



## FORMULATION AND DEVELOPMENT OF HAIR CHALK

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### ABSTRACT

**Coloring of hair, earlier called dyeing. In ancient time hair dyes were made from plants, metallic compounds, soaps and ammonia. These permanent hair dyes have been reported to be harmful. Thus in present study hair chalk was formulated. It is safe alternative of temporary hair coloring. Due to high molecular weight it does not penetrate into the cortex. Hair chalk was studied for its stability. As per BIS standard pH of product was found to be 8.27 whereas break load of product was found to be 100 & product was proved to be good in terms of all functional properties.**

**Keywords: Hair chalk, temporary hair coloring, Permanent dyes, Break load, Metallic compound**

### 1. Introduction

Coloring of hair, being a trend since 80's, was earlier called dying. The reasons for Coloring of hair are to change natural color, to color the white hairs which begin to appear with age and to change the color of the hair temporarily on a particular occasion. Or add the color to attain a desired effect. (Wilkinson, et al. 1982). In general, there are 3 basic categories of dyes based on their color retention to the hair, permanent, semi-permanent and temporary. Permanent dyes are oxidative dyes. It contains oxidizing agents, responsible for color development. In ancient times hair dyes were made from plants, metallic compounds, or a mixture of the two. Most commercial hair dyes contain modifiers, antioxidants, alkaline, soaps, ammonia and wetting agents. These could be wetted or rubbed on the surface. So, extensive use of such agents cause allergic reactions and represent potential health risk. (Sankar, et.al 2017). Temporary non-oxidative dyeing has a reduced permanence time on the fiber, leaving

the hair after the first shampooing. The dye utilizes high molecular weight and deposits on the hair surface without being able to penetrate into the cortex. (Halal, 2009) This type of dye does not have the power of whitening the hair strand and therefore, it is indicated only to add new nuance and not change its color. ((Harrison, et al. 2004).

These dyes contain anionic characteristics and are selected to allow the maximum solubility in water and the minimum penetration in hair. (Robbinson, 2012). Since temporary colorants need not comprise small molecules capable of penetrating the hair, a wide variety of compounds may be used, which facilitates convenience. Which is not possible with permanent colorants. These temporary hair colorants are available in the form of color stick, color spray, liquid type, and Hair tints. Color stick are blocks similar to crayons made with waxes and pigments. These could be wetted and rubbed on the hair or applied with a wet brush. (Ankur kumar,). Color spray apply through the medium of solution containing transparent polymers. (Takeo, 1997). Hair tints are usually aqueous or alcoholic based solutions. These products contain acids, polymers, waxes in small amounts. These products intended to shade the existing color of the hair and are applied to whole scalp. In the modern era, fashion trend has changed. Youngsters prefer multicolored hair strands to enhance and change their look and style. The main aspect is to give entirely different look to personality by coloring or highlighting few locks of hair. So the demand of temporary and convenient method of coloring of hair is going up. Thus the hair chalk is a safe and convenient alternative of all such colors. It is easy to apply and last for whole day. Hair chalk can be used in a multitude of different ways like

multicolored hair strands. The objective of present study was to formulate and develop hair chalk of different colors and to know its stability and efficacy.

## 2. EXPERIMENTAL ANALYSIS

### Chemicals

All the chemicals and reagents were procured from Sd. fine chemical Ltd. Mumbai.

**Colors:** Colors D & C Red No. 7 calcium lake, D & C Red. No. 247 Aluminum Lake. D & C Red No. 33 Aluminum Lake and D & C Blue No. 1 Aluminum Lake were obtained from Koel colors private limited. , Gujrat.

**Lake** - color lakes that are not soluble in the medium but soluble in water. (Paye, et.al, 2008).

These lakes are prepared by precipitating a soluble dye on a reactive substratum or diluent. All these colors are certified by Federation of Food, Drugs and Cosmetics Administration, 1940. (Sagarin, et al. 1992)

### 2.1. Preparation of Chalk Base

In formulation and development of hair chalk, the chalk base was prepared by mixing all the ingredients in proper proportion the base was selected, which is non-breakable and firm.

**Table 1 Formulation and development of product base**

Ingredients	Quantity in %
Talc	13.3
Koolin	1.33
Bentonite	2
Calcium	3.33
Carbonate	
Magnesium	5.33
Stearate	1.33
Titanium	0.33
Dioxide	20
Acudyne 180	Upto
Dimethicone	100gms.
Water	

To the base colors were incorporated in various concentrations 3.3%, 6.6%,10% ,13.3%, 16.6%, and 20%. The base of 20% concentration was selected for further studies.

### 2.2. Application of hair chalk

Hair chalk was rubbed on the wet hair strands and then set by using blow dryer or iron to get long-lasting effect.

### 2.3. Evaluation of the product

Various qualitative tests were carried out.

### 2.3.1 Determination of pH

5% solution of powder of hair chalk was prepared and pH was measured using pH meter. (Bureau of Indian standard, 1999)

### 2.3.2 Determination of Accelerated Stability Test.

The product was further studied for accelerated stability over a period of one month. The chalk was kept at room temperature, fridge (4°C) and at over (45 °C). Parameters such as color and pH was checked at these temperatures.

### 2.3.3 Determination of break load test

The hair chalk with 20% color was firmly fixed with horizontal assembly. The burette was adjusted just above the hair chalk. A marking was made at a distance of 1.5 cm from the base of the chalk. The plastic container was weighed along with hook and was suspended on this 1.5 cm. mark. Water was released slowly from the burette into the plastic contained till the chalk breaks. Burette reading was added with the mass of suspended container which gave the breaking load of the chalk. (Bureau of Indian standard, 1990)



**Fig. 1 Break load test**

### 2.3.4 Determination of color retention on hair

The chalk was applied on wet hair and color was checked by visual method.

### 2.3.5 Subjective evaluation of the product

In order to access the effect of the developed product, subjective evaluation of the product was carried out. 25 subjects were selected and were grouped according to the occupation. In subjective evaluation the product was tested under the parameters such as easily applicable, satisfactory coloration, dryness after application, color retention and appearance.

## 3. Results and discussion

The main important aspect of hair colorants is to give entirely different look to personality by coloring or highlighting few locks of hair. Therefore, in the present study, hair chalk was formulated and different colors were incorporated in various concentrations. 3.3%, 6.6%, 8.3%, 13.3%, 16.6%. And 20%. At 3.3%, 6.6%, and 8.3% concentrations, there was no

satisfactory coloration on hair. At 13.3% and 16.6% concentration, there was little coloration on hair but removed very quickly. At 20% concentration, product showed satisfactory color retention and long lasting effect. Thus hair chalk of 20% concentration was accepted. The accelerated stability test of product showed that there was no change in color and pH after one month. The product was found to be stable. The pH of the product was found to be 8.27 as per BIS standard of powder dye. As per BIS standard of lipstick, the Break load of hair chalk was found to be 100. From subjective evaluation of the product it was observed that most of the people like to color their hair as shown in fig.2. Amongst them girls like to color their hair most. According to Occupation College going girls preferred to use temporary colorants to give highlighting effect to their hair, as Shown in fig. 3

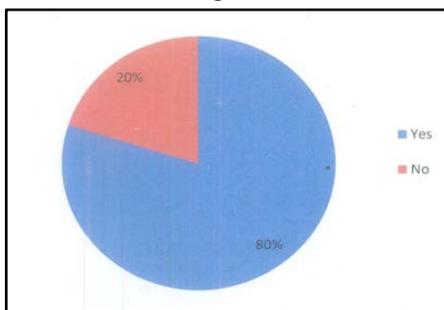


FIG.2 Number of people like to color their hair

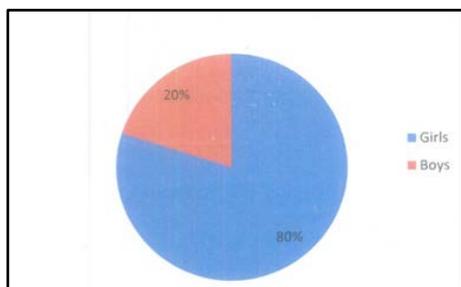


FIG.3 Gender based subjective evaluation of the product

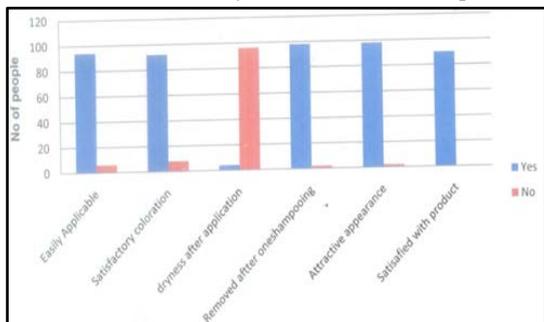


Fig.4 Subjective evaluation for product performance

Considering all parameter shown in fig no. 4, it was observed that most people are satisfied with the product.

**4. CONCLUSION:**

The product was acceptable in view of satisfactory color to the hair after application and GOT EASILY removed after one shampooing. The product passed all the mentioned tests successfully. The product was found to be good in all terms of all functional parameters.

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