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FORMULATION AND EVALUATION OF HERBAL HAIR DYE GEL USING TECTONA GRANDIS AND PSIDIUM GUAJAVA

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ABSTRACT

One brilliant way to maintain youthful appearance is to colour your hair. Additionally, colouring your hair can help it looks thicker and more beautiful. Herbal formulations have greater acceptance than that of synthetic one, because of its benefits and devoid of side effects therefore herbal ingredients are widely used in the cosmetic formulations for attain maximum beneficences without causing side effects. Our study aims the formulation and evaluation of herbal hair dye using Tectona grandis and Psidium guajava. Tectona grandis has an excellent dye property because of the presence of constituents such as anthocyanin, flavonoids, anthraquinones and naphthoquinones whereas Psidium guajava having vitamin C, antioxidants and essential fatty acids helps the hair strengthen, prevent premature graying and retain the hair moisture. Therefore, the combination of Tectona grandis and Psidium guajava can create many advantages on hair. The extracts of Tectona grandis and Psidium guajava is added to the gel which was made using Carbopol, triethanolamine, glycerin and methyl para hydroxybenzoate. The evaluation studies were conducted such as organoleptic, pH, spreadability and homogeneity, where the results shows that the product is within the acceptable range.

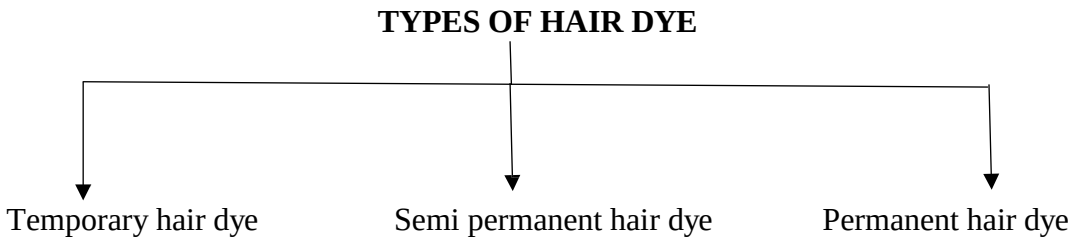
KEYWORDS: Natural hair dye, Hair dye gel, Tectona grandis, Psidium guajava.

1. INTRODUCTION

Hair is the protective part of the skin which is made up of protein called keratin and melanin.[2] Melanin is the pigment which are responsible for imparting color to the hair. The presence of melanin determines the color of the hair which differs in individuals due to genetic reasons.

The hair shaft composed of mainly 3 layers: cuticle, cortex and medulla, where cuticle is the outermost layer of hair shaft, cortex is the middle layer which contains pigment melanin and finally, the medulla which is the inner most layer made up of keratin cells.[1] Our study mainly focusing on imparting color to the cortex layer in order to attain temporary coloring of hair using Tectona grandis.[8]

Temporary hair dye using herbal ingredients have a greater acceptance in Indian market as well as in European market. Hair dye not only give good appearance but also protect our hair from external hazardous environment. There is a high demand for hair dye on the market because half of the world's population will have fifty percentage of grey hair.[4] Psidium guajava which helps to strengthening the hair, prevent premature greying and helps to retain the moisture content of the hair. Therefore, the combination of Tectona grandis and Psidium guajava can create a greater impact in hair care industries. Carbopol, Triethanolamine, glycerin, methyl para hydroxybenzoate, are the ingredients used in the formulation of this gel. Carbopol is used as a thickener, Triethanolamine is used to balance pH, methyl para hydroxybenzoate is used as preservative in the preparation. Gel formulation have much more stability than cream and ointments and also have a greater adherence in the site of application.[6] So formulation of gel using Tectona grandis and Psidium guajava can be an effective temporary hair dye formulation in hair care market.



ADVANTAGES.[5] They are less prone to cause skin irritation, friendlier to scalp and hair and cost effective.

2. MATERIALS AND METHODS

Materials: Tectona grandis extract, Psidium guajava extract, Carbopol, glycerin, Methyl para hydroxybenzoate, Water.

Requirements: Mechanical stirrer, beaker, funnel, filter paper, digital weighing balance

Fig No.1: Materials used.

A. Tectona grandis

Tectona grandis leaves are collected from surroundings. It is washed and extract is collected by decoction process. The extract obtained is collected on a beaker which is then sealed properly.

Synonym: Teak. Family: Lamiaceae Part used: Young leaf

Description: The Tectona grandis leaf is large, papery, and tropically oval shaped with rough texture. It is characterized hairy lower surface and upper smooth surface. The leaves are arranged oppositely in the tree and grown up in 75cm length and 45cm in width.

B. Psidium guajava

Psidium guajava leaves were collected from the surroundings which is then cleaned and extracted by decoction process. The extract is stored in a beaker.

Synonym: True guva, guva bush, guva Family: Myrtaceae

Part used: leaf

Description: Psidium guajava having a dark green elliptical to oval shaped leaf which having smooth edges, they are oppositely arranged in the tree. The upper surface is smooth and the lower surface is slightly hair.

C. Carbopol

Carbopol is used as a thickener in the formulation. Carbopol have other properties includes stabilizing, emulsifying, gelling agent.

Synonym: acrylic acid, carbomer, carboxy polymethylene.

Description: Carbopol is water swellable polymer which can be used as thickener, stabilizer, emulsifier and gelling agent. It is widely used in many industries such as cosmetic industries, toiletries and pharmaceuticals etc.

D. Glycerin

Mainly glycerin is used as humectant in the preparation of gel, which helps in retaining the moisture content of the preparation. Additionally, which enhances the stability of the preparation by preventing separation.

Synonym: glyrol, glycyl alcohol, glycerine, glycerol.

Description: glycerin is a colorless, odorless, liquid. It is a type of carbohydrate and having a sweet taste. Glycerin is hygroscopic in nature and which is miscible in both alcohol and water.

E. Triethanolamine

Triethanolamine is mainly used to adjust the pH of the formulation. They stabilize the gel consistency by neutralizing the acid components in the formulation.

Synonym: Trolamine, Triethanolamin-NG.

Description: Triethanolamine is a viscous colorless liquid. It can also be used as corrosion inhibitor, Surface active agent and emulsifying agent.

3. METHODOLOGY

I. COLLECTION OF HERBS

The leaves of Tectona grandis and Psidium guajava were collected from surroundings, which is then cleaned thoroughly with water.

II. PREPARATION OF HAIR DYE GEL

a. Preparation of Extract

Tectona grandis and Psidium guajava leaves are pinched into small pieces manually which are transferred into two different 250ml beaker containing 100ml of water. The extraction is then carried out by decoction process until the amount of water taken become ½ of its initial volume.

b. Preparation of Gel

The required amount of Carbopol is soaked in 20ml of water for 24hrs. After that the swelled Carbopol is continuously stirred using mechanical stirrer, then glycerin and methyl para hydroxy benzoate is added into it. Make up the preparation using sufficient quantity of water.

c. Preparation of Hair Dye Gel

The collected extract was added into the gel in desired quantity. Sufficient amount of triethanolamine is added in order to adjust the pH of the formulation. Three formulations are prepared by changing the concentrations of extracts and water.

d. Storage

The prepared herbal hair dye gel is transferred in a suitable container.

III. FORMULATION OF HERBAL HAIR DYE GEL

Three formulations were made (F1, F2, F3) and these formulations are taken for further evaluation studies.

Table No: 1 Formulation of Herbal Hair Dye Gel.

SLNO	INGREDIENTS	F1	F2	F3
1	Tectona grandis leaf extract	6ml	8ml	10ml
2	Psidium guajava leaf extract	6ml	8ml	10ml
3	Carbopol	1g	1g	1g
4	Glycerin	10ml	10ml	10ml
5	Methyl para hydroxybenzoate	0.3g	0.3g	0.3g
6	Triethanolamine	Qs.	Qs.	Qs.
7	Water	Qs.	Qs.	Qs.

IV. PROCEDURE FOR APPLYING THE HERBAL HAIR DYE GEL

First ensure that the hair is cleaned and well dried. Divide your hair into different sections, apply the hair dye gel directly into each section of hair using a brush. Ensure that the gel is evenly distributed into the hair and wait for few minutes for complete drying.

4. EVALUATION OF HERBAL HAIR DYE GEL

a) ORGANOLEPTIC EVALUATION

The color of the formulation was evaluated under a white background and odor by taking the smell.

b) HOMOGENEITY

Visual inspection was conducted to check for lumps, flocculates and aggregates in order to ensure homogeneity in all of the prepared gels.

c) pH DETERMINATION

The pH of F1, F2 and F3 formulations was evaluated for several times and average pH was given below. pH of the formulation was evaluated using digital pH meter.

(d) SPREADABILITY[7]

Spreadability refers how easily the formulation can be applied to the desired area. It was conducted by placing 1g of hair dye gel in between two glass slides. 40g of weight is placed on the upper glass slide for a time period of 30 sec. The diameter of gel spreaded is noted after 30 sec.

S= M L/T

where,

S= Spreadability

M= Weight applied on upper slide (g) L= length of sample spread

T= Time (sec)

5. RESULTS AND DISCUSSION

a) ORGANOLEPTIC EVALUATION

Color, odor, and texture were examined for the prepared hair dye gels and the result was shown in table no: 2.

Table No: 2 Organoleptic Evaluation.

Criteria	F1	F2	F3
Color	Light Reddish brown	Reddish brown	Dark reddish brown
Odor	Aromatic	Aromatic	Aromatic
Texture	Smooth	Smooth	Smooth

Fig No: 2 Organoleptic Evaluation.

b) HOMOGENEITY

Visual inspection has conducted, the result was found to be that the formulations was free from lumps, flocculates and aggregates.

Table No: 3 Homogeneity

SL NO.	FORMULATION	HOMOGENEITY
1	F1	Good
2	F2	Good
3	F3	Good

c) pH DETERMINATION

The pH of the formulations is determined by using digital pH meter. From the observation we can determine that F3 formulation is having a suitable pH than F1 and F2 formulation which is shown in table no: 4.

Table No: 4 pH Determination.

SL NO.	FORMULATION	pH
1	F1	8.21 ± 0.002
2	F2	8.04 ± 0.003
3	F3	7.88 ± 0.001

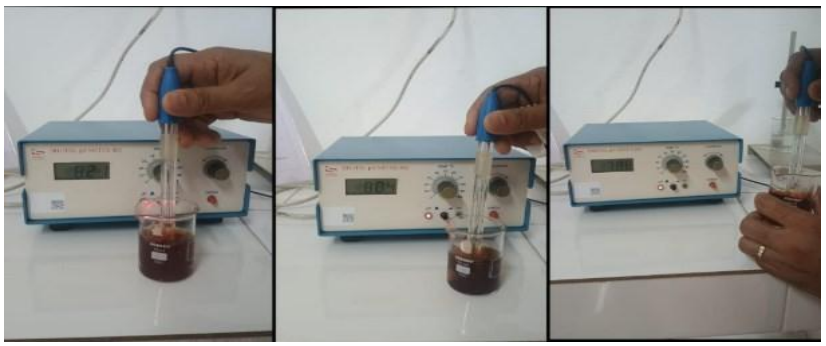


Fig No: 3 pH Determination.

d) SPREADABILITY

The spreadability is measured by placing 1g of sample in between two glass slide and 40 g of weight is loaded on the upper glass slide for 30 sec. after 30 sec the length at which the sample spread is measured. The obtained results are shown in table no: 5.

Table No: 5 Spreadability.

SL NO	FORMULATION	SPREADABILITY
1	F1	9.3
2	F2	12
3	F3	13.3

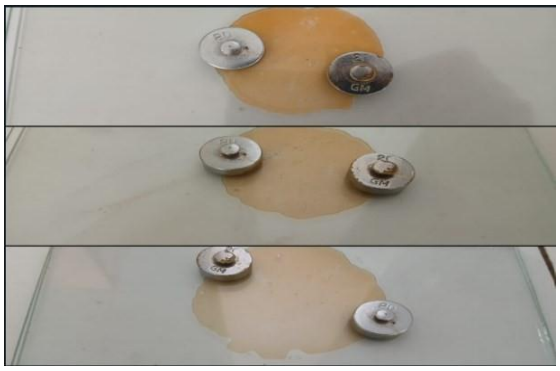


Fig No: 4 Spredability.

In this study we are indicating that Tectona grandis can be an effect solution for overcoming greying of hair temporarily. Our study aims both dying as well to maintain a good healthy hair. Tectona grandis can provide color to the hair whereas Psidium guajava can promote the hair health. The combination of these two herbal ingredients can create a greater impact on hair

coloring products because of its efficacy and lack of side effects. Formulation of herbal hair dye as a gel can be easily applicable to the hair and also having much advantages. It can also be formulated in other suitable formulation rather than a gel which may can create a greater efficacy and more stable product.

In this study, we have developed mainly three formulations (F1, F2, F3) and conducted the evaluation studies. From the evaluation studies, we observed that all formulations are having smooth texture and F3 formulation is having a better color when compared to F2 and F1. We observed that three formulations are free from aggregates, lumps and flocculate by conducting homogeneity studies. Triethanolamine is finally added to the product in order to maintain the pH of the formulation within acceptable range for the hair dye. From spreadability test, we evaluated that F3 formulation has better spreadability than F2 and F1 formulations.

The results from these evaluation parameters shows that F3 formulation can be considered as an effective formulation than F1 and F2 formulations.

6. CONCLUSION

Herbal cosmetics having a greater acceptance in Indian as well as European market because of its efficacy and lack of side effects. The formulation of herbal hair dye gel using Tectona grandis and Psidium guajava can be an effect solution for hair greying and hair discoloration. Our formulation could produce color to hair along with which is useful for promoting the hair health. Formulating the hair dye as a gel has many advantages such as easy application, easy to handle etc. The product can also be formulated in other suitable forms rather than a gel, may create a better efficacy and stability. The study shows that F3 herbal hair dye gel is better than F1 and F2, which is having suitable color, good spreadability, homogeneity and acceptable pH range.

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