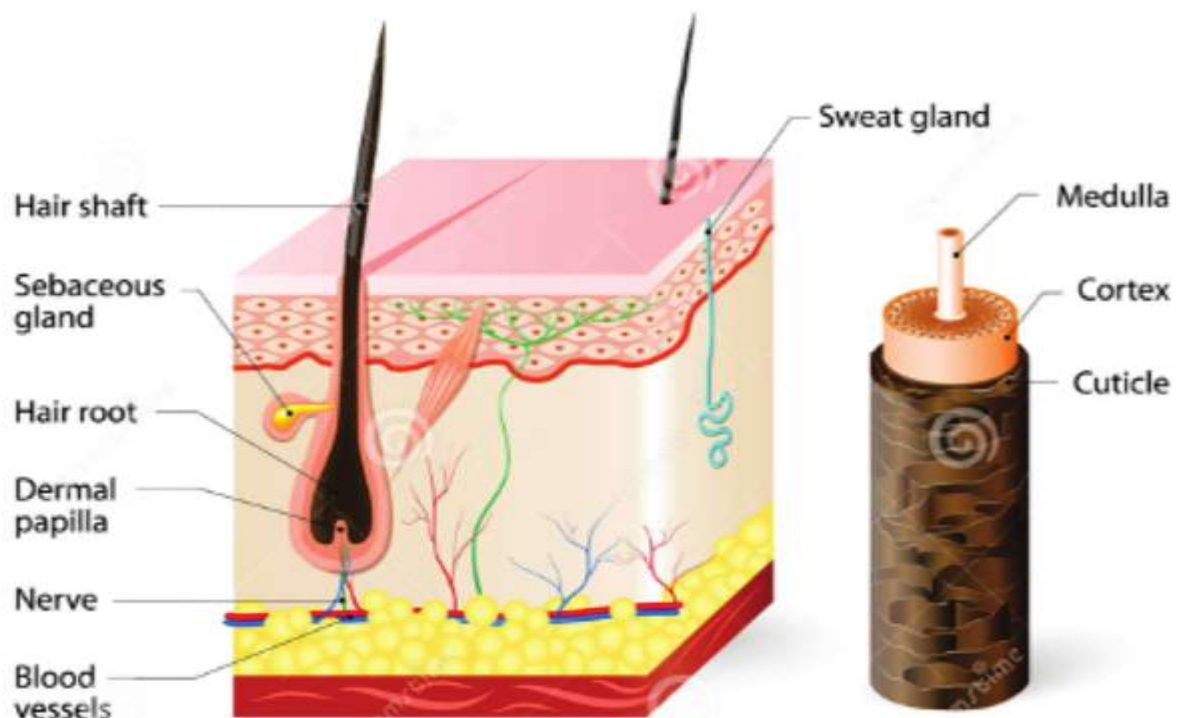


### **2.3STRUCTURE OF HAIR :**

Hair structure is made up of different layers and structures. Usually hair consists of two parts:

(a) Follicle; (b) Shaft.

## **HAIR ANATOMY**



**(a)The Hair follicle:** is the centre of the biological activity like hair growth, pigmentation; whereas the hair shaft is considered to be dead and is mainly made of protein.

- The hair follicle is the point from which the hair grows. It is a club-shaped structure in the skin. At the end of the follicle is a network of blood vessels that supply nutrients to feed the hair and help it grow. This is called the papilla.
- Surrounding the papilla is a bulb. The hair bulb forms the base of the hair follicle. In the hair bulb living cells divide and grow to build the hair shaft.
- Blood vessels nourish the cells in the hair bulb and deliver hormones that modify hair growth and structure at different times of life. Adjacent to the hair follicles are glands.
- The most important one of these glands is the sebaceous gland, which secretes oil that helps to keep the hair conditioned, is associated with the bulb.



- The hair bulb has special cells known as melanocytes which produce the pigment called melanin. This melanin gives hair its color. Within the skin, internal and external root sheaths cover the hair follicles.
- The outer rooting of a hair follicle has a continuous growth cycle along with the epidermis.

**(b)The Hair shaft:** The part of the hair seen above the skin is called the hair shaft. is made up of dead cells that turn into protein called keratin and binding material, together with small amounts of water.

- Keratin makes hair both strong and flexible. Like all proteins, keratin is made up of a chain of amino acids that forms a helical, or spiral, shape. These helices are connected by strong bonds between amino acids. These bonds make hair strong.

The hair shaft is formed of three layers (Fig. 2.3)

**(i)The medulla:** It is the deepest layer of the hair shaft, only seen in large and thick hairs. It is a honeycomb like keratin structure with air spaces inside.

**(ii) The cortex:** It is the middle layer of the hair shaft which provides the strength, colour and texture of a hair fibre. The cortex is made from tiny fibers of keratin running parallel to each other along the length of the hair shaft.

**(iii) The cuticle:** It is the outer layer of the hair shaft which is thin and colourless. It serves as protection to the cortex. It is made up of 6 to 11 layers of overlapping semi-transparent keratin scales (which make the hair waterproof and allow it to be stretched). Thick, coarse hair have more overlapping layers of cuticles than fine hair.

(COSMETIC SCIENCES Concepts and Principle by (Dr. KAMLA PHATAK & Dr. ANKUR VAIDYA. NIRALI PRAKASHAN.))[4]

## **2.4INTRODUCTION TO GREY HAIR**

- Your hair follicles have pigment cells that make melanin, a chemical that gives your hair its color. As you age, these cells start to die. Without pigment, new hair strands grow in lighter and take on various shades of gray, silver, and eventually white. Once a follicle stops making melanin, it won't make colored strands again.
- Mostly your genes that dictate how early and how quickly it happens. So if either of your parents had a full head of gray hair in their 30s, there's a good chance you will, too.
- 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.
- Chemical hair dyes and hair products Chemical hair dyes and hair products, even shampoos, can contribute to premature hair graying. Many of these products contain harmful ingredients that decrease melanin.
- Hydrogen peroxide, which is in many hair dyes, is one such harmful chemical. Excessive use of products that bleach hair will also eventually cause it to turn white.
- If genetics or aging is the cause, nothing can prevent or reverse the process. However, treating graying hair could allow color pigmentation to return if the loss is due to a medical condition.
- When diet and vitamin deficiencies are the cause of prematurely white hair, correcting these may reverse the problem or stop it from worsening.
- Graying of hair also called canities or achromotrichia occurs with normal aging.
- Till date, the exact etiopathogenesis of graying remains incompletely understood.[5,6]



**2.5 INTRODUCTION TO HAIR DYE :**

Hair dye has been used since ancient Egyptian times when Rameses I reinforced red hair colour using henna. 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 pollen. Some of the most well known are henna (*Lawsonia inermis*), indigo, Cassia obovata, senna, turmeric and amla. Others include katam, black walnut hulls, red ochre and leeks. The development of synthetic dyes for hair is traced to the 1860s discovery of the reactivity of para-phenylenediamine (PPD) with air. Since Second World War, great progress in discoveries and applications of new synthetic dyes has taken place

**2.6 CLASSIFICATION OF HAIR DYE:**

Hair dying systems can be divided into Two main categories,

***(A) According to Mechanism:***

- (i) Oxidative (containing hydrogen peroxide).
- (ii) Non-Oxidative.

***(B) According to the color durability after the application on hair strands:***

- (i) Temporary
- (ii) Semipermanent
- (iii) Demipermanent
- (iv) Permanent

- Many studies established the diffusion path of the dye molecule to the inner hair fiber. It involves the permeation of the molecules into intercuticular regions, passing through non-keratinized regions of the endocuticle and the intracellular cement. In later stages, it migrates to keratinized regions and, eventually, reaches the macrofibrils, before being incorporated into the matrix. The temporary and semipermanent non-oxidative dyes are based on colorful molecules, named dye deposition, because the dye molecule only interacts with the hair cuticles. When there is a small penetration of the molecules into the hair cortex, they are named semipermanent products and can be resistant up to six washes.



**(i)Permanent Hair Dyes:**

- Permanent oxidative hair dyes are commonly used because this category provides greater efficacy of permanent dyeing, resistance to shampoo washes and other external factors, such as drying, friction, light, and others. This category represents about 80% of the sold hair dyes and gets any shade, covering up to 100% of white hair strands. Also, it is possible to have dark and light natural hair color due to the combination of the oxidizing agents with the ammonia hydroxide.
- The principal difference between the semi-permanent hair dye in comparison with a permanent one is the alkalizing agent used because, in the first, monoethanolamine with low colour lightening power is used. Colour formation happens upon mixture and involves complex reactions between precursors in the presence of an oxidizing agent. The precursors can be classified into two categories: oxidation basis or primary intermediaries, and the couplers or reaction modifiers.
- The reaction occurs in an alkaline medium that promotes the opening of the cuticles that allows the penetration of the dyes' molecules into the cortex. The oxidizing agent permits the beginning of the reaction that occurs in the cortex and results in a colorful complex with high molar mass, which avoids the exit of molecules formed in the hair. Part of the reaction also happens on the cuticles and the molecules are removed in the first wash. The ammonia hydroxide and ethanolamines are the most alkalizing agents used.
- A mixture of surfactants and solvents is used to disperse the dye molecules and ensure the hair wetting. A small amount of reducing agent is added to prevent auto-oxidation of the dyes during storage of the finished product, which may be formulated as an emulsion, gel, solution and powder.
- The reactions involved in the formation of permanent dyes are redox types and require four major components: the aromatic amine with substitutions at positions ortho or para (hydroxy or amino) as their coupling bases; the reaction modifiers; an alkalizing compound; and an oxidizing agent.

**(ii) Demi-permanent Hair Dyes:**

- Demi-permanent hair colour is the hair colour that contains an alkaline agent other than ammonia (e.g. ethanolamine, sodium carbonate) and, while always employed with a developer, the concentration of hydrogen peroxide in that developer may be lower than used with a permanent hair color.

- Since the alkaline agents employed in demi-permanent colours are less effective in removing the natural pigment of hair than ammonia, these products provide no lightening of hair's color during dyeing. As the result, they cannot colour hair to a lighter shade than it was before dyeing and are less damaging to hair than their permanent counterpart. Demi-permanents are much more effective at covering gray hair than semi-permanents, but less so than permanents.
- Demi-permanents have several advantages as compared with permanent colour. Because there is essentially no lifting (i.e., removal) of natural hair colour, the final colour is less uniform/homogeneous than a permanent and therefore more natural looking; they are gentler on hair and therefore safer, especially for damaged hair; and they wash out over time (typically 20 to 28 shampoos), so root re-growth is less noticeable and if a change of colour is desired, it is easier to achieve.
- Demi-permanent hair colors are not permanent, but the darker shades in particular may persist longer than indicated on the packet.

### **(iii)Semi-permanent hair colouring:**

- involves little or no developer, hydrogen peroxide or ammonia, and is thus less damaging to hair strands. The reduced amount of developer, whether peroxide or ammonia, means that hair previously damaged by applying permanent color or permanent reshaping is less likely to be damaged during the colour application process.
- Semi-permanent hair colour uses compounds of low molecular weight than are found in temporary hair colour dyes.
- These dyes penetrate the hair shaft only partially, because of the reduced amount of developer used. For this reason, the colour will survive repeated washing, typically 4-5 shampoos or a few weeks, before undergoing significant fading or washing out entirely. The final colour of each strand of hair will depend on its original color and porosity. Because hair's colour and porosity across the head and along the length of a hair strand, there will be subtle variations in shade across the entire head.
- This gives a more natural-looking result than the solid, all over colour of a permanent colour. Because gray or white hairs have a different starting colour than other hair, they will not appear as the same shade as the rest of the hair when treated with semi-permanent colour.



**(iv) Temporary Color Hair dyes**

- Temporary hair color is available in various forms including rinses, shampoos, gels, sprays, and foams. Temporary hair colour is typically brighter and more vibrant than semi-permanent and permanent hair color. The pigments in temporary hair colour are high molecular weight and cannot penetrate the cuticle layer.
- The colour particles remain adsorbed to the surface of the hair shaft and are easily removed with a single shampooing because dye presents high molecular weight and deposits on the hair surface without the capacity of penetrating the cortex. This type of dye does not have the power of whitening the hair strand and, therefore, it is indicated only to add new nuance and not to change its colour. Temporary hair colour can persist on hair that is excessively dry or damaged in a way that allows for migration of the pigment to the interior of the hair shaft.
- The temporary dye can be used for specific purposes such as adding colourful reflections, removing the yellowish effects of the white hair, and covering a small quantity of white hair.
- These dyes, that present acid characteristics usually have high molar mass. They contain anionic characteristics and are selected to allow the maximum solubility in water and the minimum penetration in hair so it is removed in the first washing.

**(v) Alternative Colour Hair Dyes:**

Alternative hair coloring products are designed to create hair colors not typically found in nature. The available colours are diverse, such as the colors green and fuchsia. Permanent alternatives in some colors are available. Some colour shades are blacklight-reactive, and thus show up under certain nightclub lighting, for instance. The chemical formulae of alternative color dyes typically contain only tint and have no developer. This means that they will only create the bright colour of the packet if they are applied to light blond hair. People with darker hair (medium brown to black) need to use a bleaching kit before tint application. Some people with fair hair may benefit from prior bleaching as well. Gold, yellow and orange undertones in hair that has not been lightened enough can adversely affect results, especially with pinks, blues and greens. Although some alternative colours are semi-permanent, such as blue and purple, it could take several months to fully wash the colour from bleached or pre-lightened hair.



**(vi) Plant based dyes**

- Henna is the most widely used vegetable dye for hair, promoting reddish orange colour shades. In some commercial products, it is mixed with other dyes to increase the range of colour. It consists of the dried leaves of the *Lawsonia alba* plant, growing in North Africa, in the Midwest, and in India. Its colouring properties are due to the presence of the substance 2-hydroxy-1,4-naphthoquinone, soluble in hot water and substantive to hair keratin in pH 5.5. It is therefore considered semi-permanent to permanent, depending on a person's hair type.
- Most people will achieve a permanent colour from henna, especially after the second dye. With repeated use the orange colour builds up into red and then auburn. While "natural" henna is generally a red colour, variations exist.
- These variations usually contain ingredients from other plants and even synthetic dyes. Using a plant-based colour such as henna can cause problems later when trying to do a perm or permanent hair colour. Some commercial formulations contain metallic salts which react to hydrogen peroxide that is used in hair lightening.
- This may lead to unpredictable results, such as green or blue tones in the hair. Henna is a healthy way to colour hair, as long as no metallic salts are used.
- Indigo is natural dye from a plant (*Indigofera tinctoria*, *suffructicosa*, or *arrecta*) that can be added to henna or layered on top of it to create brown to black colours in the hair. Henna is orange, and indigo is blue, so as complementaries on a standard colour wheel, the two colours' combined effect is to create brown tones.
- Like henna, indigo may fade after one application, but it becomes permanent on the hair with repeated use. Another vegetable dye commonly used to obtain yellow shades is chamomile that promotes greater light reflection. Of all the species of chamomile, only *Anthemis nobilis* (Roman Chamomile) and *Matricaria chamomillae* (German chamomile) have cosmetic applications, and both are substantive to hair. The active ingredient of the flowers is 1,3,4-trihydroxyflavone, also known as apigenin.[7]



**2.7 IDEAL CHARACTERISTIC OF HAIR DYE**

- It should be non-injurious to hair shaft but should colour the hair without impairing the natural texture and gloss.
- It should possess no primary irritant action and be free from sensitizing properties.
- It should produce no toxic effect when in contact with the skin.
- The colour of the dyed hair should be stable to air, sunlight, friction and sweat.
- It should not change colour, nor bleach out on the application of toilet preparations such as setting lotion, hair waving preparation, soap or shampoo etc.
- Colourants should be stable over time in the aqueous solutions and formulated products in forms in which they are sold and used.
- It should not produce different colouration on different parts of the same hair.
- It should have affinity for Hair Keratin and capacity to penetrate into the hair shaft.[8]

**2.8 (i) ADVANTAGES:**

- Gives you a different look
- Adds volume to your hair
- Compliments your feature
- Hide your Grey hair

**(ii) DISADVANTAGES:**

- Damage your hair
- Can be expensive
- Allergic Reactions
- Unreliable[9]

## **2.9 NEED FOR STUDY**

The primary aim of this work is to formulate Hair dye gel using Natural color for treating grey hair with help of naturally available ingredients. Herbs are particularly important in modern times, when the harmful effects of food processing and overmedication have reached alarming proportions. Cosmetics, foods, and teas, as well as alternative medications, are increasingly containing them. Herbal interest is developing as part of a larger trend to change lifestyles. This movement is founded on the premise that plants have enormous potential for use as a therapeutic agent. Herbal cosmetics are completely natural and free of all dangerous synthetic ingredients that can be detrimental to the skin & Hair. Natural cosmetics are considered safe to use. They are hypoallergenic and dermatologists have tested and proved that they are safe to use anytime, anywhere. People do not have to worry about developing skin rashes or itching because they are comprised of natural materials. Synthetic beauty products might irritate your skin lead to damage to your hair. They may damage your hair shaft and follicle dry disturbing their quality and structure. These are not a problem with natural cosmetics. The natural components utilised have no negative effects, and they can be taken at any time and in any location. ( Herbal Cosmetics : an overview) Herbal medication has a long history of use and is more tolerated and accepted by patients. Medicinal plants are renewable, which is our only hope for ensuring a steady supply of low- cost medications for the world's rising population. The availability of medicinal plants is not a problem in developing countries like India because the country has a diverse agro-climatic, cultural, and ethnic variety. It is environmentally friendly to grow and process therapeutic plants and herbal products[10,11,12]







# LITERATURE SURVEY

**3. LITERATURE SURVEY:**

[13]

**3.1 Z. Shahi** et al 2017: The world is changing towards the use of safer, nontoxic and natural products with traditional usage. Plants play a key role in food, textile and cosmetic fields and are safe to use. A few of these natural herbs are henna, chamomile, Eclipta alba, Annattoetc. Also, the herbal hair coloring are used in various disorders such as dandruff, premature greying and head lice and etc. Used vegetable oils for hair may provide multifunctional effects such as softening, reduce dandruff and promotion of growth of hair.

**3.2 MIA R,** et al 2021: Natural dyes are advantageous in environmental protection, biodegradable by virtue, non-toxic, and do not cause allergies or cancer when in contact with the human skin. In the 21st century, people have fully realized that the unique nature and effect of natural dyes and their modified products are the fundamental guarantee for the sustainable development of our society. Under the impact of the wave of advocacy for green consumer goods, it will have a broader development prospect. The synthesis of synthetic dye is a complex process and needs lots of additional raw materials, such as H-acid, K-acid, J-acid, vinyl sulphone etc. In addition, it must maintain a lot of parameters for effective processing, which requires sophisticated arrangement and diversified technology. In contrast, natural dye extraction process does not need such type of toxic acids and chemicals. Utilizing an appropriate extraction process for a specific natural dye the processing cost can be minimized to an extent.

**3.3 Renu Singh and Sangita Srivastava,** et al 2017 : Due to increasing awareness among people about the harmful effects of synthetic dyes, products made from natural materials are gaining popularity. As natural dye shows nontoxic, non-allergic effects and results in less pollution as well as less side effects, it become a thrust area in the field of textile dyeing research. Although art of natural dyeing has been practiced for centuries in India, no serious attempts have been made to document and preserve this treasure of traditional knowledge of natural textile dyeing associated with the indigenous people.

**3.4 Aniket S Katta** et.al 2019: The limitations of currently marketed natural hair colorants used as a paste includes a lengthy soaking time, messy application and difficulty to rinse it off. This study exhibits a gel based formulation of plant powders which is stable and ready to use. Also, this developed formulation has excellent dyeing properties and good rinsability. It also imparts additional benefits such as promotion of hair growth and prevention of hair greying while being safe and ecofriendly.

**3.5 Rashmi Saxena** Pal et.al: A herbal hair pack colours the hair in an utmost gentle manner. The advantages of herbal based cosmetics are their nontoxic nature. It nourishes the skin of the scalp and hair. This hair formulation provides vital nourishment to the skin. It helps to treat dandruff by removal of excess oil from scalp. Frequent use of this pack leads to manageable, frizz free coloured hair. Pollution, ageing, stress and harsh climates badly affect the quality of hair. In this research, we found effective properties of the herbal hair pack and further studies are needed to be performed to explore more useful benefits of this herbal hair pack. Natural remedies are widely accepted with open hands nowadays as they are safer with minimal side effects as compared to the chemical based products. Herbal formulations are in great demand to fulfill the needs of the growing world market. It is a noticeable attempt to formulate the herbal hair pack containing the goodness of powders of different plants, which are excellent for hair care.

**3.6 Shagufta Rehman** et.al; Dying of hairs is customary cosmetic measure in all communities since immemorial time. There might be various reasons for coloring the hairs. The main reasons for this are cosmetic to cover gray or white hair, to change to a color regarded as more fashionable or desirable, or to restore the original hair color after it has been discolored by hairdressing processes or sun bleaching. There are various synthetic substances in vogue for dying hairs in requisite tones and shades but most of the preparation contains PPD as usual ingredient, beside hydrogen peroxide and ammonia. Studies revealed that use of these hair dyes linked to various health hazards including allergic and respiratory disorders and even cancer. The classical Unani medicine suggests considerable number of natural substances with promising results and safety. However, there is a need to screen these substances for their efficacy and safety as per the GCP norms.



**3.7 Nurina Ayuningtyas, Neneng Siti Silfi A et al 2020** ;Red beet (*Beta vulgaris L.*) has betasianin as natural dyes pigment which can give purplish red color. The purpose of this study was to determine whether the red beet can be used as a natural dye for hair dyes. The method of this experiment is divided of two different treatments there are control group consist of double application hair without using red beet and the experiment group using red beet to be hair dyes. The color resistance of the groups will be observed for 2 weeks. Data collecting method used was observation by involving 5 observers. Based on the results of data analysis from this study can be simulated that red beetroot can be used as a natural dye on double application hair producing color changing into red brown color. Color stability results show categories are good enough to be well reviewed from the washing results 7 times.

**3.8 Pranali Salunkhe\* and Pallavi Salve et al 2018**; The powder of beet root, Henna, Ratanjot, Bhiringraj, Amla, Shikhakai, Methi seeds were passed through the sieve number 80. These powder materials were studied for their Morphological, Physical and Phyto-chemical identifications. All powder material were weighed and mixed uniformly according to the formula and packed them. (Prepare smooth paste of this powder formulation before 10 minutes of application on hair). The human hair was collected from barber shops from which white hairs were separated and used for study. Then the white hairs were soaked separately in smooth paste of polyherbal hair dye for 5 hours for analysis of better hair dyeing. Then hair was washed with water for further studies. The coloured hairs are observed under the compound microscope (Motic Microscope).

**3.9 K.Sudheer Kumar\*, Afreen Begum, et al 2016**;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. 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

## ❖ REFERENCE:

- 3.1 **Z. Shahi, M. Khajeh Mehrizi\*, M. Hadizadeh** A Review of the Natural Resources Used to Hair Color and Hair Care Products Z. Shahi et al /J. Pharm. Sci. & Res. Vol. 9(7), 2017,1026-1030
- 3.2 **MIA R, Pal rs, pal y, wal p.** In-house preparation and standardization of herbal face pack. Open dermatol j 2021;
- 3.3 **Renu Singh and Sangita Srivastava**, preparation and standardization of herbal hair pack. dermatol j 2017;
- 3.4 **Aniket S Katte, Manmat B Rumane, Naushad N Mirza, Sagar S Sontakke, Akshay R Kale and Mahewash A Pathan** Journal of Pharmacognosy and Phytochemistry 2019; 8(2): 1363-1365
- 3.5 **Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal** The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOIb 10.2174/1874372201812010090, 2018, 12, 90-98
- 3.6 **Shagufta Rehman\*, Shariq A. Khan, Nida Sultana, Sarfaraz Ahmad** TRADITIONAL AND INTEGRATIVE MEDICINE Med, Volume 4, Issue 1, Winter 2019 Review Traditional & Integrative Medicine Regional Research Institute of Unani Medicine, Aligarh, (Central Council for Research in Unani Medicine), Ministry of AYUSH, Government of India, India
- 3.7 **Nurina Ayuningtyas1, Neneng Siti Silfi A, Fitria Habibah Tuanaya Program Studi Pendidikan Tata Rias, Fakultas Teknik, Universitas Negeri Jakarta** The 3rd International Conference on Cullinary, Fachion, Beauty, and Tourism (ICCFBT)2020
- 3.8 **Pranali Salunkhe\* and Pallavi Salve** FORMULATION AND EVALUATION OF POLYHERBAL HAIR DYE BY USING BEET ROOT International Journal of Current Advanced Research Vol 7, Issue 12(C), pp 16582-16584, December 2018
- 3.9 **K.Sudheer Kumar\*, Afreen Begum, B.Shashidhar, M.Meenu, C.Mahender, K.Sai Vamsi** Dept. of Pharmacology, Chilkur Balaji College of Pharmacy, Aziz Nagar, Hyderabad, Telangan Formulation and Evaluation of 100% Herbal Hair Dye International Journal Of Advanced Research In Medical & Pharmaceutical Sciences (IJARMPS-ISSN:2455-6998) Volum1,Issue.2,March.2016.

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*Project work*



# SCOPE & OBJECTIVE





## **4. SCOPE AND OBJECTIVE**

### **4.1 Scope:**

- Herbal based hair dyes are being preferred on large scale, due to the vast number of advantages it exerts to overcome the ill-effects of a chemical based hair dye. We have attempted to prepare and standardize this preparation to ensure its quality as well as stability aspects.
- Aim was to prepare hair dye gel for the graying of hair.[14]

### **4.2 Objective:**

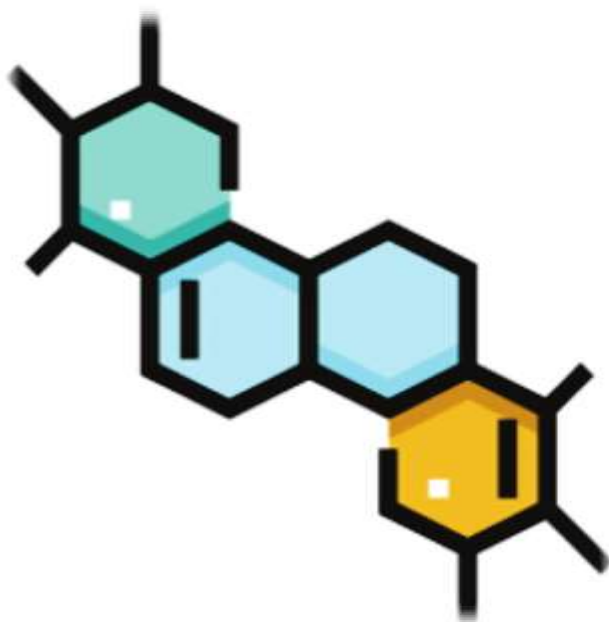
- The current study was aimed at the preparation of hair dye using natural colors and the evaluation of its various parameters as organoleptic, physico-chemical, phytoconstituents, rheological aspects, patch test and stability testing for its efficacy and shelf life. [15]
- Conventional methods of hair dyeing involve use of chemicals that result in unpleasant side effects which include irritation, breakage of hair, skin discoloration and cancer. Marketed hair colors containing crude plant powders require processing prior to use which is inconvenient to the consumer and these products also have poor rinsability. Hence, there is a need to formulate hair dyes containing crude drugs which are ready to use with good rinsability [16]

*Preparation of hair dye (using natural colors)*

*Project work*

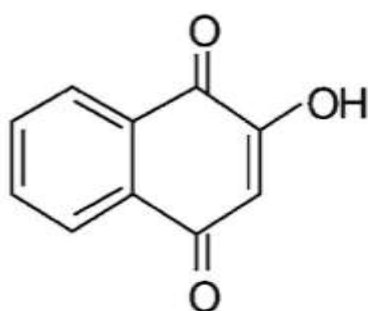


# PLANT & EXCIPIENT PROFILE



## **5. PLANT AND EXCIPIENT**

**5.1 HENNA** : The principle coloring compound of Henna is “Lawsone,” a red-orange colored compound present in dried leaves



**fig (5.1)The structure of Lawsone Lawsone**

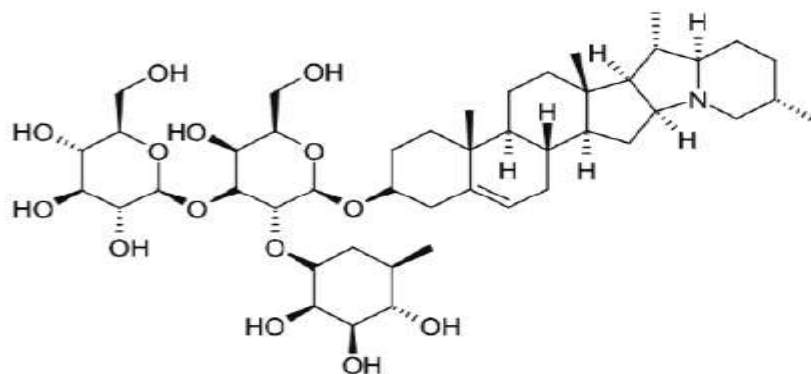


**fig(5.2): HENNA POWDER**

- *Scientific Name : Lawsonia inermis*
- *Family: Lythraceae*
- Chemical constituents: is proposed to be used as a non-oxidizing hair coloring agent at a maximum concentration of 1.5% in the cosmetic product Other components in henna such as flavonoids and gallic acid contribute as organic mordants to the coloring process.
- Carbohydrates give the henna paste a suitable consistency to hair attachment. Henna has affinity to the keratin in the mildly acidic environment (pH=5.5) . Natural henna is usually hypoallergenic but allergic reactions occurred in mixed types including black henna.
- This was caused by chemical compounds consisting of para-phenylenediamine, 2-nitro-4- phenylenediamine, 4- aminophenol and 3- aminophenol . Henna has also antifungal activity against Malassezia species (causative organism of dandruff).
- Henna balances the pH of the scalp for preventing premature hair fall and graying of hair. Henna leaf paste used for alleviating jaundice, skin diseases, smallpox, etc.
- Antibacterial, Coloring, Antidandruff, Antibacterial property[17,18]



**5.3 SHIKAKAI :** *Senegalia rugata*, commonly known in India by the Tamil derived name Shikakai, It is renowned as a raw material for shampoo, and the leaves and young shoots



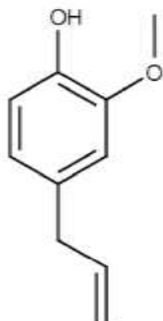
Fig(5.5) Structure of *Acacia concinna*



fig(5.6)SHIKAKAI

- *Family : fabaceae*
- *Subfamily: Caesalpinioideae*
- Chemical constituents: 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 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.[,22,23]

**5.4 CLOVE OIL:** Clove oil is obtained from the dried flower buds of *Eugenia caryophyllus*.



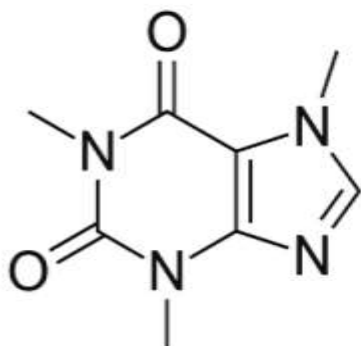
*Fig (5.7) Structure of eugenol*



*fig(5.8) CLOVE OIL*

- *Family: Zingiberaceae*
- *Order: zingiberaceae*
- Chemical constituent: The antioxidant of clove leaf essential oil (*Eugenia caryophyllus*) and its main constituent eugenol.
- This essential oil comprises in total 23 identified constituents, among them eugenol (76.8%), followed by  $\beta$ -caryophyllene (17.4%),  $\alpha$ -humulene (2.1%), and eugenyl acetate (1.2%) as the main components.[24]
- The essential oil from clove demonstrated scavenging activity against the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical at concentrations lower than the concentrations of eugenol, butylated hydroxytoluene (BHT), and butylated hydroxyanisole (BHA).
- This essential oil also showed a significant inhibitory effect against hydroxyl radicals and acted as an iron chelator. With respect to the lipid peroxidation, the inhibitory activity of clove oil determined using a linoleic acid emulsion system indicated a higher antioxidant activity than the standard BHT[25]

**5.5 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.



*Fig (5.9)Caffeine*



*fig(5.10) Coffee*

- *Family: Rubiaceae*
- *Botanical name : coffea arabica linn*
- **Chemical constituent:** The main constituents of coffee are A, caffeine, tannin, fixed oil, carbohydrates, and proteins.
- It contains 2-3% caffeine, 3-5% tannins, 13% proteins, and 10-15%, fixed oils. In the seeds, caffeine is present as a salt of chlorogenic acid (CGA)
- It also contain phenol ,pyridine and valerianic acid.[27]

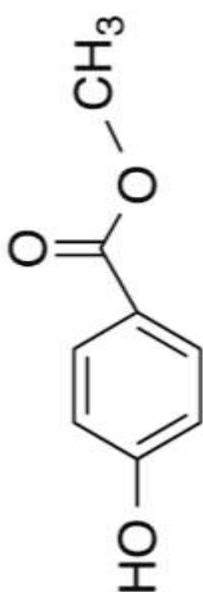
## **5.6 METHYL PARABEN:**

IUPAC name: Methyl 4-hydroxybenzoate Chemical formula:  $\text{CH}_3[\text{C}_6\text{H}_4(\text{OH})\text{COO}]$

Description: Pure methyl paraben is a colourless crystalline or white powder. It is odourless or has a faint characteristic odour and a slight burning taste.

Methyl paraben is one of a homologous series of parabens (including methyl, ethyl, butyl, heptyl and benzyl parabens), used singly or in combination to exert the intended antimicrobial affect. Parabens are particularly useful against moulds and yeasts. These substances can have multiple biological effects, but it is generally considered that their inhibitory effects on membrane transport and mitochondrial function processes are key for their actions. The parabens meet several of the criteria of an ideal preservative, in that they have a broad spectrum of antimicrobial activity, are safe to use (i.e., relatively non-irritating, non-sensitizing, and of low toxicity), are stable over the pH range, and are sufficiently soluble in water to produce the effective concentration in aqueous phase.[28]

Cosmetic uses: Parabens are widely used cosmetic preservatives present in a large variety of products, including face, body and hand creams, lotions and moisturizers; eye makeup products; foundation and other makeup products; night creams and lotions; cleansing products; hair conditioners; bubble baths; shampoos; mud packs; underarm deodorants; skin lighteners; and sachets.(mg soni) [29]



***Fig (5.11)Structure of Methyl Paraben***



***fig(5.12)Representational bottle***



**5.7 SODIUM ALGINATE:** Sodium alginate is a linear polysaccharide derivative of alginic acid comprised of 1,4- $\beta$ -D-mannuronic (M) and  $\alpha$ -L-guluronic (G) acids.

Chemical formula ( $\text{NaC}_6\text{H}_7\text{O}_6$ )

IUPAC name : sodium;3,4,5,6-tetrahydroxyoxane-2-carboxylate.



*Fig (5.13) structure of sodium alginate*



*fig (5.14) sodium alginate appearance*

Description: Occurs as white to yellowish brown filamentous, grainy, granular or powdered forms

Functional uses / cosmetic: Stabilizer, thickener, gelling agent, emulsifier [30]

**5.8 CALCIUM CHLORIDE:** A crystalline, white substance, soluble in water, calcium chloride is the chloride salt of calcium.

Chemical formula: ( $\text{CaCl}_2$ ) & IUPAC name: calcium;dichloride;dihydrate



*Fig(5.15)Structure of calcium chloride*

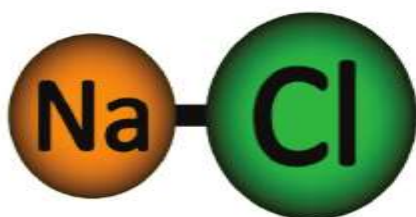
*fig(5.16)CALCIUM CHLORIDE POWDER*

Cosmetic use: Calcium Chloride is used in cosmetic and personal care products as a viscosity increasing agent and as a cosmetic astringent[31]

**5.9 SODIUM CHLORIDE:** is an ionic compound with the chemical formula NaCl, representing a 1:1 ratio of sodium and chloride ions.

Chemical formula: NaCl [32]

IUPAC: sodium;chloride



*Fig(5.17)Structure of Sodium Chloride*



*fig(5.18) crystalline powder of NaCl*

Sodium chloride is a multifunctional ingredient used in cosmetics and skincare products as a binder, oral care agent, gentle abrasive, thickening agent, and preservative.[33][34]





**6. MATERIAL AND METHODS:****6.1 CHEMICALS:**

Methyl Paraben (M. W.):152.15- Research-Lab Chem Industries, Mumbai

**6.2 APPARATUS:**

Enlisted glassware were used for the formulation

Sr.NO	Glassware/Apparatus
1	Test tube
2	Beaker
3	Measuring Cylinder
4	Stirrer
5	Glass Slides
6	Dropper
7	Spatula

**5.3 EQUIPMENTS :**

In the following Project the following Instruments were used

Sr.NO	Instrument	Model	Manufacturer
1	Electronic Balance	AUX 220	Shimadzu Corporation, Japan
2	pH Meter	EQ-610	Equip-Tronics, Analytical Instrument, Mumbai

**6.4 Collection of Plant Material:** All the Natural material used in the present study ie., Heena

Shikakai, were purchased from local Market in a form of dried powdered (Patanjali shop, Lonavala) and were authenticated at Pharmaceutics department of SIPS College, Lonavala.

## **6.5 METHODS:**

### **6.4.1 Weighing:**

All the required herbal powders for face pack preparation were accurately weighed individually by using digital balance.



*Fig 6.1 Weighing Machine*

### 6.4.2 Mixing

All the ingredients of Heena, Shikakai, Sodium Alginate, Calcium Chloride, Methyl paraben, Coffee, Common salt mixed with helped for stirrer to form homogenous fine gelling agent

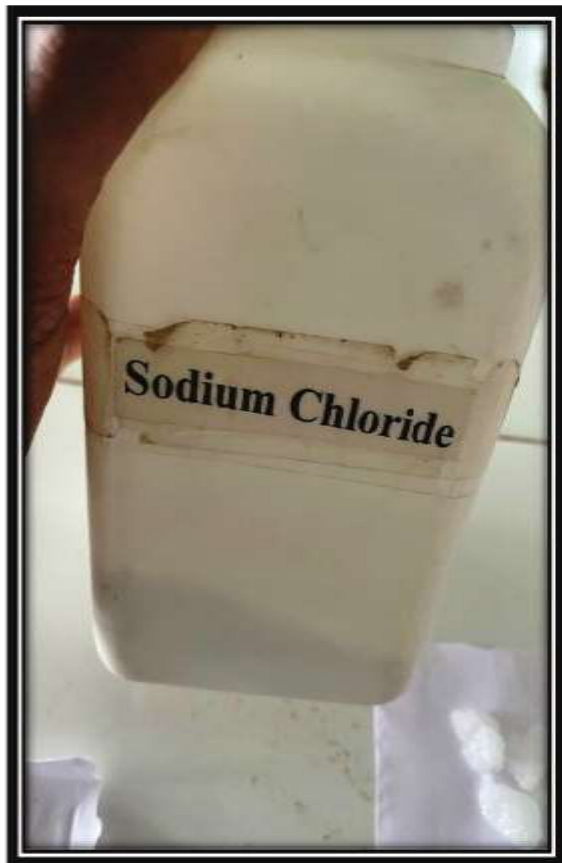


Fig 6.2 Ingredients used in formulation



*Preparation of hair dye (using natural colors)*

*Project work*



*Fig 6.3 Ingredients used for preperation*

**6.6 METHOD OF PREPERATION:**

Preperation of HEENA by taking is fine powder in a beaker, Adding small amount of Common salt (NaCl) in it followed by SHIKAKAI and them stir it with stirrer.

Further Add Sodium Alginate slowly slowly & Calcium Chloride along with it also add small amount of coffee mix it shake add clove oil it to get better fine gelling property until Gel is formed

**6.7 Formulation of Hair Dye Gel:**

<u>SR.NO</u>	<u>Ingredients</u>	<u>Quantity</u>	<u>Activity</u>
1	Heena	10gm	Enhance hair growth, Hair colorant
2	Sodium alginate	0.25gm	Gelling agent
3	Shikakai	10gm	Anti-dandruff, Hair conditioner
4	Calcium chloride	1.5gm	Geling agent
5	Methyl paraben	0.25gm	Preservative
6	Common salt	0.1gm	Colour fixer
7	coffee	4gm	Give darker color
8	Clove oil	0.9ml	Antibacterial, Fragrance

***Table 6.1 formulation table***

*Preparation of hair dye (using natural colors)*

*Project work*



**7.EVALUATION PARAMETERS****7.1 Organoleptic Evaluation:**

Some important morphological evaluation is colour, odour, appearance, texture etc. It shows the external characters of the formulation. Colour and texture were evaluated by vision and touch sensation respectively. (2)

**7.2 pH:**

A standard single or double electrode pH meter used. Instrument shall be initially calibrated at pH 4, 7 and 9.2 with appropriate buffer solution. The pH was measured by using digital pH Meter. (2)

**7.3 Washability:**

Formulation was applied on the skin and then ease and extent of washing with water were checked manually. (2) This is the common method for checking the washability of the formulation. 1 litre of water is used to remove all content of the formulation that were applied on the surface. (5)

**7.4 Irritancy test:**

Mark an area (1sq.cm) on the left-hand dorsal surface. Definite quantities of prepared face packs were applied to the specified area and time was noted. Irritancy, erythematic, oedema, was checked if any for regular intervals up to 4 hrs and reported. (12)(28)

**7.5 Shinoda Test:**

To the ethanolic extract, few drops of concentrated hydrochloric acid (HCL) were added. Then the magnesium turnings were put into the solution and observed for appearance of pink red colour. (14) Characteristics color produced within a minute or two and the subsequent addition of more acid often causes modification of the colour in a manner characteristics of the compound being examined. The test is positive with production of pink, scarlet, crimson red colour for flavonoids.( Dr. Santram Lodhi and Dr. Mohan Lal Kori Practical book of Herbal Drug Technology)



**7.6 Spread-ability :** Spreadability was determined by an apparatus suggested by fabricated in-house. The apparatus consists of a wooden block with a fixed glass slide and movable glass slide with one end tied to weight pan rolled on the pulley, which was in the horizontal level with fixed slide. The spread-ability of the formulated gel was measured on the basis of 'Slip and Drag' characteristics of face pack. An excess of face pack (about 2g) under study was placed on this ground slide. The face pack was then sandwiched between two slides. One kg weight was placed on the top of the two slides for 5 min to expel air and to provide a uniform film of the gel between the slides. Excess of the face pack was scrapped off from the edges. The top plate was then subjected to pull off. Mix with the help of string attached to the hook and the time (T, in seconds) required by the top slide to move a distance of 7.5 cm be noted. A shorter interval indicated better spread-ability. (18)

The spread ability (S) can be calculated using the formula:

$$S = m \cdot L / T$$

Where,

S-spread ability

m- weight tied to upper glass slide l- length moved on a glass slide

t- time taken

### **7.7 Accelerated Stability studies:**

The evaluations considered several temperature conditions and times of analysis. Initially, they were evaluated after t<sub>0</sub> (48 hours after preparation) in the conditions: Freezer (-10.0 ± 1.0 oC), Room Temperature (22.0 ± 2.0 oC) and Oven (45.0 ± 2.0 oC) – analysis at 1st, 5th, 7th days. (21). Formulations were observed for any change in colour and phase separation.

*Reference : (Dr. Santram Lodhi and Dr. Mohan Lal Kori Practical book of Herbal Drug[35]*

# Result and Discussion

## *Part*



## **8. RESULT & DISCUSSION**

**8.1 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.

Sr.No	Parameters	Observation
1.	Colour	Greyish brown
2.	Odour	Earthy smell
3.	Texture	Soft
4.	Appearance	Semi-solid

*Table 8.1*

### **8.2 pH:**

Sr.no	Parameters	Observation
1.	pH	5.9

*Table 8.2*

### **8.3 Washability test:**

Sr.no	Observation	Time (seconds)
1.	Mild washable	240 sec.

*Table 8.3*

**8.4 Irritancy Test:** formulation has littler cooler effect. No irritancy was sensed on normal skin

Sr.no	Parameter	Observation
1	Irritancy	No (cooler effect)
2	Redness	No
3	Swelling	No

**Table 8.4**

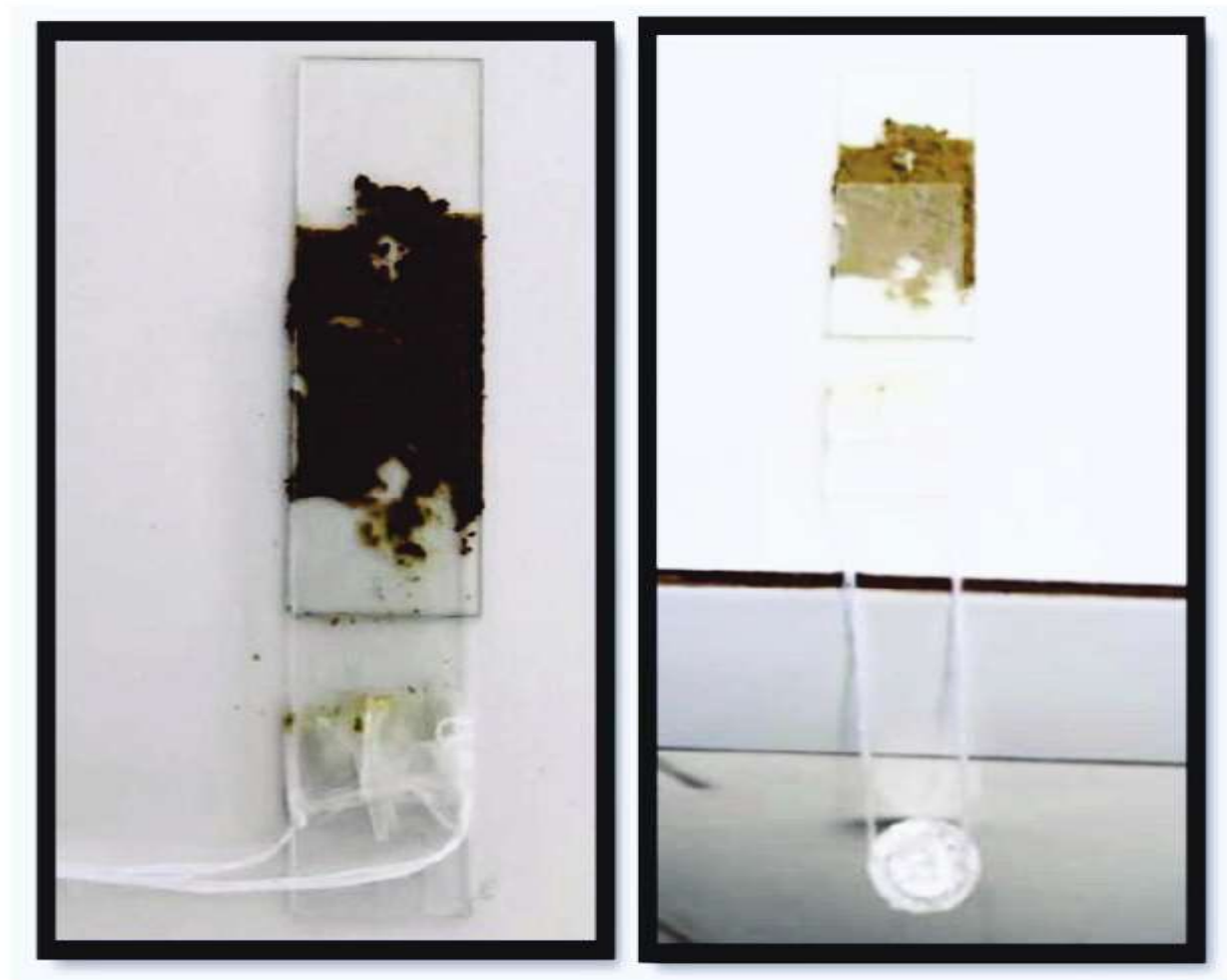


**Fig 8.1 Before & After**



**8.5 Spread-ability Test:**

Sr.no	Observation (gm-cm/sec)
<u>1</u>	<u>4.02</u>

*Table 8.5**Fig8.2 spread ability test*

**8.6 Drying time** : It was found that after applying hair dye gel the drying time was 24:54 minutes

**8.7 Before & After dye test** : the before and after test was performed findout the dye capacity on grey hair



*Fig 8.3 Before applying*



*fig 8.4 After applying and washing*

**8.8 Result** : *It was found that the dye has coloring properties with black color on grey hair*

*Preparation of hair dye (using natural colors)*

*Project work*



**9. CONCLUSION** : Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. It is a very good attempt to establish the Hair dye using natural colors pack containing different powder of plants. Hair dye with natural colors are used to colour hair with good antidandruff, hair growth, healthy hair nutrients property. The advantage of herbal cosmetics is their non-toxic nature, reduce the allergic reactions and time-tested usefulness of many ingredients. Herbal ingredients opened the way to formulate cosmetics without any harmful effect. They are considered as a sustaining and productive way to advance the appearance of skin. Herbal cosmetics advantages are nontoxic nature, reduce the allergic reaction. This hair dye pack is beneficial, economical, and passed all evaluation parameters. It has been revealed that hair dye pack having enough potential to give colour and dye hair. The overall study is useful to substantiate product claims due to its useful benefits on human beings. Thus, in the present work, we found good properties for the hair dye and further optimization studies are required on this study to find the useful benefits of hair dye using natural colors on human use as cosmetic product.





**10.REFERENCES :**

1. RASHMI MALLYA\*, PADMINI RAVIKUMAR International Journal of Pharmacy and Pharmaceutical Sciences ISSN- 0975-1491 Vol 7, Issue 3, 2015
2. MATTHEWHOFFMAN,MD(<https://www.webmd.com/skin-problems-and-treatments/picture-of-the-hair#:~:text=Hair%20is%20simple%20in%20structure,to%20build%20the%20hair%20shaft.>)
3. (<https://www.google.com/amp/s/slideplayer.com/amp/7480815/>)
4. (COSMETIC SCIENCES Concepts and Principle by (Dr. KAMLA PHATAK & Dr. ANKUR VAIDYA. NIRALI PRAKASHAN.)
5. Anagha Bangalore Kumar, Huma Shamim, and Umashankar Nagaraju International Journal of Trichology Wolters Kluwer - Medknow Publications Premature Graying of Hair Review with Updates
6. Anagha Bangalore Kumar, Huma Shamim, and Umashankar Nagaraju International Journal of Trichology Wolters Kluwer - Medknow Publications Premature Graying of Hair Review with Updates
7. Simone Aparecida da França, Michelli Ferrera Dario \*, Victoria Brigatto Esteves, André Rolim Baby and Maria Valéria Robles Velasco
8. Zahra Shahi Mohammad khajeh mehrizi Yazd University Mohsen Hadizad Yazd University. A Review of the Natural Resources Used to Hair Color and Hair Care Products July 2017 Journal of Pharmaceutical Sciences and Research 9(7):1026-1030
9. Hair Coloring and its Pros & Cons BY AAROHI JULY 12, 2021 • HAIR

10. Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
11. Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
12. Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98

### 13. LITERSTURE SURVEY

- a. **Z. Shahi, M. Khajeh Mehrizi\* , M. Hadizadeh** A Review of the Natural Resources Used to Hair Color and Hair Care Products Z. Shahi et al /J. Pharm. Sci. & Res. Vol. 9(7), 2017,1026-1030
- b. **MLA R, Pal rs, pal y, wal p.** In-house preparation and standardization of herbal face pack. Open dermatol j 2021;
- c. **Renu Singh and Sangita Srivastava**, preparation and standardization of herbal hair pack. dermatol j 2017;
- d. **Aniket S Katte, Manmat B Rumane, Naushad N Mirza, Sagar S Sontakke, Akshay R Kale and Mahewash A Pathan** Journal of Pharmacognosy and Phytochemistry 2019; 8(2): 1363-1365
- e. **Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal** The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOIb 10.2174/1874372201812010090, 2018, 12, 90-98
- f. **Shagufta Rehman\*, Shariq A. Khan, Nida Sultana, Sarfaraz Ahmad** TRADITIONAL AND INTEGRATIVE MEDICINE Med, Volume 4, Issue 1, Winter 2019 Review Traditional & Integrative Medicine Regional Research Institute of Unani Medicine, Aligarh, (Central Council for Research in Unani Medicine), Ministry of AYUSH, Government of India, India

- g. **Nurina Ayuningtyas<sup>1</sup>, Neneng Siti Silfi A, Fitria Habibah Tuanaya** *Program Studi Pendidikan Tata Rias, Fakultas Teknik, Universitas Negeri Jakarta* The 3rd International Conference on Cullinary, Fachion, Beauty, and Tourism (ICCFBT)2020
  - h. **Pranali Salunkhe\* and Pallavi Salve** FORMULATION AND EVALUATION OF POLYHERBAL HAIR DYE BY USING BEET ROOT International Journal of Current Advanced Research Vol 7, Issue 12(C), pp 16582-16584, December 2018
  - i. **K.Sudheer Kumar\*, Afreen Begum, B.Shashidhar, M.Meenu, C.Mahender, K.Sai Vamsi** Dept. of Pharmacology, Chilkur Balaji College of Pharmacy, Aziz Nagar, Hyderabad, Telangan Formulation and Evaluation of 100% Herbal Hair Dye International Journal Of Advanced Research In Medical & Pharmaceutical Sciences (IJARMPS-ISSN:2455-6998) Volum1,Issue.2,March.2016.
14. Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
  15. Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
  16. A.K Rai, Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
  17. Types of Hair Dye and Their Mechanisms of Action
  18. Cosmetics 2015, 2, 110-126; doi:10.3390/cosmetics2020110
  19. Laxmi N Jamagondi, Aniket S Katte, Manmat B Rumane, Naushad N Mirza, Sagar S Sontakke, Akshay R Kale and Mahewash A Pathan Journal of Pharmacognosy and Phytochemistry 2019; 8(2): 1363-1365



20. Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
21. RASHMI MALLYA\*, PADMINI RAVIKUMAR International Journal of Pharmacy and Pharmaceutical Sciences ISSN- 0975-1491 Vol 7, Issue 3, 2015
22. Z. Shahi, M. Khajeh Mehrizi\* , M. Hadizadeh A Review of the Natural Resources Used to Hair Color and Hair Care Products Z. Shahi et al /J. Pharm. Sci. & Res. Vol. 9(7), 2017,1026-1030
23. Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
24. Shagufta Rehman\*, Shariq A. Khan, Nida Sultana, Sarfaraz Ahmad TRADITIONAL AND INTEGRATIVE MEDICINE Med, Volume 4, Issue 1, Winter 2019 Review Traditional & Integrative Medicine Regional Research Institute of Unani Medicine, Aligarh, (Central Council for Research in Unani Medicine), Ministry of AYUSH, Government of India, India
25. Rashmi Saxena Pal, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal The Open Dermatology Journal Content list available at: [www.benthamopen.com/TODJ/](http://www.benthamopen.com/TODJ/) DOI: 10.2174/1874372201812010090, 2018, 12, 90-98
26. 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>]
27. Wallis te. Text book of pharmacognosy. 5th ed.. New delhi: cbs publishers & distributors, 2002; 123: pp. (132)210-5. [58] rajpal v. Standardization of botanicals. New delhi. Eastern publishers 2002; 1: 39-44. Tandon n, sharma m. Quality standards of indian medicinal plants. New delhi. Indian council of medical research 2010; 8: 161-3.

28. Kokate ck, purohit ap, gokhale sb. Pharmacognosy. 42nd ed.. Pune: india: nirali prakashan 2008; 6: pp. 1-a1
29. lachman l, lieberman ha, kanig jl. The theory and practice of industrial pharmacy. 3rd ed. 1987
30. Mandeep s, shalini s, sukhbir lk, ram ks, rajendra j. Preparation and evaluation of herbal cosmetic cream. Pharmacologyonline 2011; 1258-64.
31. Rani s, hiremanth r. Formulation & evaluation of poly-herbal face wash gel. World j pharm pharm sci 2015; 4(6): 585-8.
32. VALUATION OF ORGANIC HAIR DYE FORMULATION BY AN ENVIRONMENT FRIENDLY PROCESS PADMAJA NAISHADHAM\*, SUSHMA P.R, ROHAN DASIKA, SIDDHARTH TANGIRALA, SUMANTH TANGIRALA 4-7-41/10/B, STREET. NO.1, BAPUJI NAGAR, HMT NAGAR, NACHARAM, HYDERABAD, AND INT. J. PHARM. SCI. REV. RES., 21(2), JUL – AUG 2013; NO 28, 152-157
33. NENENG SITI SILFI A, FITRIA HABIBAH TUANAYA PROGRAM STUDI PENDIDIKAN TATA RIAS, FAKULTAS TEKNIK, UNIVERSITAS NEGERI JAKARTA THE 3RD INTERNATIONAL CONFERENCE ON CULLINARY, FACHION, BEAUTY, AND TOURISM (ICCFBT)2020
34. AFREEN BEGUM, B.SHASHIDHAR, M.MEENU, C.MAHENDER, K.SAI VAMSI dept. of pharmacology, chilkur balaji college of pharmacy, aziz nagar, hyderabad, telangan formulation and evaluation of 100% herbal hair dye international journal of advanced research in medical & pharmaceutical sciences (ijarmps-issn:2455-6998) volum1,issue.2,march.2016.
35. ***(DR. SANTRAM LODHI AND DR. MOHAN LAL KORI PRACTICAL BOOK OF HERBAL DRUG***