ABSTRACT

Lots of people occasionally have the urge to change or enhance their hair color, but are unwilling to use the harsh and, in some cases, potentially harmful hair dying chemicals found in most commercial dyes and color rinses. Just as men and women have done for thousands of years, you can change your basic hair color, put new highlights in your locks or naturally darken grey strands using natural hair colors. From ancient days, various plant materials like Henna, Indigo, Chamomile, Shoe flower, Madder, Aloe etc are used to dye grey hair to get natural black color. But instead of getting black color shades of red to copper color are obtained. A need was felt to formulate a dye containing only plant products which is safe for use and does not have the problems of staining skin during use and hypersensitive reactions. In the present investigation the formulations are developed using different combinations of Henna and Aloe along with other herbs.

Keywords: Henna, Aloe, Hair Colorant, Natural Herbs.

INTRODUCTION

The dyeing of hair has been practiced since the time of earliest Man. When it was impractical to dye the hair, then the wearing of wigs was customary, even as early as the period of the ancient Egyptians. The use of natural dyes on the hair has not made very great progress, and this is due to a number of factors that should not be the reason for despair. Natural dyes are not very stable in solution, are prone to oxidation, browning, discolouration, pH colour shift, fading and attack by UV light. However, none of these adverse effects are applicable to the dry powdered natural dye. A single natural dye is not the right colour, and only henna or...
walnut seem to be suitable to colour the hair, perhaps with chamomile to tint blond hair\textsuperscript{1}. Loss of color in hair is due to various reasons like genetic influence, effect of environmental factors, use of alcoholic preparations etc. Though the permanent synthetic hair dyes are available in different ranges and retain natural luster, they have the chief disadvantage of producing hypersensitive reactions in some individuals. All natural hair dyes made from living plants using the latest scientific achievements in green chemistry and utilizes a revolutionary breakthrough in dye technology based on more than 30 years of research by leading experts in hair coloring industry. The result is a new, 100% natural plant based permanent patent pending hair colorant that is free of: paraphenylene diamine and its derivatives, resorcinol, m-aminophenol, p-aminophenol, toluene-2, 5-diamine, azo-dyes, diazo-dyes, disperse dyes, ammonia, and parabens - all synthetic chemicals which are known allergens and suspected carcinogens\textsuperscript{2,3}. 

Hair dye is one of the oldest known beauty preparations, and was used by ancient cultures in many parts of the world. Ancient Egyptians, Greeks, Hebrews, Persians, Chinese, and early Hindu literature mention the use of hair coloring agents. Early hair dyes were made from plants, metallic compounds, or a mixture of the two. Rock alum, quicklime, and wood ash were used for bleaching hair in Roman times. Herbal preparations included mullein, birch bark, saffron, myrrh, and turmeric\textsuperscript{1}. Many different plant extracts were used for hair dye in Europe and Asia before the advent of modern dyes. Indigo, known primarily as a fabric dye, could be combined with henna to make light brown to black shades of hair dye\textsuperscript{4}. An extract of the flowers of the chamomile plant was long used to lighten hair, and this is still used in many modern hair preparations. The bark and leaves, or nutshells of many trees were used for hair dyes. Wood from the Brazil wood tree yielded brown hair dyes, and another hair dye known in antiquity as fustic was derived from a tree similar to the mulberry\textsuperscript{5}.

Other dyes were produced from walnut leaves or nut husks, and from the galls, a species of oak trees. Some of these plant-derived dyes were mixed with metals such as copper and iron, to produce more lasting or richer shades. The Food and Drug Administration has issued a monograph that approves henna for the use as hair colorant. Henna is one of a select group of natural products to achieve official FDA recognition\textsuperscript{6}. Therefore, need was felt to formulate a dye containing only plant products which is safe for use and does not have the problems like staining skin during use and hypersensitive reactions. The present study aims to formulate and evaluate polyherbal hair colorant which is safe to use.
MATERIALS AND METHODS

The plants [7-11] used in the study are: Henna (Lawsonia inermis), Aloe (Aloe barbadensis), Marigold (Tagetes erecta), Madder (Rubia cordifolia), Shoe flower (Hibiscus rosasinensis), Jujube (Ziziphus jujube), Ritha (Sapindus mukorossi), Black Til seed (Sesamum indicum), Kakmachi (Solanum nigrum), Nagarmotha (Cyperus rotundus) and Pale catechu (Uncaria gambir).

Preparation of Natural Colorants

The leaves of Henna, Aloe, flowers of Marigold, Madder, Shoe flower, seeds of Jujube, Ritha, Black Til, fruits of Kakmachi, rhizome of Nagarmotha and shoots of Pale catechu were collected/ procured from the different places and dried in shade. They were made into powders and used for the preparation of hair colorants [12].

Collection of Unpigmented Hair

The human hair were collected from barber shops from which white hairs were separated and used for study.

Experimental

The procedure was followed by modifying the method given by Tomer and Sethiya [13]. Suitable combinations of henna and indigo were taken and mixed in different proportions and rests of the powders were added in it to make a smooth paste (Table 1).

Table 1: Herbal formulations of suitable combination of Henna and Aloe

<table>
<thead>
<tr>
<th>Formulations</th>
<th>Ingredients Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HF1</td>
</tr>
<tr>
<td>Henna: Aloe</td>
<td>2:1</td>
</tr>
<tr>
<td>Marigold</td>
<td>0.2</td>
</tr>
<tr>
<td>Madder</td>
<td>0.2</td>
</tr>
<tr>
<td>Shoe flower</td>
<td>0.2</td>
</tr>
<tr>
<td>Jujube</td>
<td>0.2</td>
</tr>
<tr>
<td>Ritha</td>
<td>0.4</td>
</tr>
<tr>
<td>Black Til seed</td>
<td>0.1</td>
</tr>
<tr>
<td>Kakmachi</td>
<td>0.1</td>
</tr>
<tr>
<td>Nagarmotha</td>
<td>0.1</td>
</tr>
<tr>
<td>Pale catechu</td>
<td>0.1</td>
</tr>
</tbody>
</table>

The pastes were prepared in water and kept in iron container for 8 hrs. Six groups for different formulations were prepared and formulations were applied to the grey hair and kept for 3 hrs. The hairs were washed after 3hrs with herbal shampoo. The hairs after washing
were pasted on white sheet and covered with cellophane. The colored hair were exposed to sunlight for 7 days and again washed as per previous method.

**Primary Irritation Testing**

All animal experiments were carried out in accordance with guidelines of CPCSEA and the study was approved by the Institutional Animal Ethical committee (379/01/ab/CPCSEA). Four healthy female wistar albino rats, weighed 200-250gm were selected for study. Each rat was caged individually food and water given during the test period 24hrs prior to the test. The hair from the back of each rat of 1cm² was shaved on the side of the spine to expose sufficiently large test areas, which could accommodate three test sites were cleaned with surgical spirit. 1ml quantity of formulations (HF1-HF6) was applied over the respective test sites of one side of the spine. The test sites were observed for erythema and edema for 48hrs after application [14].

**RESULTS AND DISCUSSION**

In the formulations HF 1, HF 2 and HF 3 proportion of Henna is more than that of Aloe. In formulations HF4, HF 5 and HF 6 proportion of Aloe is more than that of Henna. It has been observed that formulations HF 1, HF 2 and HF 3 showed darker color as compared to HF4, HF 5 and HF 6 (Fig. 1 and 2).

![Figure 1: Effect of formulation HF1, HF2 and HF3 on 1st day](image1.png)

![Figure 2: Effect of formulation HF4, HF5 and HF6 on 1st day](image2.png)
The colored hairs were then exposed to sunlight for 2 hrs daily. All the groups were washed with herbal shampoo and on seventh day the change in the color was observed (Fig. 3 and 4). It was observed that there was no color change after exposing the hair to sunlight and washing after 7 days.

![Figure 3: Effect of formulation HF1, HF2 and HF3 on 7th day after washing](image1)

![Figure 4: Effect of formulation HF4, HF5 and HF6 on 7th day after washing](image2)

Also the formulations did not cause any irritation of nails or fingers during preparing as well as application and washing.

**Primary Skin Irritation Test**

Primary skin irritation test was conducted to evaluate the irritation by the prepared formulations on intact skin of rats. All of the prepared formulations were not showed any erythema and edema; this indicates that the prepared formulations were non-irritant on skin of rats.

**CONCLUSION**

The formulation was found to produce excellent coloration on application. The formulation did not cause any irritation to the skin. As the results were found to be encouraging, the authors would like to work further for developing the suitable formulation for further studies.
ACKNOWLEDGEMENTS

The authors are grateful to Dr. A. K. Jain, Professor, SIPS, College of Pharmacy, Sagar, M.P., for providing facilities and Dr P.K. Tiwari, Prof. and Head, Dept. of Botany, Dr. H.S. Gour, Central University, Sagar, M.P., for authentication of the plant material.

REFERENCES