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Research Article

**DYNAMIC FORMULATION OF HAIR COLOR SPRAY
CONTAINING NATURAL HERBS**¹Mr. Aniket Sadashiv Joshi*, ²Prof. Pavan. N. Folane, ³Miss. Pallavi Milind Borse,
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Abstract:

The active constituents present within the hair color spray are non-toxic and empty any side effects. The mordant used is of natural origin and springs from herbal individual powders of extracts sort of a Neem powder Extract, Beetroot powder Extract, Coffee powder extract, Annatto powder extract, extract powder extract, indigo powder extract, Amla powder extract were tested for his or her hair. Facilitate its application and enhance. Penetration of the hair in to cortex region of the human hair. it's prepared from 100% water soluble plant ingredients; hence it's free from any obnoxious odor. The raw materials used and also the final product is completely biodegradable. The extracted pigments entirely impart its color to the hair and don't react with it. The pigment penetrates deep in to medulla region without rupturing the cortex. The formulation contains 100% water soluble herbal extracts. The solvent and carrier utilized in the full preparation is just H₂O. Very simple to use and a highly economical hair dying Process. the merchandise is stable at temperature. The composition and mode of preparation is environmental friendly.

KEYWORDS- Hair Color Spray, *Emblica officinalis*, *Beta vulgaris L.***Corresponding author:****Aniket Sadashiv Joshi,**

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1. INTRODUCTION:

1.1 Hair

In humans, hair has an aesthetic function influencing our appearance. For hundreds of years, decoration and styling of the scalp hair are means of social communication furthermore as display of social identity and standing. Today, it also has social, psychological, and sexual significance. Any change within the pattern of the hair, like hair loss, hair overgrowth, or color change, may negatively affect the self-esteem of people and has emotional consequences. Additionally, hair is an aid in camouflage and protection from the sun and provides sensory, tactile information about the environment.¹

1.1.1 Structure and Function of Human Hair

Hair may be a flexible thin keratin thread with great strength and elasticity. It's present on most surfaces of the human skin, apart from the palms, soles, vermilion zone of the lips, and certain genital parts. Each hair consists of a root embedded within the dermis and a hair shaft protruding above the surface of the skin. The hair root is surrounded by a tube-like sheath made from epithelial cells that form a downward extension of the epidermis into the dermis. This is often called the follicle. The bottom of the basis and follicle is slightly larger than the remainder of the root; this onion-shaped structure is termed the hair bulb. The hair bulb receives a cluster of blood vessels from the dermis which pushes into the bulb to create the hair papilla (otherwise called the dermal papilla). Oxygen and nutrients via the blood vessels supply the actively growing cells within the follicle around the hair bulb called the hair matrix. These cells are the sole source of recent hair.²

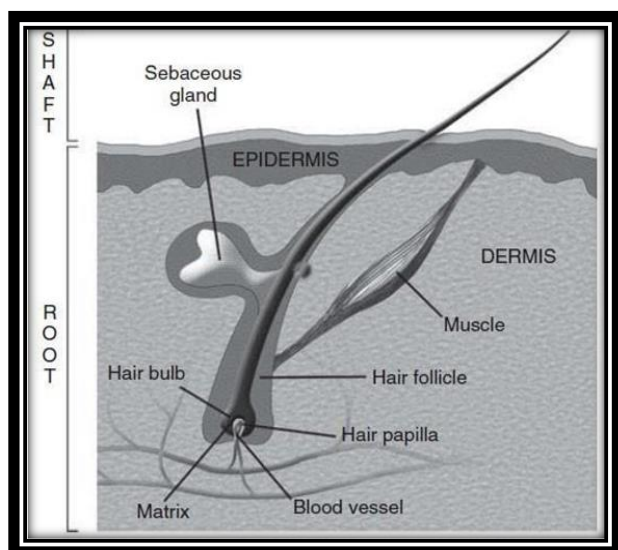


Fig.No 1- Human Hair

The hair shaft itself arises from the bulb region of the basis and is produced by rapidly multiplying matrix keratinocytes. The expansion of hair is comparable thereto of skin cells; as cells divide and grow, they push older cells upward far from the blood supply,

leading to gradual death and keratinization. About midway to the surface, all cells forming the hair root die and complete the method of keratinization. The shaft is, therefore, made up entirely of dead cells composed mainly of keratin. These cells remain attached to every other by an intercellular cement-like substance.

1.1.2 Hair Types

Hair may be classified in several ways, supported its color, thickness, shape, texture, length, and curliness. The most classifications are discussed within the following sections. Classification supported Thickness Hair thickness refers to the diameter of individual hair shafts. Generally, hair may be classified as coarse, medium, or fine. Someone may have a mix of those types with one being the foremost prevalent.

- **Coarse hair** is that the thickest. It's often more proof against chemical processes, like hair perming, than medium or fine hair and frequently requires longer for completing such procedures.
- **Medium hair** is typically considered the quality to which other types are compared.
- **Fine hair** is that the thinnest and, therefore, is more fragile and more prone to damage. Classification supported Color Natural color is that the results of melanin present within the cortex. There are two sorts of melanin: eumelanin, which provides dark brown and black color to hair, and pheomelanin, which provides red to blond tones. Natural hair color ranges from black, brown, and blond to red with subtle hues in each category. The range of hair pigmentation results mostly from the amount and ratio of eumelanin and pheomelanin.³

1.1.3 Hair Coloring Products

Colored hair has become a typical statement of individuality, youth, and fashion. Today, consistent with some estimates, over 60% of girls within the US color their hair, as do a growing number of men. Additionally, an estimated 50% of yankee women above the age of 25 color their hair; this market is predicted to still grow. Hair colorants are widely employed by both genders to change their natural

hair color by removing a number of the present color and/or adding a brand new color. While most consumers have their individual reasons, the most motivator for coloring the hair is to hide up gray hair. The hair color will be changed temporarily (for 1 time up to 24 times of shampooing) or permanently. The hair coloring procedure may be done reception with kits sold commercially or in salons by professionals.

This section provides an outline of the varied techniques and products available to change the haircolor. It reviews the most product types, their ingredients and formulation technique, still as their required qualities and consumer needs. The safe use of hair coloring products has always been a hot topic; therefore, the most issues and also the scientific evidence behind them also are discussed here.

1.2 Types and Definition of Hair Coloring Products

Today's hair color products can remove (lift) natural hair color, add (deposit) a brand new color to the natural color, or accomplish both processes at the identical time. The dimensions of the coloring molecule, swelling of the hair at the time of application, and alkalinity of the dye product determine whether the dye penetrates the cortex and colours the hair for an extended period of your time or precipitates on the cuticle and provides a short lived effect. Hair coloring products are often classified in several ways. supported the action of hair coloring products, we are able to distinguish between hair dyes and hair bleaches.

1. Hair dyes add color to the hair, which may be lighter or darker looking on the kind of hair coloring product used.

2. Hair bleaches only lighten the hair without adding a brand new color to that. supported the permanency of the new color, the subsequent hair coloring product types are available on the market today: temporary, semi-permanent, demi-permanent, and permanent dyes, likewise as hair bleaches.

3. Temporary hair dyes adhere to the surface of hair fibers by weak chemical bonds and, therefore, are washed out by the primary shampooing.

4. Semi-permanent dyes adhere to the skin of hair fibers and partially penetrate the cuticle layers, making the dye longer lasting.

5. Demi-permanent hair dyes penetrate the cuticle and cortex. They contain an oxidizer, have a more alkaline pH and are, therefore, significantly longer lasting than the previous types. However, they're still

not completely permanent and can't lighten the first hair color.

6. Permanent hair dyes also penetrate both the cuticle and cortex. They contain the next amount of oxidizing agents and have a highly alkaline pH (compared to demi-permanent dyes), which make them permanent. they will be wont to change the initial hair color into two shades: either lightening it or darkening it. because of their composition, they're the foremost damaging chemicals among the hair coloring products. Permanent hair coloring may also be achieved without oxidizing agents. These products employ metal ions and are called progressive hair dyes.

7. Hair bleaches remove the hair color through a chemical process. they will be used alone or by combination with permanent hair colors.

1.3 How Hair Coloring Products May Affect the Scalp and Hair?

Hair frames the face, and thus, it's one among the foremost important features in terms of first impressions. Following a person's smile, eyes, and skin, the hair is commonly the subsequent feature people notice on first encounters. Additionally, it's among the highest features used when describing others. Attractiveness is strongly connected to confidence and positive self-esteem. Styled, well-kept hair gives the external appearance of being well managed, which successively can contribute to feeling the same way internally. Hair coloring products can significantly contribute to a healthy and well-managed appearance. this is often what makes hair dyeing products one among the fastest growing segments of the whole hair care market. As mentioned earlier, the key motivator for coloring the hair is graying. Graying can have a major effect on both men and girls, including emotional and psychological stress furthermore as lowered self-esteem. Hair coloring products can hide the grey hair shafts and may have a life-transforming potential. Statistics show that people feel more attractive and younger after having their hair colored additionally as more confident in their private life and work environment. Additionally, people are rarely satisfied with their natural hair color. a large kind of hair coloring products offers an choice to everyone to change their hair color, which might also contribute to self-esteem and confidence. Hair coloring products, however, can have potential negative effects on the hair and scalp even under recommended conditions of use. These should be considered before undergoing a hair coloring treatment.

- Oxidative hair dyes, including demi-permanent, permanent, and bleaching products, contain peroxide and have an alkaline pH, which may have a big effect on the hair shaft's structure and its physical state. the upper the pH, the more damaging the procedure. Generally, oxidative hair dyeing procedures may result in damaged cuticle, porous hair, decreased enduringness, and increased hair breakage. of these can cause undesirable sensorial attributes, like poor shine, poor feel, coarse hair, which also lacks luster. Additionally, hair that has been permanently colored or bleached is more sensitive to physical and environmental damage. It should be emphasized that these changes are more prominent with frequent use and inappropriate application technique.
- Hair dyes can cause sensitivity, mainly at the positioning of application. aversions to hair dyes are well known; however, the quantity of adverse reactions is estimated to be but 0.5% of the overall population, which continues to be relatively rare, taking under consideration the quantity of individuals using such products. A key hair coloring ingredient (dye intermediate), also called a skin sensitizer, is para-phenylenediamine (PPD). PPD is an element of the quality patchtests. Main symptoms of allergy to the current ingredient include scalp redness and itching. Progressive and temporary hair dyes present minimal risk for hypersensitivity, as they are doing not contain PPD. Permanent hair dyes contain the best amount of this ingredient and, therefore, pose a possible risk for clients still ashairdressers. For permanent and even for semi-permanent hair colorants, consumers are advised to conduct a skin sensitivity test with the merchandise to be used 48 h before hair coloring, by following the manufacturer's recommendations. just in case of any allergic reaction, the hair dyeing product should be removed immediately, and users should contact their dermatologist. so as to stop such reactions, hairdressers are usually advised to wear gloves during the hair dyeing process.
- Hair bleaching has also been reported to cause skin irritation, including scalp burns and allergic dermatitis.

1.4 Required Qualities and Characteristics and Consumer Needs

From a consumer perspective, a quality hair coloring product should possess the following characteristics:

- Gentle to the hair and scalp, does not dry or damage it
- Good coverage for gray hairs
- Does not color skin
- Permanent dyes: long-lasting coloring effect
- Easy to spread on the hair
- Easy to rinse off from the hair
- Well-tolerated and non-allergenic.

1.4.1 The technical qualities of hair coloring products can be summarized as follows:

- Strong coloring power
- Appropriate rheological properties
- Appropriate pH
- Long-term stability
- Dermatological safety.

1.5 Types, Typical Ingredients, and Formulation of Hair Coloring Products

Today, a good range of products for changing the colour of hair is out there to consumers. Hair coloring products will be categorized supported the presence or absence of the chemical process (known as oxidation) involved within the hair coloring process. Non-oxidative products include temporary dyes and semi-permanent dyes, while demi-permanent dyes, permanent dyes, and hair bleaches fall under the category of oxidative products. a further product type is thought as progressive hair dyes, which are permanent but not oxidative.

i. Non-Oxidizing Products The products that belong to the current category don't contain oxidizing agents, as their name implies. As a result, non-oxidizing dyes aren't ready to produce lighter shades than the originally presenting shade and can't significantly darken the originally presenting color.

ii. Temporary Dyes Temporary dyes or color rinses usually contain molecules that are overlarge to penetrate the hair cortex and even have low affinity to hair, meaning that the binding forces between the hair cuticle and also the dye molecules are low.²⁴ As a result, temporary dyes provide a weak coating on the hair cuticle (see Figure 2) and are easily washed out after the primary shampooing. Temporary coloring agents include a compounds, triphenylmethane-based dyes, indolamines, and indophenols.

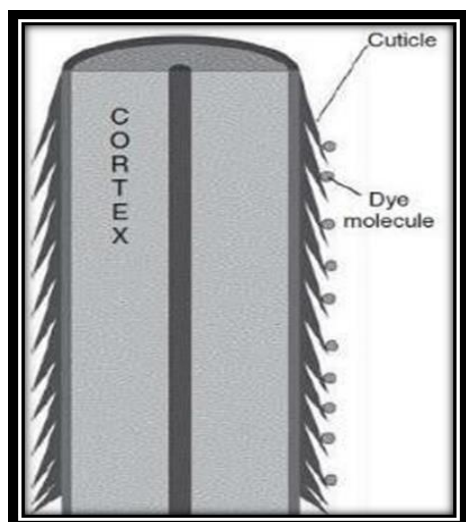


Fig.No.2 Temporary dyes provide a weak coating on the hair cuticle

It should be kept in mind, however, that individuals who had permanent straightening, permanent waving, or maybe previous permanent coloring may have damaged cuticle, making the hair less proof against the dyes. In such cases, the dyes can enter the cortex. Under these conditions, it's going to take over one shampooing to get rid of the colour. Temporary hair coloring products are often accustomed add a small tone, brighten the hair, refresh the already colored hair, or undertake a hair color before permanently dyeing the hair. Typical product forms include liquids, shampoos, hair mousses, gels, and hair sprays.

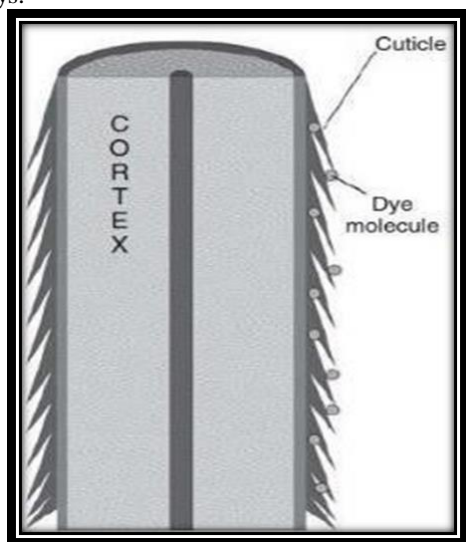


Fig.No.3 Semi-permanent hair dyes penetrate the hair cuticle

iii.Semi-Permanent Dyes usually employ dyes that are sufficiently little to to some extent (see Figure 3),

additionally to staining it from the outside, and, hence, remain on the healthy hair through 6–8 shampooing. Semi-permanent coloring agents usually include nitro phenylenediamines, nitro amino phenols, and azo dyes. Like temporary dyes, their effect is also longer, if applied to damaged, porous hair. they're usually used on natural, unbleached hair to hide gray, add highlights, and canopy up unwanted tones.³⁰ The pH of semi-permanent dyes is slightly alkaline (7.0–9.0), making the cortex to swell and rise.

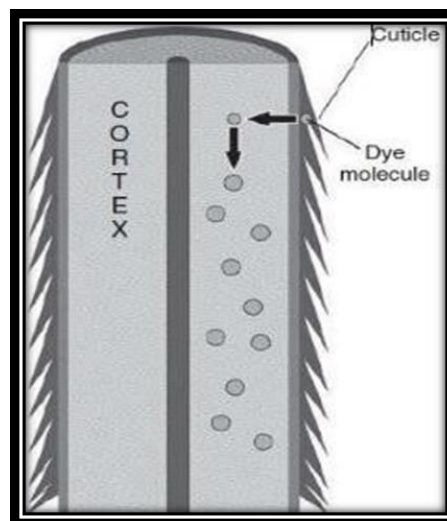


Fig.No.4 oxidizing hair small dye intermediates into the cortex.

iv.Oxidizing Products are two-component systems: one component contains colorless dye intermediates (such as PPD; p-toluene diamine, PTD; and p- amino phenols) and couplers (such as resorcinol and m-amino phenols) in a very highly alkaline formulation. the opposite component contains oxide (the oxidant, otherwise called the developer or activator). These products are mixed right before application, which generates a reaction. The alkaline agent swells the hair cuticle and thus helps the penetration of the relatively

v.Demi-Permanent Hair Dyes Demi-permanent products are a more recent category of hair coloring products. They typically employ 2% oxide and lower levels of alkalizers (usually mono-ethanolamine). Their effect is longer lasting than that of semi-permanent colors; however, it's still not permanent because of the utilization of non-ammoniacal alkaline agent. they're gradually washed out, usually during 20–24 shampooing.

vi.Permanent Hair Dyes Permanent hair coloring agents are the foremost popular today. Their popularity is because of the large choice of shades

available further as their ability to both lighten and darken the hair. Permanent hair dyes may be accustomed entirely cover gray hair and produce a totally new color. Permanent colorants use up to six peroxide and contain ammonia as an alkalizer to bring the pH of the ultimate product to 9.0–10.5. This permits complete penetration across the cortex.⁵

2. Aim:

To Formulation, Development and Evaluation of Hair Color Spray.

2.1 Objective:

3. ACTIVE PROFILE

3.1 Amla powder:

The objective of this project is to formulate, develop and evaluate a hair color obtained from natural origin, which have multifunctional activity. It will have following properties:

- ❖ Provide color on hair shaft.
- ❖ Provide conditioning to hair shaft.
- ❖ Provide antidandruff property.
- ❖ Provide manageable hairs.
- ❖ Provide anti-frizz property.
- ❖ Remove buildup from the hairs.
- ❖ Impart shine on the hairs.
- ❖ Provide nourishment to the hair.



Fig.No 5 *Emblica officinalis*

Colour	Green changing to light yellow or brick red when matured.
Odour	None
Taste	Sore and astringent.
Shape	The fruits are depressed, globose.
Size	1.5 to 2.5 cm in diameter.
Extra Features	Fruits are fleshy obscurely four-lobed with 6-triangular seeds. They are very hard and smooth in appearance.

Emblica, Indian goose berry, amla. This consists of dried, as well as fresh fruits of the plant *Emblica officinalis* Gaerth (*Phyllanthus emblica* Linn.), belonging to family Euphorbiaceae.

It is highly nutritious and is a very important dietary source of ascorbic acid, minerals, and amino acids. The green groceries tissue contains protein concentration 3-fold and vitamin C concentration 160-fold compared thereto of the apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apples. The pulpy portion of fruit, dried and free of the nuts contains: acid 1.32%, tannin, sugar 36.10%; gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12%; and moisture 3.83%. Tannins are the mixture of acid, ellagic acid, and phyllembin. The alkaloidal constituents like phyllantidine and phyllantine have also been reported within the fruits. An immature fruit contains indolacetic acid and 4 other auxins— a_1 , a_3 , a_4 , and a_5 and two growth inhibitors R1 and R2. The fruits are diuretic, acrid, cooling, refrigerant, and laxative. edible fruit is beneficial in haemorrhage, diarrhoea, diabetes, and dysentery. they're useful within the disorders related to the gastrointestinal system and also are prescribed within the treatment of jaundice and coughs. it's antioxidant, antibacterial, antifungal, and antiviral activities. Amla is one amongst the three ingredients of the famous ayurvedic preparation, triphala, which is given to treat chronic dysentery, bilousness, and other disorders, and it's also an ingredient in chyavanprash.

3.2 Beetroot Powder:



Fig.No 6 Beetroot (*Beta vulgaris* L.)

Beetroot are Kingdom:		Plantae
Division:		Magnoliophyta
Class:		Magnoliopsida
Order:		Caryophyllales
Family:		Chenopodiaceae
Genus:		Beta
Species:		<i>B. vulgaris</i>

Beetroot (*Beta vulgaris* L.) belongs to the Chenopodiaceae family. it's bright crimson colour. Beetroot is often referred to as beet, chard, spinach beet, sea beet, garden beet, white beet and Chukander (in Hindi). it's very medicinal properties which give some positive effect on the shape. Beetroot are often eaten raw, boiled, steamed and roasted. Red beetroot may be a rich source of minerals (magnesium, manganese, sodium, potassium, iron, copper) (Mathangi, 2019) [14]. The beetroot has different medicinal properties and help to shield against cardiopathy and certain cancers (colon cancer) (Kavalcova et al., 2015). Beetroot are rich in other valuable compound like glycine, betaine (De Zwart et al., 2003) [6], Saponins (Atamanova et al., 2005) [1], betacyanin (Patkai et al., 1997) [15], carotenoids (Diasetal., 2009) [7], folates, betanins, polyphenols and flavonoids (Vali et al., 2007) [20]. Beetroot contributes to consumer's health and wellbeing because it's antioxidant property thanks to the presence of nitrogen pigment betalain. Beetroot also are known for its antimicrobial and antiviral effects (Strack et al., 2003) [19] and it may also inhibit the cell proliferation of human tumor cells (Reddy et al., 2005) [18]. Beetroot is one among the natural food which boosts the energy because it has one among the best nitrates and sugar contents plant (Yadav et al., 2016) [22]. Beetroot makes a superb dietary supplement because it isn't only rich in minerals, vitamins and nutrients but it also has unique Phytochemical compounds (carotenoids, phenolic acids, ascorbic acid) which have many medicinal uses. Several parts of this plant are used as antioxidant, antidepressant, antimicrobial, antifungal, anti-inflammatory, diuretic and carminative. (Yadav et al., 2016) [22]. The beetroot is an alkaline food

with a pH 7.5-8 and it contains significant amount of antioxidant, vitamin B1,B2, niacin, B6, B12 and its leaves are excellent source of fat-soluble vitamin. The beetroot juice also can be consumed as a natural remedy to expel kidney and bladder stones and also for sexual weakness. Beetroot is simple to grow and is often ranked united of the highest 10 vegetables grown in India. Beetroot is grown for food uses (pickles, salad, juice) instead of for sugar production. In contrast to other fruits, the most sugar in beetroot sucrose with only touch of glucose and fructose (Bavec et al., 2010) [2]. Because fructose lowers one's exercise capacity, low fructose and high sucrose content, for instance, in sports drinks. Beet powder is employed as a colouring agent for several foods product. Some frozen pizzas use beet powder for colouring in pasta sauce. the foremost common garden beet is crimson ruby in colour, but yellow, white, and pepper arrows are available in specialty markets. Outside the u. s., beets are often called beetroots. it's estimated that about two thirds of the beetles' crops remain chemical. The Greek Peripatetic Theophrastus later describes the identical beetle as an herb, while Aristotle also mentions a plant (Hilland Langer, 1991) [9]. Beets are employed in molded vegetables, flowering roots, and beetles and in many product systems. Beetroots for processing and fresh market are harvested mainly in September and October. A yield of 20,000 kg per hectare (Beetroot, 1983). The roots and greens are great for ladies health and for those planning pregnancies. The fresh beetroot and sliced.

3.3 Annatto Powder:



Fig.No 7 *Bixa orellana*

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Rosids
Order	Malvales
Family	Bixaceae
Genus	<i>Bixa</i>
Species	<i>B. orellana</i>

Annatto, and it's over just a fairly seed. Annatto or *Bixa orellana* may be a shrub native to South and Central America together with the Caribbean. Annatto has other names like *Aeschynanthus radicans* and it's derived from the seeds of the achiote tree. Annatto is widely cultivated for its fruit seeds where a natural colorant springs. The achiote tree grows branches and prickly, reddish-orange heart-shaped pods that contain around 50 seeds. The seeds are said to possess a rather peppery smell with a touch of nutmeg together with a peppery, nutty, and sweet taste. The seeds of the annatto are covered in a very thin layer of the reddish-orange pulp. Annatto is employed as a colorant and dye for food, textiles, and body paint. Annatto has carotenoids or organic pigments present in plants and photosynthetic organisms. it's utilized in Latin American and Caribbean cuisine as a coloring and flavoring agent while in Central and South America it's used as a body paint and lipstick. Although not an produce, the pulp covering the seeds are using as a food color. Called Achiote dye, it's created by grinding the seeds or simmering them in water or oil. Despite being employed for coloring annatto actually has been used for hundreds of years to condition hair and skin. It is because of the vitamins A, D, and beta- carotene. It has been used for the skin as an emollient and with its anti-inflammatory, antiseptic, and astringent abilities. It can be a seed paste or seed oil and often added to shampoo and conditioners because it can give the hair a natural sunny glow. It can even be found in hair dye because of this feature as well. Interested in trying a quick hair color rinse for a funky and spunky color combination of orange-red? Here's the simplest way to do it with Annatto powder.

3.4 Neem Powder



Fig.No 8 Azadirachta indica Neem

Scientific Classification : Neem	
Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Rosids
Order	Sapindales
Family	Meliaceae
Genus	Azadirachta
Species	<i>A. indica</i>

Neem is also known as Azadirachta indica Neem tree or Indian lilac. Neem could be a popular medicinal plant that's typically grown in tropical and semi-tropical regions. Mostly all the parts of the Azadirachta indica are resourceful. Its fruits and seeds are the sources of neem powder and oil. Neem has been recognized greatly as a medicinal plant that helps to cure various hair, skin, and oral problems. within the Ayurvedic medicine system, neem or neem extract has been used for a range of health-related issues for a really while. Almost every Indian grandparent must be having a book of natural remedies from pure herbs. We Indians are quite lucky to possess such great botanical wealth. The trend shows that more and more people are seeking to cure their problems naturally nowadays. this is often because people became more aware.

Neem has anti-bacterial, anti-fungal and anti-inflammatory properties which is that the reason for its use in medicine and cosmetics. most the parts of the neem plant are used for various things. Neem fruit, seeds, leaves, stems, and bark contain diverse phytochemicals, a number of which were first discovered in azadirachta seed extracts, like azadirachtin established within the 1960s as an insect antifeedant, growth disruptor, and insecticide.[11][12] The yield of azadirachtin from crushing 2 kg of seeds is about 5 g.[11] additionally to azadirachtin and related limonoids, the seed oil contains glycerides, diverse polyphenols, nimbolide, triterpenes, and beta-sitosterol.[11][13] The yellow, bitter oil includes a garlic-like odor and contains about 2% of limonoid compounds.[11] The leaves contain quercetin, catechins, carotenes, and vitamin C.[11]

3.5 Black catechu Powder:



Fig.No 9 Black catechu

Colour	Black or brownish black mass
Odour	Odourless
Taste	Astringent and subsequently sweet taste
Size	Irregular mass
Extra features	Outre surface is firm and brittle. When broken the fractured surface appears glassy with small cavities.

Black catechu is that the dried aqueous extract prepared from the heartwood of Jerusalem thorn Willdenow, belonging to family, Leguminosae. catechu may be a medium- sized tree with thorns. For preparation of the drug the tree is interrupt from the bottom. the most trunk and branches are cleared of foliage and thorns. The bark is stripped off, and also the heartwood is formed into chips. Heartwood is boiled in water in large earthen pots. The decoction is then strained and boiled in an iron pot with continuous stirring till it forms the syrupy mass. When the extract is cool enough, it's spread within the shallow wooden trays and kept for overnight. When sufficiently dry, it's turn over pieces. Since the decoction is concentrated in iron vessels, the color of the catechu becomes darker because of its reaction with iron salts. If the syrupy extract is stirred during cooling, it develops the shining crystals of catechin and produces

translucent catechu. Nowadays stainless-steel vessels are used for the manufacture of catechu that produces a lighter coloured product. Cutch or extract resembles pale catechu or gambier in its composition. It contains about 2–12% of catechin and about 25 to 33% of phlobatannin catechutannic acid. The principle fraction of cutch has been identified as a combination of catechin isomers which has (-) epicatechin, acatechin, DL-acacatechin, L-acacatechin and D-isoacacatechin. It also contains 20–30% gummy matter, catechin red, quercetin and querecitin. It yields 2–3% of ash. Cutch is employed in medicine as astringent. It cures troubles of mouth, diseases of the throat and diarrhoea. It also increases appetite. In India and eastern countries, it's utilized in betel leaves for chewing. In dyeing industries, cutch I used for dyeing fabrics brown or black. it's also employed in calico printing.

3.6 Coffee Powder:**Fig.No 10 Coffee bean**

Chemical and Physical Data	
Formula	C₈H₁₀N₄O₂
Molar mass	194.194 g mol⁻¹
3D model (JSmol)	Interactive image
Density	1.23 g/cm³
Melting point	235 to 238 °C (455 to 460 °F) (anhydrous)^{[9][10]}
Smiles	CN1C=NC2=C1C(=O)N(C(=O)N2C)C

Coffee bean, coffee seed, Arabica coffee, Coffea arabica, Abyssinian coffee, Brazilian coffee.

The main constituents of coffee are caffeine, tannin, fatty oil and proteins. It contains 2–3% caffeine, 3–5% tannins, 13% proteins, 10–15% fixed oils. within the seeds, caffeine is present as a salt of chlorogenic acid. Also it contains oil and wax.

Coffee is widely used as a flavoring agent, as in frozen dessert, pastries, candies and liquors. Source of caffeine, dried ripe seeds are used as a stimulant, nervine and diuretic, working on CNS, kidneys, heart and muscles. Very valuable in cases of snake- bite,

helping to bar the terrible coma. It also exerts a soothing action on the system, preventing a too rapid wasting of the tissues of the body; these effects don't seem to be only because of the oil but to the caffeine it contains.

Coffee hair coloring works wonders for the hair with a lightweight base tone. Caffeine's nourishing properties within the coffee hair coloring can offer you a healthy mane. Coffee dye could be a safer alternative to synthetic hair dyes.

3.7 Indigo Powder:**Fig.No 11 Coffee bean (Indigofera tinctoria),**

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Edudicots
Clade	Rosids
Order	Fabales
Family	Fabaceae
Subfamily	Faboideae
Genus	Indigofera
Species	I. tinctoria

Indigo (*Indigofera tinctoria*), a natural herb, could be a species of plant from the bean family and is additionally called true Indigo. Indigo is employed as a dye and for medicinal purposes also. It's mainly grown in Asia and a few parts of Africa. Indigo powder comes from crushing of the leaves of the plant. Indigo dye comes from crushed leaves of indigo and is rich, navy blue in colour. It's wont to colour not only your hair and beard but also most quite blue denim, some fabrics, silk and wool. Indigo dye may be a natural dye, unlike the

synthetic dyes that we get nowadays. Indigo is full of numerous natural ingredients that help strengthen and canopy the greys of the hair. Thus it's the simplest alternative for all sorts of cosmetics. Indigo hair coloring may be a natural way of colouring hair. you'll be able to make the hair as dark as you wish without using any chemicals with indigo powder. Generally, to do this, there are two ways. People with light-coloured hair need a henna base, and people with darker hair can use indigo powder without a henna base.

4. INGREDIENTS

Formulation Table		
Sr.No.	Ingredients	Gm/ml
1.	Water	17.30%
2.	Neem Powder Extract	4.00%
3.	Beetroot powder Extract	15.00%
4.	Coffee powder extract	15.00%
5.	Annatto powder extract	15.00%
6.	Black catechu extract	15.00%
7.	indigo powder extract	7.00%
8.	Amla powder extract	5.00%
9.	Cocamidopropyl Betaine (CAPB)	2.00%
10.	Glycerin (Humectant)	3.00%
11.	Benzyl Alcohol (and) Ethylhexylglycerin (and) Tocopherol (euxyl™ k 900 preservative)	1.00%
12.	Vitamin E (Tocopherol)	0.20%
13.	sepiclear g7	0.5%

5. SUMMARY

- The active constituents present in the hair color spray are non toxic and devoid of any side effects.
- The mordant used is of natural origin and is derived from herbal individual powders of extracts like A Neem powder Extract, Beetroot powder Extract, Coffee powder extract , Annatto powder extract, Black catechu powder extract, indigo powder extract, Amla powder extract were tested for their hair. facilitate its application and enhance. Penetration of the hair in to cortex region of the human hair.
- It is prepared from 100% water soluble plant ingredients; hence it is free from any obnoxious odor.
- The raw materials used and the final product is totally biodegradable.
- The extracted pigments entirely impart its

color to the hair and do not react with it.

- The pigment penetrates deep in to medulla region with out rupturing the cortex.
- The formulation contains 100% water soluble herbal extracts.
- The solvent and carrier used in the whole preparation is only distilled water.
- Very simple to use and a highly economical hair dying Process.
- The product is stable at room temperature.
- The composition and mode of preparation is environmental friendly.

5.1 CONCLUSION:

It can be concluded from the investigation that by changing the proportion of coffee and indigo a suitable brown color could be obtained for hair. A pH of 7 was best for penetration of hair colorant. Repeated application of the Coffee and indigo product gives an increase. It was observed that

when indigo are subjected to ageing give more color intensity. No influence of ageing. Advantage of this natural hair colorant is that it does not cause any irritation. Staining of nails or fingers is not seen while preparing the hair colorant formulation and spray which is the main problem with marketed products. At the same time the colour does not stick to the clothes which come into contact with the product. Hence it is a suitable natural hair colorant and can be recommended for further studies and use.

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