FORMULATION & EVALUATION OF COMMONLY USED NATURAL HAIR DYE.

Project work

Submitted in the Partial Fulfilment of the requirement for

The award of the Degree of

BACHELOR OF PHARMACY

In the Faculty of Medicine

Gondwana University, Gadchiroli.

By

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Certificate

This is to certify that the investigations described in this project work entitled ***"FORMULATION & EVALUATION OF COMMONLY USED NATURAL HAIR DYE"*** *was carried out by* ***MR. Sarang S. Mohurle*** *in the laboratories of* ***Maharashtra Institute of Pharmacy, (B. Pharm), Betala,*** *under my supervision and guidance, in partial fulfilment of the requirement for the Degree of Bachelor of Pharmacy in the*
Faculty of Medicine of Gondwana University, Gadchiroli.

This project work is now ready for examination.

Place: BETALA ***Prof. Mr. A. D. MESHRAM***

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2019-2020

DECLARATION

I hereby declare that the project work entitled ***"FORMULATION AND EVALUATION OF COMMONLY USED NATURAL HAIR DYE "*** *is based on work carried out in the laboratories of the* ***Maharashtra Institute of Pharmacy, (B. Pharm), Betala,*** *and has not been submitted before for the award of any Diploma or Degree of this University or any other University.*

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ALL THE BEST to everyone to achieve all the success in life.

Date:

Place: Betala ***Sarang S. Mohurle***

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ABSTRACT:

OBJECTIVE :

The ward 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 result in unpleaseant 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.

MATERIAL AND METHOD:

The composition of natural hair dye consisting tulsi, coffee, reetha, hibiscus, shikakai, amla, beet, tea and heena are used these dye can be standardized by physico-chemical parameter such as Ash value, moisture content and PH Phyto-chemical study, patch test, stability test and Rheological evaluation can performed.

RESULT :

The parameter was found to be comparable and sufficient for the evaluation of herbal dye. The value of different evaluation justified the usage of hair dye.

CONCLUSION:

The formulation proves to be a key alternative for modern synthetic hair dye and it is stable or safe. The result of parameter can be incorporated while developing the pharmacopoeial standards.

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INTRODUCTION:

As compared to the chemical based hair dyes, which cause skin and other skin related diseases, natural herbal dyes are being preferred. 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. People have been using natural dyes since ancient times for the purpose of dyeing carpets rugs and clothings by the use of roots, stems, barks, leaves, berries and flowers of various dye yielding plants. The need of herbal based natural medicines is increasing fastly due to their natural goodness and lack of side effects. Amla, Hibiscus, Henna, Shikakai, Tea, Reetha, Coffee, Beet, Tulsi are well-known ayurvedic herbal drugs traditionally used as hair colorant and for hair growth. Many different powder from plant were used for the purpose of hair dyeing in Europe and Asia before the invention of modern dyes. Amla, coffee known as initial fabric dye could be mixed with henna to make different light brown to black shades of hair dye. Use of these chemicals can result in unpleasant side effects such as skin irritation, allergy, hair breakage, skin discoloration, unexpected hair color.

Continuous application of such compounds on natural hair causes multiple side effects such as skin irritation, allergy, hair fall, dry scalp, erythrema and also skin cancer. In India henna has been used traditionally for colouring palms and hairs. There are so many herbs like Amla, Hibiscus, Henna, Shikakai, Tea, Reetha, Coffee, Beet, Tulsi are used as a major constituents in hair care preparations mainly meant for dyeing hair. Henna has been used traditionally for colouring women's bodies during marriage and other social celebrations since the times of Bronze Age.[1]

Natural hair colorants that are currently marketed mainly contain henna along with plant components that need to be used in the paste form. However such preparations have several disadvantages like lengthy preparation time, messy application, poor rinsability, lack of a standard coloring and limited color shades. Formulations promoted as natural hair colorants also contain synthetic dyes and chemicals. Synthetic hair colorants involve the use of chemicals like 1-3% phenylenediamine, ammonia, peroxide and coal tar dyes that are capable of removing and replacing or covering the natural hair color.

Inorganic salts like aluminum sulphate, copper sulphate, lead acetate and potassium dichromate which act as mordants are also added to improve and protect the color produced by the dye . Use of these chemicals can result in unpleasant side effects, including temporary skin irritation and allergy, hair breakage, skin discoloration, unexpected hair color and cancer.[4] The human body apart from areas of glabrous skin, is covered in follicles which produce thick terminal and fine vellushair. Hair fibers have a structure consisting of three layers, starting from the outside, the cuticle, which consists of several layers of flat, thin cells laid out overlapping one

another as roof shingles. The cortex, which contains the keratin bundles in cell structures that remain roughly rod-like. The medulla, adisorganized and an open area at the fiber's center.

Most of the synthetic hair coloring agents rely on harsh chemicals like phenylenediamine, which have some side effect. The demand of herbal medicines is increasing rapidly due to their lack of side effects. Amla, Hibiscus, Henna, Shikakai, Tea, Reetha, Coffee, Beet, Tulsi and seeds are well –known ayurvedic herbal drugs traditionally used as hair colorant and for hair growth. To our best knowledge, there is no scientific report on the combination of these herbal drugs hair dye formulation. Hence, the present study has been designed to formulate and evaluate the polyherbal formulation of Amla, coffee, henna, Tea, Beet, Shikakai, Reetha as hair coloring agent.[2]

Hair dyes include dyes modifiers, antioxidant, alkalizers, soaps, ammonia, wetting agent, fragrance, and varieties of other chemicals used in small amounts that impart special qualities to hair such as softening the texture or give a desired action to the dye. The chemicals that are normally used in the dye are amino compound (4-amino-2-hydrosytoluene and m- Aminophenol). Metal oxides, such as titanium dioxide and iron oxide, are also often used as colorants in the process. Colorant is classified as being temporary or permanent. In temporary coloring the color can be washed away easily. Permanent coloring of hair involves addition of aromatic diamine or hydricphenols or polycompounds such as paraphenylenediamine in the formulation. Continuous usage of such compounds results in many side effects such as skin irritation, erythrema, loss or damage of hair and skin cancer.[3]

Composition of herbal dyes and hair coloring mordant can be used to deliver a variety of hair colors to the hair. However, substantial improvement is needed in the areas of color saturation, color development , initial color consistency, improved wash fastness, improve hair conditioning without causing hair damage and skin irritation and of course the cost of the preparation. Because of the manufacturing hazards, environmental pollution, its side and toxic effect there is a vital need for an alternative to the existing black dye. These limitations of the chemically derived dye can only be overcome by replacing the constituents in the composition, by nontoxic ingredients derived from herbal resource. The black dye produced from herbal resources may be used in wide variety of context including hair color products. At this juncture, there is enormous need for a method to increase the yield of such dyes from herbal products.

A dye can generally be described as a colored substances that has an affinity to the fibre, 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 Pheomelani. The desire to look beautiful is human weakness and is as old as the origin of human being itself. 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. In some, these symptoms of age arrive much earlier. Graying starts on the scalp at about 40 years.

ROLE OF INGREDIENTS USED IN THE FORMULATION:

1] Henna :

Its principle coloring ingredient of is lawsone, a red orange colored compound present in dried leaves of the plant in a concentration of 1 1.5% w/w. Lawsone acts as a non oxidizing hair coloring agent at a maximum concentration of 1.5% in the hair dyeing product. Other constituents in henna such as flavonoids and gallic acid act as organic mordants to the process of colouring. Carbohydrates give the henna paste a suitable consistency for adherence to the hair . Natural henna is usually hypoallergenic but allergic reactions occurred in mixed types including black henna. This occurs due to 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 prevents premature hair fall by balancing the pH of the scalp and graying of hair. Henna leaf paste used for alleviating Jaundice, Skin diseases¸ Smallpox. Extract of Henna leaves with ethanol (70%) showed significant hypoglycaemic and hypolipidaemic activities in diabetic mice.

2] Amla :

Berries obtained from amla enhances the absorption of calcium, helping to make healthier bones, teeth, nails, and hair. It maintains the hair color and prevents premature graying, strengthens the hair follicles .Amla is the most rich and concentrated form of Vitamin C along with tannins found among the plants. Whole fruit is used as an active ingredient of the hair care preparations. The Vitamin C found in the fruit binds with tannins that protect it from being lost by heat or light. This fruit is also rich in tannins, minerals such as Calcium, Phosphorus, Fe and amino acid. The fruit extract is useful for hair growth and reduce hair loss. Amla has antibacterial and antioxidant properties that can help promote the growth of healthy and lustrous hair.

3] Reetha :

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

4] Shikaka :

It contains Lupeol, Spinasterol, Lactone, Hexacosanol, Spinasterone, Calyctomine, Racimase-A Oleanolic acid, Lupenone, Betulin, Betulinic acid, Betulonic acid. The extract obtained from its pods is used as a hair cleanser and for the control of dandruff Shikakai or acacia concinna, has rich amount of vitamin C, which is beneficial for hair. Shikakai naturally lowers the pH value and retains the

natural oils of the hair and keeps them lustrous and healthy. It is also effective in strengthening and conditioning hair. Amla, reetha and shikakai compliments each other therefore they are mixed together to have healthy and lustrous hair.

All of these ingredients come in two forms, one as a dried fruit and other in powdered form. Amla, Reetha and Shikakai suit all hair types and help prevent split ends, hair fall, dandruff, greying of hair and other hair related problems, to make hair soft and silky.

5] Coffee :

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

6] Tea :

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

7] Hibiscus :

It is excellent for increase in hair growth activity. Hibiscus is naturally enriched with Calcium, Phosphorus, Iron, Vitamin B1, Vitamin C¸ Riboflavin and Niacin, which help to promote thicker hair growth and decreases premature graying of hair . This flower is used for controlling dandruff. Hibiscus exhibits antioxidant properties by producing flavonoids such as anthocyanins and other phenolic compounds. It can be used to rejuvenate the hair by conditioning it.[1]

8] Beet :

Being rich in nutrients, beet juice boosts the circulation of blood throughout the scalp, which stimulates hair follicles and promotes hair growth. The anti-pruritic properties of beetroot help the scalp get rid of dead cells, dandruff, and itchiness while conditioning it thoroughly. Beet useful for hair growth or coloring of hair. It is a great source of dietary fibers, vitamins(B1, B2, B5, B6, B9 and C)

9]Tulsi :

Tulsi it also acts as a blood purifier when consumed raw. Applynig it on the scalp may help you to maintain the moisture in the hair and it also help in preventing dandruff, hair fall and itchiness. Tulsi is the regarded as a sacred hern in india ah has been used for about 5000 years. It is acclaimed for this healing properties of the mind, body and spirit. Tulsi contains may beneficial compound and is has storage antioxidant, antibacterial, antiviral and immune enhancing properties. Tulsi is considered to be an adaptogenic herb, balancing different processes in the body and enabling the body to adapt to stress. It is traditionally used for combating hair loss, dandruff and itchy scalps and for promoting helthy skin and shining hair.[5]

MATERIALS AND METHODS :

For the preparation of herbal hair dye, we have selected nine important ingredients such as Henna, Reetha, Coffee, Tea, Shikakai, Amla, Hibiscus, Beet and Tulsi. They were authenticated for their quality in the Pharmacognosy labaraty of the Institute. Reetha, coffee, tea, shikakai, amla, tulsi and Beet all in the powdered forms were procured from the authorized stores of the local market in the powdered form. Henna leaves and the flowers of Hibiscus were shade dried and coarsely powdered. Then all the ingredients were mixed uniformly to prepare a homogenous formulation. The composition of the formulation is reflected in the Table.

FORMULATION TABLE :

Sr.no	Ingredient	Quantity Use in Formulation (mg)								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Hibiscus	6.0g	7.2g	7.5g	6.5 g	6.8g	6.6g	7.1g	5.2g	6.7g
2	Amla	19.5g	19.0g	20.0g	18.5g	19.0g	19.0g	20.2g	21.5g	20g
3	Heena	33g	30g	32g	30g	34 g	33g	35.2g	34.8g	36g
4	Shikakai	6.5 g	6.8 g	6.5 g	7.5 g	6.5 g	6.6 g	3.2 g	7.2 g	7.2g
5	Reetha	6.6 g	7.2 g	8.0 g	7.0 g	6.5 g	6.6 g	6.2 g	7.0 g	6.8g
6	Tea	6.8 g	7.0 g	6.5 g	8.5 g	6.5g	6.6 g	7.2 g	7.0 g	6.5g
7	Coffee	6.8 g	7.0 g	6.5 g	8.5 g	6.5 g	6.6 g	6.9 g	7.1 g	5.1g
8	Beet	7.0 g	7.8 g	7.0 g	7.5 g	8.5g	7.6 g	8.8 g	6.7 g	4.4g
9	Tulsi	7.8 g	8.0 g	6.5 g	6.0 g	5.0 g	6.6 g	5.2 g	3.5 g	6.8g

Table No. 1: Composition Of Formulation Method

Fig. No. 1 : Use of ingredients in formulations.

PHYTOCHEMICAL ANALYSIS:

1. Test for Alkaloids :

Take some petroleum ether extract of Acacia catechu in a test tube and add 2-3 drops of Dragendroff's reagent (potassium bismuth iodide solution) appearance of pale yellow colour indicates that absence of alkaloids in this extract. Again perform the same experiment with chloroform, methanol and water extract in another test tube appearance of pink colour indicates that absence of alkaloids in these extracts. Appearance of brown colour indicates that presence of alkaloids.

2. Test for Tannins :

Take some petroleum ether extract of this plant and add few drops of ferric chloride solution in it, pale yellow colour appears, in chloroform extract yellow colour appears in methanol and water extract appearance of brownish black colour indicates the absence of tannins in all these extracts.

3. Test for Flavonoids :

Take some petroleum ether extract in a test tube then add few fragments of magnesium ribbon and after this add concentrated hydrochloric acid drop wise, absence of colour means absence of flavonoids in this extract, same test is repeated with chloroform extract of Acacia and also absence of colour. In methanol and water extract there is appearance of reddish colour shows the presence of flavonoids in these extracts.

4. Test for alkaloids :

For the purpose of phytochemical analysis of the selected plants, 0.2 g of the selected plant samples were added in each test tube and 3 ml of hexane were mixed in it, shaken well and filtered. Then took 5 ml of 2% HCl and poured in a test tube having the mixture of plant extract and hexane. Heated the test tube having the mixture, filtered it and poured few drops of picric acid in a mixture. Formation of yellow color precipitate indicates the presence of alkaloids

6. Test for Carbohydrates :

Treat the all four extract with Benedicts reagent (alkaline solution of cupric citrate complex) absence of red precipitates boiling on water bath indicates the absence of carbohydrates.

7. Test for Glycosides :

Take all the four extract of this plant separately then add dilute sulphuric acid into it. The solution was boiled and filtered. The filtrate was cooled, and then adds 2-3 drops of benzene. The solution was shaken well, organic layer got separated. After this add equal volume of ammoni solution to the organic layer, ammonical layer did not turn pink, which indicates absence

of glycosides in these extracts.

8. Test for Saponins :

Take all the four extracts separately in test tubes and add some water into them and shake well no persistent foam is formed which indicates absence of saponins.

9. Test for anthraquinones :

1.0 g of methanolic plant extract was boiled in 6 ml of 1% HCl and filtered. The filtrate was shaken with 5 ml benzene and the benzene layer was removed. 10% NH4OH was added and the colour in the alkaline phase was observed. Formation of pink/violet or red colour indicated the presence of anthraquinones.

10. Test for coumarins :

0.5 g of the moistened methanolic plant extract was taken in a test tube. The mouth of the tube was covered with filter paper treated with 1 N NaOH solution. Test tube was placed for few minutes in boiling water and then the filter paper was removed and examined under the UV light for yellow fluorescence indicated the presence of coumarins.[1]

PHYTOCHEMICAL SCREENING :

Sr. no	PHYTOCONSTI-TUENTS	Henna	Amla	Tulsi	Hibiscus	Shikakai	Retha	Tea	Coffee	Beet
1	Alkaloids	-	-	+	+	+	+	+	+	-
2	Glycosides	-	+	+	+	+	-	-	+	+
3	Tannins	+	+	+	+	+	+	+	+	+
4	Anthraquinones	+	+	-	+	-	-	-	-	-
5	Carbohydrates	+	+	+	-	+	+	-	+	-
6	Terpenoids	+	+	+	-	+	-	-	+	-
7	Coumarins	+	+	-	-	-	-	-	-	-
8	Flavonoids	+	+	+	+	+	+	+	+	+
9	Saponins	-	+	+	+	+	+	+	+	+

Table No. 2 : Pytochemical Screening of Formulation By various Test

EVALUATION :

Evaluation of the Herbal Hair Dye:

The prepared herbal hair dye was evaluated for its various parameters, such as organoleptic, physico-chemical, phytoconstituents and the rheological aspects.

1. Organoleptic Evaluation:

Organoleptic characteristics for various sensory characters like color, taste, odour was carefully noted down as illustrated. The raw drugs and powders were separately studied by organoleptic and morphological characters like colour, odour, texture and appearance

Sr. No	Param-eters	Results								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Colour	Greenish brown	Greenish brown	Greenish brown	Greenish brown	Greenish brown	Greenish brown	Greenish brown	Greenish brown	Greenish brown
2	Odour	Character istic	Character istic	Character istic	Character istic	Character istic	Character istic	Character istic	Character istic	Character istic
3	Texture	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Fine
4	Appearance	Powder	Powder	Powder	Powder	Powder	Powder	Powder	Powder	Powder

Tabel No. 3 : Organoleptic evaluation of Formulation (herbal dye)

2.Physico-Chemical Evaluation:

The physical and chemical features of the herbal hair dye were evaluated to determine the pH, its moisture content and its ash value for the purpose of stability, compatibility and the amount of inorganic matter present in it.

Sr.no	Parameter	Result								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	PH	6.54	5.52	5.63	6.50	6.49	6.90	6.64	5.70	5.90
2	L.O.D	5%	7%	4%	5%	8%	4%	6%	3%	8%
3	Ash value	0.27	0.21	0.35	0.30	0.37	0.22	0.40	0.39	0.44

Table No.4 : Physico-chemical evaluation of formulated herbal dye

3.Phytochemical Evaluation:

Prepared herbal hair dye was subjected to Phytochemical screening to reveal the presence or absence of various phyto-constituents as Carbohydrates, Lipids, Alkaloids, Sugars . The formulation when dissolved individually in 5 ml of water and filtered; the filtrates were used to test the presence of carbohydrates. The aqueous extract of the formulated herbal face pack was evaluated for the presence or absence of different phyto-constituents as per the standard procedures and norms.

Sr.no	Parameter	Result								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Foam test	present	present	Present	present	present	Present	present	present	Present
2	Molisch test	present	present	Present	present	present	Present	present	present	Present
3	Fehling test	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
4	Hager test	present	present	Present	present	present	Present	present	present	Present
5	Volatile test	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Tabel No. 5 : Phytochemical evaluation of Formulated herbal dye

4.Rheological Evaluation :

Physical parameters like untapped or bulk density, tapped density, the angle of repose, Hausner's ratio and carr's index were observed and calculated for the in house formulation. Bulk density symbolizes the adjustment of particles or granules collectively in the packed form. The formula for determination of bulk Density (D) is D = M/ V where M is the mass of particles and V the total volume occupied by them. This is determined by taking graduated cylinder. 100grams of weighed formulation was added to the cylinder with the help of a funnel. The initial volume was noted and thes ample was then tapped fully. The bulk density value was obtained from the initial volume and after tapping the volume noticed, from which tapped density was calculated. The angle of repose quantifies the flow properties of powder as it affects cohesion among the different particles. The fixed funnel cone method employs the calculation of Height (H)above the paper that is placed on a flat surface. The pack was carefully poured through the funnel till the formation of the peak. Here, R denotes the radius of the conical heap, tan a = H/R or a = arc tan H/R, where ‘a’ is the angle of repose. Hausner's ratio is linked with the interparticle friction and influences the

powder flow properties. The Hausner's ratio is calculated as D /D' where D' is the tapped density and D, the bulk density. Carr's index helps to measure powder flow from bulk density.

Sr.no	formulation	Parameter and result					
		Bulk density	Tapped density	True density	Angle of repose	Carr's index	Hausners ratio
1	F1	0.42	0.62	0.86	28.32	32	1.47
2	F2	0.41	0.62	1.27	27.02	33	1.51
3	F3	0.47	0.74	1.02	28.05	36	1.57
4	F4	0.42	0.71	1.20	25.68	40	1.69
5	F5	0.40	0.64	0.55	22.44	37	1.69
6	F6	0.44	0.66	0.88	27.56	33	1.5
7	F7	0.40	0.84	0.90	24.79	50	02
8	F8	0.51	0.74	0.69	23.74	32	1.48
9	F9	0.46	0.66	0.81	22.29	30	1.43

Tabel No. 6 : Rheological evaluation of Formulated herbal dye.

5.Patch Test :

This usually involves dabbing a small amount of the aqueous solution of hair dye behind the ear or on inner elbowin an area of 1sq.cm and leaving it to dry. Signs of irritation or feeing of non wellness is noted, if any. Measured and small quantities of prepared hair pack were applied to the specified area for a fixed time. Irritancy, redness, and swelling were checked and noticed for regular intervals up to 24 hours if any. The results of tests for the signs of irritation have displayed.

Sr.no	Parameter	Result								
		F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Swelling	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
2	Redness	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
3	Irritation	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative

Table no. 7 : patch test of formulated herbal dye.

6.Stability Test :

Stability testing of the prepared formulation was performed by storing it at different temperature conditions for the time period of one month. The packed glass *vial*s of formulation were stored at different temperature conditions room temperature and 35°C and were evaluated for the physical parameters like color, odour, pH, texture, and smoothness as highlight.

Sr.no	formulation	At Room temperature					At 35ºC				
		color	odour	pH	texture	smoothness	color	odor	pH	texture	smoothness
1	F1	No change	No change	5.80	Fine	Smooth	No change	No change	5.80	Fine	Smooth
2	F2	No change	No change	6.20	Fine	Smooth	No change	No change	6.20	Fine	Smooth
3	F3	No change	No change	5.50	Fine	Smooth	No change	No change	5.49	Fine	Smooth
4	F4	No change	No change	5.38	Fine	Smooth	No change	No change	5.38	Fine	Smooth
5	F5	No change	No change	6.50	Fine	Smooth	No change	No change	6.50	Fine	Smooth
6	F6	No change	No change	6.82	Fine	Smooth	No change	No change	6.82	Fine	Smooth
7	F7	No change	No change	6.30	Fine	Smooth	No change	No change	6.30	Fine	Smooth
8	F8	No change	No change	5.46	Fine	Smooth	No change	No change	5.46	Fine	Smooth
9	F9	No change	No change	5.38	Fine	Smooth	No change	No change	5.38	Fine	Smooth

Table No. 8 : Stability test Parameters For The Formulations of Herbal Dye.

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.

RESULTS AND DISCUSSION :

The prepared herbal hair dye contains all the goodness of natural ingredients. Apart from acting as a hair dye, this formulation, because of the perfect blend of herbals, also acts as a hair growth promoter, hair nourisher, conditioner and anti-dandruff agent as well. Henna acting as the base powder, acts as the universal hair dye as it used for its colouring properties throughout the globe. It is also beneficial in the removal of excess oil from the scalp and conditions the hair well. Reetha restores the health of dull, dry, and damaged hair. Tulsi aids in improving the circulation of blood flow at the root of the hair by providing more nutrients to support hair growth. The extract of B Neet Hibiscus is helpful in the growth of hair. It is beneficial for smooth, silky and healthy hair too. Shikakai is packed with vitamins A, C, D and K, which together form a powerful antioxidant. This antioxidant is probably the only thing your hair needs to cleanse the scalp of the sebum buildup, unclog pores, kill infection-causing bacteria and stimulate hair growth. Regular using of hibiscus flower juice can easily restrict hair fall control, dandruff and graying of hair even when you are touching 50years of age.

This is an age-old remedy for all those people who have been struggling for healthy hair that is free from grey hair. It also contains essential fatty acids, which strengthen hair follicles and provides shine and new life. The sufficient amount of vitamin C in amla helps to halt pre-mature greying. It is a great hair conditioner and also remover of dandruff. Tea imparts perfect color to the hair in combination with other herbs. It is good for the growth of hair and fights against dandruff. Coffee for hair strengthens hair by improving the overall quality and texture of it. It is absorbed by the follicles, making them softer and shinier, instantly. Organoleptic evaluation findings revealed that the pack is smooth and pleasant smelling powder.

Physicochemical parameters reflected that the moisture content was as minimal as 1.9%. pH was found neutral to suit the requirements of different scalp types. Ash value was found to be nominal, signifying the presence of inorganic radicals in appropriate amounts. It shows the presence of major phytoconstituents, which acts as true nourisher for the scalp as well as hair. Irritancy test revealed negative results for irritancy, redness and swelling as the herbals in their natural form without use of artificial additives were found to be compatible with the proteins of hair Stability tests performed at different temperatures over a regular period of one month disclosed the inert nature of the pack in the terms of colour, odour, appearance, texture, and pH. From the above observations, it has been signified that since the formulation is constituted with naturally occurring dried herbal ingredients, there are almost minimal possibilities of the deterioration of the formulation, as there is no moisture containing substance in either raw or processed form. The formulation was kept for one month at room temperature to observe the changes in its color,
odour, texture and appearance. The pH was also noticed before and after one month. The formulation was found to be stable. It can be easily stored and used at any temperature, at any place. Since it is a natural herbal based formulation, it
is free from the ill-effects of ammonia based chemical dyes. However, the regular use of it provides voluminous, smooth and well coloured hair. Its continuous use shows

superb effects later on. Since natural ingredients are known fort hair non-toxic, non-habit forming properties and no chemicals, preservative, artificial colors or perfumes has been incorporated in the pack, the chances of its degradation are almost close to the minimal. This leads to an increased shelf life with stable ingredients.

CONCLUSION :

A herbal hair pack colors the hair in an utmost gentle manner. The advantages of herbal based cosmetics 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 pack leads to manageable, frizz free colored hair. Pollution, ageing, stress and harsh climates badly affect the quality of hair. Form this study it is conduded that 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.

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