

A REVIEW ON FORMULATION AND EVALUATION OF ORGANIC HAIR DYE

Gonepally Surekha^{1*}, Shaik Zeba Fathima², Ch. Venkat Sumanth², V. Murali Kumar² and G. Tulja Rani³¹Associate Professor, Department of Pharmaceutical Chemistry, Malla Reddy Pharmacy College, Maisammaguda, Dhulapally, Secunderabad, Telangana, India – 500100.²Department of Pharmacy, Malla Reddy Pharmacy College, Maisammaguda, Dhulapally, Secunderabad, Telangana, India – 500100.³Professor and Principal, Department of Pharmaceutical Analysis, Malla Reddy Pharmacy College, Maisammaguda, Dhulapally, Secunderabad, Telangana, India – 500100.***Corresponding Author: Gonepally Surekha**Associate Professor, Department of Pharmaceutical Chemistry, Malla Reddy Pharmacy College, Maisammaguda, Dhulapally, Secunderabad, Telangana, India – 500100. **Email Id:** surekhapharma@gmail.com

Article Received on 20/02/2024

Article Revised on 10/03/2024

Article Accepted on 30/03/2024

ABSTRACT

The word herbal is symbol of safety in contrast to the synthetic one which has adverse effect human health. In the synthetic and conventional marketed hair dyeing use of chemical that results in unpleasant and unsuitable side effect to the hair. Such as the irritation breakage of hair, skin discoloration and major effect like cancer, marketed Hair colour containing crude plant powder required processing prior to use which is inconvenient to the consumer and the product have poor rinsability and in the formulated hair dye containing the natural crude drug which can provide the good rinsability. A dye can typically be defined as a colored Substance that has an affinity to the fiber, fur or hair. Continuous utilization of such compounds containing dye on herbal hair reasons such a lot of aspect effects along with pores and skin inflammation, erythema, loss or damage of hair and skin most cancers. In oxidation device, there's a severe diffusion of the molecule into the cortex, what promotes an extended shade resistance. Herbal preparations viz., herbal pills, herbal tonics, herbal paste, natural shampoo, natural contraceptives and herbal dyes has become popular most of the customer herbal drug treatments represent the quickest developing section to heal the various illnesses. Hair dyes encompass dyes modifiers, antioxidants, alkalizers, soaps, ammonia, wetting sellers, fragrance, and a ramification of different chemical substances used in small amounts that impart unique qualities to hair along with softening the texture or supplies a desired movement to the dye. It is the ratio of kinds of melanin Eumelanin and Pheomelanin that determines your natural hair shade. Custard apple (*Annona Squamosa*) is a first rate natural supply of copper and gives hair the dark melanin color and that it lack. Therefore in case you are handling too many greys devour custard apple to prevent your hair from losing coloration similarly. Hair color alternate by way of dye software is a common process among ladies. Hair dye beauty products are used for colouring hair. Hair dye classified according to coloration resistance, into classified, in accordance to coloration, resistant, into brief, semipermanent, and everlasting.

KEYWORDS: Organic Hair Dye, Safety, Natural Hair Colors, Amla, Human Health.**INTRODUCTION****Organic Hair Dye**

Organic hair dye is distinguished from other natural hair colors by, the main difference between organic and natural hair dyes is how they are produced and regulated. Organic hair dyes are made with ingredients grown and processed without synthetic pesticides, fertilizers, and genetically modified organisms (GMOs). They are also free of artificial preservatives, fragrances, and other harmful chemicals.^[1] Organic hair dyes are regulated by organizations such as USDA and must meet specific

standards for organic production. Natural hair dyes, on the other hand, are made with ingredients that are derived from nature, such as plants, fruits, and minerals. However, unlike organic hair dyes, natural hair dyes are not regulated and can contain synthetic ingredients or chemicals. In summary, organic hair dyes are made with ingredients grown and processed without synthetic pesticides, fertilizers, and GMOs. They are regulated by organizations such as USDA. Natural hair dyes are made with ingredients that are derived from nature but can contain synthetic ingredients or chemicals.

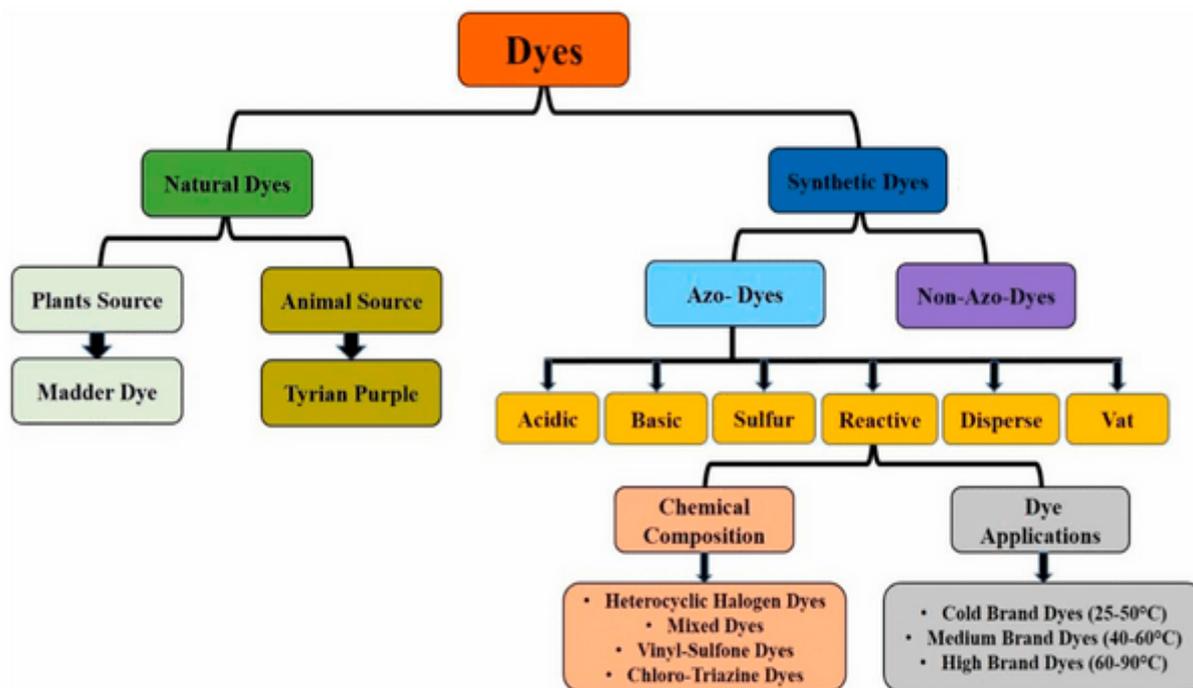


Fig. 1: Types of Hair Dyes.

What is Organic Hair Dye?

Organic is a term used to define a farming practice before plant cultivation. Organic hair color is made with natural ingredients, such as plant-based pigments and oils, which are less harsh and damaging to the hair than traditional chemical hair dyes. It's important to note that not all hair color products labeled as "organic" are 100% organic, so it's essential to read the label carefully to understand the ingredients used in the product.

100% Certified Organic

Our organic hair colors contain only carefully selected natural raw materials such as finely ground organic

herbs, fruits, and seeds. Those natural raw materials wrap your hair and penetrate it to dye it. It is made exclusively with organic herbs. It is made by drying and powdering raw organic plants' leaves, fruits, and seeds. It is not a hair dye that extracts pigment components from plants.

Ingredients Used in Formulation of Organic Hair Dye Onion (Peel)

Onion skins also make a great hair dye, turning it a beautiful golden brown (Darkening & gives the hair brownish, purple hues). Simply add onion skins to a pot of water and boil for 30-60 minutes.



Fig. 2: Onion (Peel).

Ginger (Peel)

Ginger helps improve the circulation of the scalp while also stimulating each hair follicle, which in turn promotes longer, stronger hair. The many vitamins,

minerals, and fatty acids in ginger also contribute to strengthening your hair strands to combat hair loss, and ginger contributes to restoring moisture loss.



Fig. 3: Ginger (Peel).

Indian Black Berry

It is technically possible to dye your hair with blackberries, most stylists would recommend against it as it could leave hair splotchy and unbalanced. "Blackberries act as a stain on the hair instead of a dye.

Consuming foods rich in these compounds may lower oxidative stress, a condition that occurs when harmful compounds such as free radicals overwhelm the body's antioxidant defenses, and protect hair follicle cells from oxidative damage, thus promoting healthy hair growth.



Fig. 4: Indian Black Berry.

Organic Henna Leaf

The active ingredient in henna for dyeing hair is lawsone, also known as hennotannic acid. Lawsone binds with the keratin protein found in hair to color and deeply condition it. The botanical name is *Lawsonia inermis* which is the only species of the genus *Lawsonia* and belongs to the family *Lythraceae*. The leaves of this plant poses a red dye molecule called lawsone (2- Hydroxy –

1yl- naphtha Quinone), which has the ability to bond with protein. The other components like Lawsone 1, 4 – naphtha Quinone; 2- methoxy- 3- methyl- 1, 4 - naphtha Quinone; flavonoids, coumarins and phenolic acids; 5- 10% gallic acid and tannin.¹⁰ Henna balances the pH of the scalp preventing premature hair fall and graying of hair.



Fig. 5: Organic Henna Leaf.

Curry Leaves

The botanical name is *Murraya Koenigii*. This is found to have many phenols, flavanols, amino acids and alkaloids which are known to have high antioxidant capacity. Curry leaves contain valuable antioxidants and

vitamin B, which help in increasing melanin production, thus restoring the natural hair pigment deep down in the follicles. Curry leaves also include minerals like selenium, zinc, iodine and iron that delay the onset of grey hair.



Fig. 6: Curry Leaves.

Aloe Vera

The botanical name is *Gawar Patha*, It belongs to Liliaceae family. Aloe vera gel is effective for scalp and can be used not only to treat hair loss, but to promote hair growth as well. Aloe vera contains aloe emodin which promotes hair growth by stimulating hair follicle. It is also useful in treating the scalp from sun burn. It is used as a natural mordant. It is known for its emollient effect. When coloring hair, it is advisable to use hair colors or lighteners that contain Aloe Vera to prevent irritation. It promotes scalp health, anti-inflammatory properties that help to soothe, cleanses and hydrates.



Fig. 7: Aloe Vera.

Organic Methi Seed (Fenugreek)

The active ingredient in methi seed hair dye is typically lawsone (2-Hydroxy-1, 4-naphtho quinone), an isomer of juglone. It is one of the oldest dyes used for hair coloring and pigmentation. Helps control premature graying. Fenugreek powder is enriched with potassium to help fight hair grey. You can use it as a hair dye too. Mix Amla, henna, and fenugreek powder. Use coffee or water to make the mixture. It Promote healthy scalp

environment which contributes hair growth, it boosts shine, it repair the hair shaft from damage caused by heat tools and colouring.



Fig. 8: Organic Methi Seed (Fenugreek).

Tea Leaves

Black tea contains antioxidants that may benefit your hair in a variety of ways. Black tea is not only effective at flushing out toxins from the body, but it also makes your hair shine. It helps to stimulate hair growth, reduce hair loss, remove oiliness from scalp, and treat dandruff. In particular, black tea contains theaflavins and thearubigins, which give it its characteristic dark color. Due to this dark pigment, black tea rinses may give naturally dark hair a temporary boost of color and help reduce the appearance of grey hairs. Tea Leaves act as a Conditioner, mordant, darken of hair, antioxidant.



shutterstock.com · 2291950731

Fig. 9: Tea Leaves.**Why do you need 100% Organic Hair Dye?**

The number one reason is Safer for your health. Traditional hair dyes contain harsh chemicals such as ammonia, peroxide, and PPD (para-phenylenediamine), which can cause allergic reactions, respiratory problems, and other health issues. 100% organic hair dye is free of

these chemicals and is considered safer for your health. Using 100% organic hair dye ensures that your product is free of harsh chemicals and synthetic ingredients, providing a safer and more natural alternative for hair coloring.

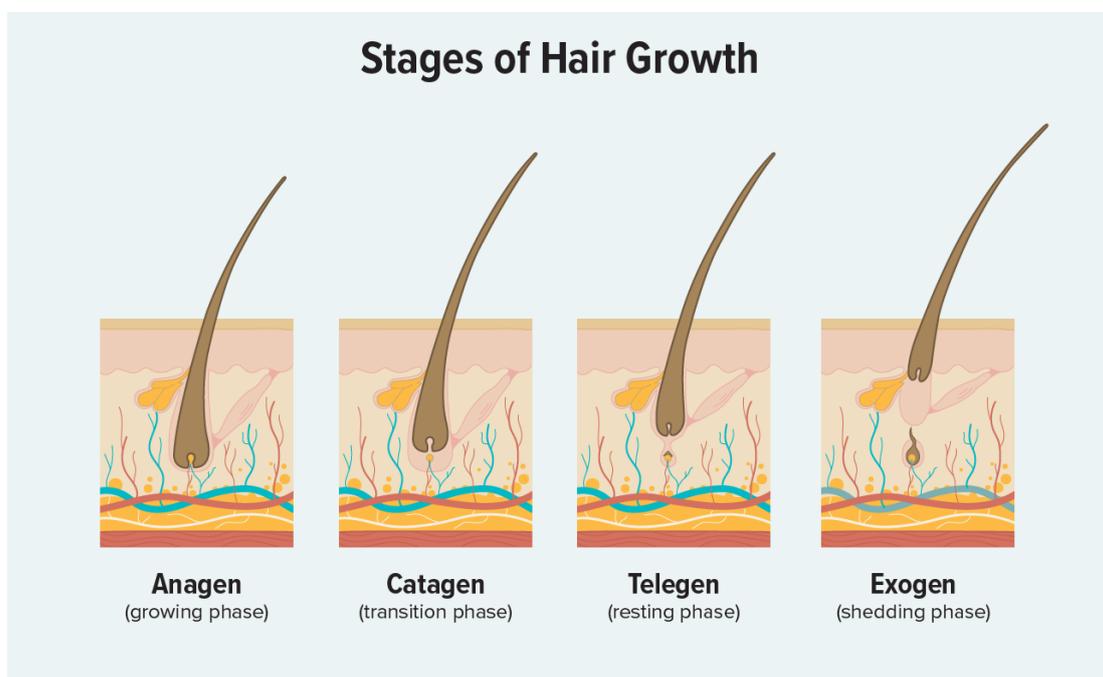
The Science of Hair

Have you ever heard that hair can change completely every seven years? Hair has a long cycle. So your daily choices have a long-term impact on hair health.

[Anagen] Scalp hair stays in this active phase of growth for two to six years.^[1]

[Catagen] This phase lasts for about two to three weeks.^[1]

[Telogen] This phase lasts for about 100 days for hairs on the scalp.^[1]

**Fig. 10: Hair Growth Cycle.****There are other reasons to choose 100% Organic Hair Dye**

Environmentally friendly: Organic hair dye is free of synthetic chemicals that can harm the environment. Many organic hair dye brands are also cruelty-free, meaning they don't test on animals.

Natural look: Organic hair dye is made from natural ingredients that can provide a natural-looking color to the hair and help to enhance the natural beauty of the hair.

As international scenario is now converting closer to the use of safer, secure herbal product with traditional use, attempts have been made inside the present research to increase natural hair dye without any chemical,

containing few traditionally used herbs and modifiers; and compare it with advertised only natural hair dye. It also reasons dermatitis around lips, reddening and swelling of scalp and face and so on. Tannins create affinity among dyes and hair and accordingly improve color and fastness of dye. Natural hair colorants which might be presently marketed particularly comprise henna together with plant additives that need to be used inside the paste shape. But, such arrangements have several hazards like prolonged coating time, messy software, terrible rinsability, loss of a trendy coloring and limited color sun shades. Formulations promoted as herbal hair colorants additionally comprise artificial dyes and chemical substances. Artificial hair colorants contain the usage of chemical compounds like 1-3% phenylene diamine, ammonia, peroxide and coal tar dyes which

might be able to getting rid of and changing or protecting the natural hair colour.

As compared to the chemical based hair dyes, which cause skin and other skin related diseases, natural herbal dyes are being preferred nowadays.^[4] Today most of the human beings are very careful about their beauty and hairs play an important role in this. Herbal drugs without any adverse effects are used for healthy hair. Nearly 70% of human beings above 50 years struggle with the problem of balding and graying of hair. In few cases, these symptoms of ageing occur earlier. Graying starts on the skin of head at about 40 years, starting initially from the temples, followed by beard, moustache and finally up to the chest. The age at which graying starts is deeply influenced by heredity. But premature depigmentation in adults is mainly due to variety of other factors, as illness, some specific drugs, shock etc.^[4,5] People have been using natural dyes since ancient times for the purpose of dyeing carpets, rugs and clothing's by the use of roots, stems, barks, leaves, berries and flowers of various dye yielding plants.^[6]

Extraction and Formulation of Dye

Padmaja Naishadham, et al. (2013), Each raw material has been applied to the hair sample brought from a parlour to check the fastness and dyeing effect on it for 30 minutes. Fresh leaves of aloe vera were collected, washed thoroughly and the outer surface has been peeled off and inner mass was collected with the help of a scoop. Finally 50 gms of *Lawsonia inermis* (Henna), 20 gms of *Hibiscus rosa-sinensis* (leaves and flowers), 20 gms of *Murraya Koenigii*, 20 gms of *Eclipta alba*, 20 gms of *Punica granatum*, 30 gms of *Embllica officinalis*, 5 gms of *Azadirachta indica*, 5 gms of *Ocimum Sanctum*, 5 gms of *Trigonella Foenum*, 20gms of Juglone Husk powders were blended with 5 gms of aloe vera gel along with 2 gms of Iron filings and soaking the mixture for 1 hour in water along with tea decoction to obtain a dye. The soaked dye composition has been applied to hair to check color imparted to it.^[7] When the formulated paste is applied on the hair shaft, the dye molecule penetrates inside the hair shaft and binds with the keratin fiber. When the light falls on the dye applied hair, the outer layer of the hair shaft shimmers / reflects the light in such a way to present the hair to be in brownish red color.

Anshu R. Dudhe, et al. (2023), For the preparation of herbal hair dye we have selected different herbal ingredients such as Henna, Reetha, Amla, Shikakai powder etc. All the ingredients were weight and pass through the sieve No.24. To prepare the homogeneous mixture of all the ingredients they are mixed uniformly to make the powder form of a dye.^[8-9]

Table-1: The Composition of Formulation.

S. No.	Ingredients	Quantity
1	Indian Black Berry	10gm
2	Henna	10gm
3	Curry Leaves	5gm
4	Fenugreek	5gm
5	Aloe vera	5gm
6	Onion Peel	3gm
7	Ginger Peel	2gm
8	Tea Leaves	10gm

Phytochemical Analysis

1. Test for Alkaloids: Take some crude ether extract of catechu in a very check tube and add 2-3 drops of Dragendroff's chemical agent (potassium atomic number 83 halide solution) look of yellow color indicates that absence of alkaloids in this extract once more perform a similar experiment with chloroform, methanol and water extract in another tubing look of pink color indicates that absence of alkaloids in these extracts. Look of brown color indicates that presence of alkaloids. [Harshada Karwatkar*, et al. (2023)].

2. Test for Tannins: Take some crude ether extract of this plant and add few drops of metallic element chloride resolution in it, yellow color seems, in chloroform extract yellow color seems in alcohol and water extract look of brownish black color indicates the absence of tannins all told these extracts.

3. Test for Flavonoids: Take some petroleum ether extract in a test tube then add few fragments of Magnesium ribbon and once this add targeted hydrochloric acid drop wise, absence of color suggests that absence of flavonoids during this extract, same check is perennial with chloroform extract of tree and conjointly absence of colour. In alcohol and water extract there's look of crimson color shows the presence of flavonoids in these extract.

4. Test for alkaloids: For the aim of phyto chemical analysis of the selected plants, 0.2 g of the chosen plant samples were additional in every tubing and three milliliter of hexane were mixed in it, agitated well and filtered. Then took 5 ml of 2% HCl and poured in very tubing having the mixture of plant extract and solvent. Heated the tubing having the mixture, filtered it and poured few drops of picric acid in a very mixture. Formation of yellow color precipitate indicates the presence of alkaloids.

5. Test for Carbohydrates: Treat the all four extract with Benedict's chemical agent (alkaline solution of metal change state complex) absence of red precipitates boiling on water bath indicates the absence of carbohydrates.

6. Test for Glycosides: Take all the four extract of this plant on an individual basis then add dilute sulphuric acid into it. The answer was stewed and filtered. The

filtrate was cooled, and so adds 2-3 drops of benzene. The answer was agitated well, organic layer got separated. Once these add equal volume of ammoniac solution to the organic layer, ammoniacal layer didn't flip pink that indicates absence of glycosides in these extracts.

7. Check for Saponins: Take all the four extracts on an individual basis in check tubes and add some water into them and shake well no persistent foam is made that indicates absence of saponins.

8. Test for anthraquinones: 1.0 g of methanolic plant extract was cooked in half dozen millilitre of I Chromic HCl and filtered. The filtrate was jolted with five millilitre benzol and also the benzol layer was removed. 100 percent NH₄OH was supplemental and also the colour the base-forming section was observed. Formation of pink/violet or red color indicated the presence of anthraquinones.

9. Test for Coumarins: 0.5 g of the moistened methanolic plant extract was taken during a check tube. The mouth of the tube was lined with paper treated with NaOH solution. Tube was placed for jiffy in boiling water so the paper was removed and examined beneath the ultraviolet {light ultraviolet illumination UV actinic radiation actinic ray} light for yellow visible radiation indicated the presence of coumarins.^[10]

Organoleptic Evaluation

Organoleptic characteristics for various sensory characters like color, taste, odour etc. was carefully noted down.^[11,13] As illustrated in Table 2 the raw drugs and powders were separately studied by organoleptic and morphological characters like color, odour, texture and appearance. [Kavita M. Heda, et al. (2024)].

Table-2: Organoleptic Evaluation of Organic Dye.

S.No.	Parameters	Results
1	Colour	Greenish Brown
2	Odour	Characteristic
3	Texture	Fine
4	Appearance	Powder

Application of Hair Dye

The pack, which is in the form of powder, should be used weekly on wet hair, forming a paste of in water with optimum consistency. It should be applied evenly on the hair with the help of a brush, covering the roots to the hair tip. The scalp should be covered. It should be left for 2-3 hours on the scalp for complete drying. Then it should be removed by washing with plain water.^[14]

CONCLUSION

Organic based hair dye has been prepared. Frequent use of this dye leads to manageable, frizz free coloured hair. An Organic hair dye colours the hair in an utmost gentle manner. The advantages of Organic based cosmetics are their nontoxic nature. Organic formulations are in great

demand to fulfill the needs of the growing world market. It is a noticeable attempt to formulate the Organic hair dye containing the goodness of powders of different plants, which are excellent for hair care. Hair dye containing Aloe Vera, Amla, etc. nitrifies the skin of the scalp and hair. Pollution, ageing, stress and harsh climates badly affect the quality of hair. Natural remedies are widely accepted with open hands nowadays as they are safer with minimal side effects as compared to the chemical based products. This hair formulation provides vital nourishment to the skin. It helps to treat dandruff by removal of excess oil from scalp.

An organic hair dye colors the hair in an utmost gentle manner. The advantages of organic based dyes are their nontoxic nature. It nitrifies 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 dye leads to manageable, frizz free colored hair. Pollution, ageing, stress and harsh climates badly affect the quality of hair. Form this study it is concluded that found effective properties of the organic hair dye and further studies are needed to be performed to explore more useful benefits of this organic 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. Organic formulations are in great demand to fulfill the needs of the growing world market. It is a noticeable attempt to formulate the organic hair dye containing the goodness of powders of different medicinal plants.

REFERENCES

- <https://radicousa.com/pages/what-is-organic-hair-dye>
- The Science of Hair [Web MD] <https://www.webmd.com/skin-problems-and-treatments/hair-loss/science-hair>
- Kumar K. Sudheer, Begum Afreen, et al., Formulation and Evaluation of 100% Herbal Hair Dye, Dept. of pharmacology, International Journal of Advanced Research in Medical & Pharmaceutical Sciences (IJARMPSISSN:2455-6998), 2016; 1(2).
- Ganpat Ashwini, A.R Aswar, L.D. Hingane, Formulation and Evaluation of Herbal Hair Dye, International Journal of Creative Research Thoughts (IJCRT), 2021; 9(12). ISSN: 2320-2882.
- Rashmi Saxena Pal*, Yogendra Pal, A.K Rai, Pranay Wal and Ankita Wal, Synthesis and Evaluation of Herbal Based Hair Dye, The Open Dermatology Journal (Bentham Open), DOI: 10.2174/1874372201812010090, 2018; 12: 90-98.
- Madhav Amle, Review on: Formulation and Evaluation of Herbomineral Hair Dye, Journal of Research in Pharmaceutical Science, 2021; 7(12): 01-11. ISSN (Online): 2347-2995.
- Anthony c Dweck: Comprehensive focus on natural dyes. Personal care, 2009; 9: 57- 69.
- Maffei C, Fossati A, Rinaldi F, et al. Personality disorders and psychopathologic symptoms in

- patients' androgenetic alopecia. *Arch Dermatol*, 1994; 130: 868-872.
9. Wolfram LJ. Human hair: a unique physicochemical composite. *J Am Acad Dermatol*, 2003; 48: S114.
 10. Rashmisaxena Pal, Pranaywal and Ankitawal; Synthesis and evaluation of herbal based hair dye; *The Open Dermatology, Journal*, and DOI: 102174\1874-3722\18, 2018; 12: 90-98.
 11. Wallis TE, *Text book of Pharmacognosy*, 5th Ed. New Delhi: CBS publishers & distributors, 2002; 123(132): 210-5.
 12. Rajpal V., *Standardization of Botanicals*. New Delhi. Eastern Publishers 2002; 1: 39-44.
 13. Tandon N, Sharma M., *Quality Standards of Indian medicinal plants*. New Delhi. Indian Council of Medical Research, 2010; 8: 161-3.
 14. Wonderful benefits and uses of Soapnuts (Reetha), Home, Health and Wellness, Ingredients.