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A Review on Polyherbal Formulation for Hair Dyeing

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ABSTRACT
Coffee, curry leaf, custard apple, beetroot root and fenugreek make up the natural hair dye's makeup. Chemicals used in conventional hair colouring methods might have undesirable side effects like cancer, inflammation, skin discolouration, and hair breakage. Investigating the formulation of those plants utilising different orders to enhance the quality and efficacy of the colourant activity was the aim of the current investigation. Greying hair is a common phenomenon associated with ageing and frequent use of synthetic shampoos, which encourages the use of synthetic colours because of the increased usage of hazardous chemicals in their production. For that reason, we favoured utilising polyherbal hair colour.

KEYWORDS: Hair dyes, Greying, Poly herbal hair colour, Melanin, Herbal Pigmentation, Hair conditioning.

I. INTRODUCTION

These days, many prefer natural herbal hair dyes over chemical-based ones that might lead to skin and other skin-related conditions. The majority of people today are quite conscious about their appearance, and hair plays a significant part in this. For healthy hair, herbal medications that have no negative side effects are used. Balding and graying of the hair are issues that about 70% of people over 5 face. These signs of aging rarely appear earlier.

Many different extracts from plant were used for the purpose of hair dyeing in Europe and Asia before the invention of modern dyes.Use of these chemicals can result in unpleasant side effects, such as skin irritation, allergy, hair breakage, skin discoloration, unexpected hair coloretc. Continuous application of such compounds on natural hair causes multiple side effects such as skin irritation, allergy, hair fall, dry scalp, erythema and also skin cancer.

Plants that produce dye are used for their roots, stems, bark, leaves, berries, and flowers.Theprocess of changing the color of hair is known as hair coloring or hair dyeing.Hair color functions as an additional layer for your hair. As a result, the hair seems thicker and more voluminous. In thiscase, choosing a semi-permanent hair color is always a great idea because it gives your hair strength and improves itsappearance of health.

Every day, our hair is exposed to a variety of harmful environmental elements, such as dirty air, excessive heat, and fluctuating temperatures.Although graying of hair is a natural part of aging,Stress and synthetic shampoo use have been connected to early graying, especially in women. Hair color loss can be caused by various factors, including genetics, environmental factors, and alcohol usage.

The term "herbal" indicates safety when contrasted with artificial materials that are detrimental to human health. Human skin, eyes, and hair are colored by melanin. Your natural hair color is determined by the ratio of two types of melanin i.e. eumelanin, and pheomelanin. Peoplebegin to have gray hairs when they have avitamin B12 deficiency, thyroid conditions, or genetic or heredity issues.

Adults are mostlyat risk of early depigmentation due to conditions like illness, UV radiation, stress, alcoholuse, some medications, shock, and more. Changing the color of one's hair is referred to as hair coloring or dying. Restoring white and grey hair, altering the natural color to something more fashionable or appealing, or returning the hair to its original hue after it has been discolored by hair coloring or sun bleaching.

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While you get your hair colored, you get a shielding layerwhich protects your natural hair from those environmental dangersColors that come from plants, animals, or insects that aren't processed chemically are known as natural dyes.In India,inside thepresent technology of eco-conservation, using herbal dyes has been revived andreviewed for the color of textiles and meals substances.

Use of these chemicalscan bring about unsightly side effects, together with pores and skin irritation,allergic reaction, hair breakage, skin discoloration, sudden hair shade and so onhenna has been used traditionally for coloring fingers and hairs.

Composition ofherbal dyes and hair coloring mordant can be used to deliver a variety of haircolors to the hair. However, substantial improvement is needed in the areas ofcolor saturation, color development, precise initial color consistency, improvedwash fastness, improved hair conditioning without causing hair damage and skinirritation.

There is an urgent need for an alternative to the current black dye due to the manufacturing risks, environmental contamination, and its adverse and harmful impacts. Only by substituting non-toxic chemicals made from herbal resources for the composition's constituents can these limits of the chemically created color be addressed. The black dye produced from herbal resources may be used in widevariety of context including hair color products.

HAIR GROWTH CYCLE

1.Anagen phase

The Anagen Phase, also known as the 'Growth Phase' or 'Active Phase,' occurs when the cells in the root of your hairdivide the most rapidly, resulting in the formation of more new hair.Your hair grows half an inch per month [about six inches annually] during the Anagen Phase, and it grows more quickly in the summer than it does in the winter. Anagen follicles are straight and long. The hair coat is angled so that it rests flat on the body. The cell cycle of proliferating matrix cells lasts roughly eighteen hours. From outermost toinnermost, daughter cells ascend through six IRS and HS lineages. Cuticle, cortex, and medulla are the HS layers, whereas Henley, Huxley, and cuticle are the IRS layers. As HS cells differentiate, they expelproviding the hair shaft with exceptional tensile strength and flexibility.

2. Catagen phase

The catagen phase starts after the anagen growth phase is over. The keratinized brush-like structure at the base of the club hair, which is surrounded by ORS epithelial cells, fixes it in the telogen follicle. The dermal papilla changes into a group of dormant cells that are situated next to the regressing hair follicle epithelium and move from the subcutis to the boundary between the dermis and subcutis to remain in contact with the hair follicle epithelium that is further removed, including the bulge and the secondary hair germ. The duration of this phase is a few weeks.

3. Telogen phase

Encircled by ORS epithelial cells, the keratinized brush-like structure at the base of the telogen follicle holds the club hair in place. To stay in contact with the hair follicle epithelium that is further removed, which includes the bulge and the secondary hair germ, the dermal papilla transforms into a group of dormant cells that are positioned next to the regressing hair follicle epithelium and move from the subcutis to the boundary between the dermis and subcutis. Thisstage lasts for a couple of weeks.

4. Exogen phase

It is also known as the shedding phase.Simply said, the exogen phase of hair development is an extension or part of the telogen phase. During the exogen period, which can last 2 to 5 months, new hairs grow in the follicles while old ones fall out.

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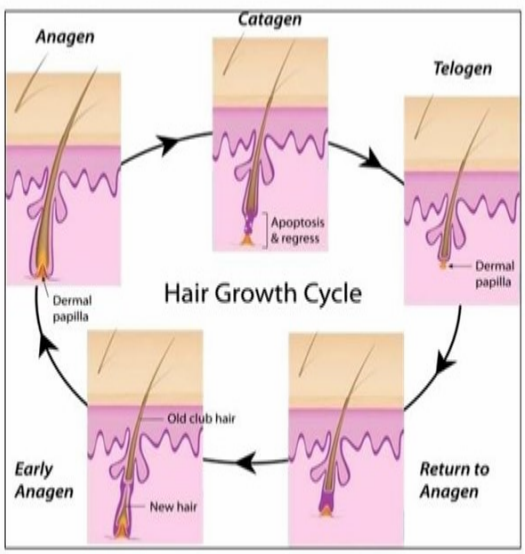

Figure 1 Hair Growth Cycle

ADVANTAGES

- One of the greatest quick remedies that has no negative effects is using herbal hair color.
- There is no mess or hair color streaks on your skin.Using actual human hair fiber with aherbal look.
- Can be styled as a natural hair.
- Capable of coloration and perm.
- Movements like natural hair.
- Much less susceptible to warmth harm

DISADVANTAGES

- The effectiveness of herbal medications is lower than that of allopathic dose types.
- It requires long tenure therapy.

TYPES OF HAIR DYE:

• They are intricate to cover taste & odor.
• More steeply-priced.
• Want extra protection and care.
• Requires styling.
• Can be heavier in weight after applying, which may cause itching.

1.Temporary

• Temporality is achieved by shading the hair with these types of hair colors..
• The colorants which are used would not penetrate into the hair or surrounding.
• Maybe without difficulty rinsed off water one shampooing.
• Temporary hair coloring occasionally involves using a puffer spray to apply finely ground metals.
• Simple dyes are used in aqueous or hydroalcoholic solutions for rinsing.

2.Semi-Permanent

• Semi-permanent dye includes particularly either Nitrophenylene diaminesor Nitroaminophenes or both Aminoanthraquinoes.
• Shampoo is the maximum generally used base.
• The addition of solvent may improve colorants' overall performance.
• The majority of them are primary dyes, which have an innate affinity for hair due to their cationic nature.

3.Permanent

• Maximum popular hair dye merchandise.
• The dyes are shaped throughout the dyeing technique and aren't present, as such in the solution before application.
• They motive some hair damage.
• Permanent dye systems are capable of dye hair a lighter color than the original.
• includes Elements ,Dye intermediates,oxidizing agent.

TAXONOMICAL PROFILE

1.fenugreek

Botanical name: Trigonella Foenum-Graecum

Kingdom: Plantae

Order: Fabales

Family: Fabaceae

Genus: Trigonella

Species: Foenum-graecum

Plant part: Seed

Chemical Constituents: Diosgenin, Triogenin, flavonoids.

Role: Antimicrobial dandruff treatment, Strengthens hair and adds shine.

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Figure 2

2.Coffee

Scientific classification

Kingdom: Plantae

Family: Rubiceae

Tribe: Coffeeae

Genus: Coffea

In hair colorants, herbscan be used in the form of powder, aqueous extract or their seed oil to influence many color colors, ranging from reddish brown to blackish brown. Herbal medications, such as coffee powder made from its seeds, are applied as hair colorants. aids in hair coloring for a more natural appearance.

Figure3

3.curry leaf

Scientific Name:Murraya koenigii (L.) Spreng.

Family:Rutaceae.

Genus:Murraya.

Plant Form:Typically a small tree or large shrub.

Leaves:Pinnately compound, small, glossy, elongated, and vibrant green. They are characterized by a central stem with 11 to 21 pairs of leaflets.

Flowers:White, funnel-shaped, and sweet-smelling, arranged in panicles.

Fruits:Small, round to oblong drupes that are green and turn black when ripe, with each containing one large seed.

Figure 4

4.Custard apple

It also helps to deal with premature greying of hair in both men and women.Custard apple is a great natural source of copper and gives hair the dark melanin color and that it lack.To have thick, long, shiny and lustrous hair,one can apply the fruit paste on the hair loss when applied on the scalp. The considerable in the amount of iron in custard apple improves blood circulation, in the scalp stimulating the follicle to promote hair growth.

Figure 5

5.Beetroot

Botanical name: Beta vulgaris

Kingdom: Plantae

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Family: Chenopodiaceae

Genus: Beta

Species: vulgaris

Plant part: Root

Chemical constituents: Betaxanthin,Betanin

Role: nourishment for scalp, used as a natural hair color.

Figure 6

METHODS OF HAIR DYE PREPARATION

1. Weighing :

Next a worker weigh out of the ingredient for the batch. For some ingredients, only a small amount 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 mix mixture.The texture.The ingredients are completely mixed with each other.

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 ware house to await distribution.

S.NO	INGREDIENTS	QUANTITY
1.	Fenugreek powder	5gm
2.	Coffee powder	4.5gm
3.	Curry leaf powder	3gm
4.	Custardapple seed powder	3gm
5.	Beetroot powder	5gm

Table: formulation of herbal hair dye

REFERENCES:

[1]. Rashmi S., Yogendra P., Synthesis and Evaluation of Herbal Based Hair Dye, The Open Dermatology Journal 2018, 12, 90-98.

[2]. Dharmistha P., Sarala N., Bhuvana K., Trends in Use of Hair Dye: A Cross-Sectional Study, International Journal of Trichology, Jul-Sep 2013, Vol-5, Issue-3.

[3]. Michelli D. a, Richard P. b, Efficacy of Punica granatum L. hydroalcoholic extract on properties of dyed hair exposed to UVA radiation, Journal of Photochemistry and Photobiology B: Biology, Volume 120, 5 March 2013, 142-147.

[4]. Mrinal G., A study of knowledge, attitude, and practices regarding the study of knowledge, attitude, and practices regarding hair dye use among the general population, Department of Dermatology, 2018, 15-18.

[5]. Nilani P., Saravanan K., Formulation and Evaluation of Herbal hair dye: An eco-friendly process, Journal of pharmaceutical science and research, Vol.2(10); 2010, 648-656.

[6]. Mane A., Prof.Aswar A.R., HINGANE L.D., Formulation and Evaluation of Herbal Hair Dye, International Journal of Creative Research Thoughts (IJCRT), 2021, Volume 9, Issue 12, 2320-2882.

[7]. Pratik Gupta, Mr. Yogesh Tiwari, Formulation and evaluation of herbal hair dye: A review article, International Journal of Health Sciences, 6(S6), 3591–3609.

[8]. Waggh J.H ., Dhangar P. S., Formulation and Development of Polyherbal Hair Dye, Journal of emerging technologies and innovative research (JETIR), Vol 10 (2023),2349-5162.

[9]. Amreen Fatima AF, Shashi Alok SA, Parul Agarwal PA, Singh PP, Amita

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Volume 10, Issue 5 Sept - Oct 2025, pp: 383-388 www.ijprajournal.com
ISSN: 2456-4494

Verma AV. Benefits of herbal extracts in cosmetics: a review. 2013.

[10]. Meenaprabha P, Kamalakkannan V, Sambathkumar R, Janani R, Nithyanandham S. Formulation and evaluation of herbal hair dye. World Journal of Pharmaceutical Research. 2021 Mar 2;10(5):1533-44.

[11]. Joshi MV, Nilkanth JV, Rasane SR. Knowledge, practice, and adverse reactions amongst hair dye users-a cross sectional study. Int J Ayurvedic Med. 2021;12(3):645-8.

[12]. Jamagondi LN, Katte AS, Rumane MB, Mirza NN, Sontakke SS, Kale AR, Pathan MA. Development and evaluation of herbal hair dye formulation. Journal of Pharmacognosy and Phytochemistry. 2019;8(2):1363-5.

[13]. Lachman L, Lieberman HA, Kanig JL. The theory and practice of industrial pharmacy. Philadelphia: Lea & Febiger; 1976.

[14]. Sankar J, Sawarkar S, Malakar J, Rawat BS, Ali MA. Mechanism of hair dying and their safety aspects: a review. Asian Journal of Applied Sciences. 2017;10:190-6.

[15]. Shahi Z, Mehrizi MK, Hadizadeh M. A review of the natural resources used to hair color and hair care products. Journal of Pharmaceutical Sciences and Research. 2017 Jul 1;9(7):1026.

[16]. Palaniappan V, Karthikeyan K, Anusuya S. Dermatological adverse effects of hair dye use: A narrative review. Indian Journal of Dermatology, Venereology and Leprology. 2023 Jul 27:1-7.

[17]. Wahyuningsih S, Ramelan AH, Wardani DK, Aini FN, Sari PL, Tamtama BP, Kristiawan YR. Indigo dye derived from Indigofera tinctoria as natural food colorant. InIOP Conference Series: Materials Science and Engineering 2017 Apr 1 (Vol. 193, No. 1, p. 012048). IOP Publishing.

[18]. Ghosh B, Chandra I, Chatterjee S. Fenugreek (Trigonella foenum-graecum L.) and its necessity. Fire Journal of Engineering & Technology. 2015;1(1):60-7.

[19]. Adeel S, Abrar S, Kiran S, Farooq T, Gulzar T, Jamal M. Sustainable application of natural dyes in cosmetic industry. Handbook of renewable materials for coloration and finishing. 2018 Jul 16:189-211.

[20]. Oh JY, Park MA, Kim YC. Peppermint oil promotes hair growth without toxic signs. Toxicological research. 2014 Dec;30:297-304.

[21]. Handa P. Herbal Beauty Care. Orient Paperbacks; 2005.

[22]. Abu-Ghosh S, Sukenik N, Amar Z, Iluz D. Yellow dyes in archaeological textiles: Sources, locations, identification, and challenges. Journal of Archaeological Science: Reports. 2023 Jun 1;49:104030.

[23]. Prakash B, CH S, Melappa G, Gavimath C. Evaluation of antifungal activity of banana peel against scalp fungi. Materials today: proceedings. 2017 Jan 1;4(11):11977-83.

[24]. Polar M. Dikilitas M. Oztas P, Ali N. Allergic contact dermatitis to pure henna. Dermatol Online J 2009: 1S (1):15.(PMID:19281720) Mac Dougall Color in food woodhead publishing Ltd 1st Ed. 2002

[25]. 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)

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

[27]. 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.

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

International Journal of Pharmaceutical Research and Applications
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ISSN: 2456-4494

[29]. Alali, F. Q., Liu, X. X. and Mclaughlin, J. L. (1999).Annonaceous acetagennis :recent progress. Journal of Natural. Product. 62:504-540.
[30]. Bhakuni,D.S.Tewari, S. and Dhar, M. M. (1972).Aporphine alkaloids of Annona Squamosa. Phytochemistry. H (5):1819-1822.
[31]. Janick, J. and Paull, R. (2006).The Encyclopedia of Fruit and Nuts. Publisher. CABI.
[32]. 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.
[33]. Khare CP. Encyclopedia of Indian medicinal plants 2004:197-8.
[34]. Willamson EM. Major herbs of ayurveda 2002 :126-8.
[35]. Lachman L, Lieberman HA,Kanig JL-The Theory and practice of industrial pharmacy 3rd ed1987.