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Development and Evaluation of Polyherbal Formulation for Hair Colorant.

Rajesh Yadav^{*1}, Nita Yadav², Murli Dhar Kharya¹

¹Deptt. of Pharmaceutical Sciences, Dr H. S. Gour Central University, Sagar, Madhya Pradesh, India.

²Sagar Institute of Pharmaceutical Sciences, Sagar, Madhya Pradesh, India.

ABSTRACT

Herbal cosmetics are formulated by using various colouring ingredients to form the base in which one or more colouring ingredients are used to provide defined cosmetic benefits, shall be called as "Herbal Cosmetics". The need of herbal medicines is increasing rapidly due to their lack of side effects. Herbal drugs constitute a major part in all the traditional systems of medicine. There are approximately 1250 Indian medicinal plants, which are used in formulating therapeutic preparation according to Ayurveda and other traditional system of medicine. Traditionally *Pterocarpus santalinus*, *Eclipta alba*, *Lawsonia innermis*, *Phyllanthus emblica*, *Centella asiatica* and *Acacia catechu* were used as a main ingredients in the preparation of hair dyeing. The present studies revealed that investigation of these plants in terms of its formulation by using different extracts was to develop the affectivity in terms of quality for better colourant action on sheep wool threads. Results of studies showed that three hair colorant formulations viz. PF-7, PF-5, PF-3, out of eight dried formulations of both aqueous and alcoholic extract, blackened better colorless sheep wool threads. The black colouring capacity of the formulation PF-7 was found to be maximum. The black colour remained for longest duration when the threads kept at room temperature, when sun light and natural detergent treatment, the order of blackening wool threads of both the herbal formulations were- PF-7 >PF-5 >PF-3 >PF-4 >PF-6 >PF-2 >PF-8 >PF-1. The colour effect of alcoholic extract formulation was significantly higher than aqueous extract formulation.

Keywords: Indian Herbs, Polyherbal Formulation, Herbal Cosmetics, Colouring Ingredients, and Hair Colorant.

**Corresponding author*

INTRODUCTION

Hair is a filamentous biomaterial that grows from follicles and found in the dermis. The human body, apart from its glabrous skin, is covered in follicles which produce thick terminal and fine vellus hair. Most common interest in hair is focused on hair growth, hair types and hair care, but hair is also an important biomaterial primarily composed of protein, notably keratin. The word “natural” on hair color does not necessarily mean chemical-free. Some brands commonly found in natural products on peroxide to prepare the hair for their colorants. These chemicals have serious side effects like hypersensitivity[1]. They weaken and destroy the hair shaft over time. Additionally, many chemical hair colorants were used for various petroleum or coal tar-based ingredients derived from the environmentally harmful processing of oil or coal tar-based ingredients that have been found over time and increased the long-term risk of various forms of cancer[2]. In contrast, henna has a long history as a safe and gentle hair color[3]. 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. Therefore, the need was felt to formulate a dye containing only plant products which was safe for use and did not have the problems like staining skin during use and hypersensitive reactions[4-5]. In India, henna has been used traditionally for colouring palms and hairs, there are so many herbs like Kikar (*Acacia arabica*), bihi (*Cydonia oblonga*), bhringraj (*Eclipta alba*), patnag (*Haematoxylon campechianum*), akhrot (*Juglans regia*), narra (*Petrocarpus indicus*), jaborandi (*Pilocarpus jaborandi*), jatamansi (*Nardostachys jatamansi*), amla (*Phyllanthus emblica*), kuth (*Saussurea lappa*), Giloe (*Tinospora cordifolia*), behera (*Terminelia belerica*) which are used as a main ingredients in hair care preparations mainly for dyeing hair[6-9]. The present study aims to formulate and evaluate polyherbal hair colorant which is safe to use.

MATERIALS AND METHODS

Collection and identification of plant materials

The plant materials were collected from the Satbhaia Herbal shop and Ratan Bilaiya Herbal shop, Sagar (M.P.) and authentication was done by Dr. A. K. Jain, Professor and Principal, Sagar Institute of Pharmaceutical Science, Sagar (M.P.).

Drying of plant material

The collected plant materials were washed with water to make free from dust or foreign matter and dried in open shade. After air drying the plant materials were packed in polythene bags separately.

Preparation of aqueous and alcoholic herbal extracts from powdered drugs

2 x 250 gm powder of each i.e. stems of *Pterocarpus santalinus*, whole plant of *Eclipta alba*, leaves of *Lawsonia innermis*, fruits of *Phyllanthus emblica*, whole plant of *Centella asiatica* and whole plant of *Acacia catechu* were extracted separately with distilled water and then again procedure is repeated for fresh powder with ethanol for 72hrs by cold

maceration[10]. All the obtained extracts were dried on steam bath under vacuum to get dark colored powder masses (5-10%).

Preparation of hair colorants formulation

The quantities of above mentioned dried extracts of all in gm were taken as mentioned in **Table-1**. All the extracts of above mentioned plants were mixed in sufficient quantity (25ml) of subsequent solvent (water for aqueous extractive and alcohol for alcoholic extractive) to prepare uniform viscous pastes for formulations development.

Table 1: Ratio of extracts in gm for hair colourant formulations

Formulations*	EPS	EEA	ELI	EPE	ECA	EAC
PF-1	1	1	2	-	-	-
PF-2	-	1	2	1	-	-
PF-3	-	-	2	1	1	-
PF-4	-	-	2	-	1	1
PF-5	1	1	2	1	-	-
PF-6	-	-	2	1	1	1
PF-7	1	1	2	1	1	1
PF-8			2			

* All the extracts were mixed according to above mention ratio separately for aqueous and alcoholic extractive based formulations.

Where EPS (Extracts of *Pterocarpus santalinus*), EEA (Extracts of *Eclipta alba*), ELI (Extracts of *Lawsonia innermis*), EPE (Extracts of *Phyllanthus emblica*), ECA (Extracts of *Centella asiatica*), EAC (Extracts of *Acacia catechu*).

Characterization of formulations on sheep wool pieces

The sheep wool procured from Local market of Sagar, M.P., India, was cut into small pieces and washed with petroleum ether four times to remove fatty materials. The wool pieces were dipped into each formulation placed in a china dish for 2hrs and they were divided in three categories to observe their affects of room temperature, sunlight and natural detergent as follows Kar *et al.*, 2008 [11-13].

Effect of room temperature on colored wool pieces

The colored wool pieces were pasted on a white paper sheet and covered with transparent cellophane sheet then kept for 30days at room temperature. The photographs of pieces were taken on 0, 15 and 30days.

Effect of Sunlight on colored wool pieces

The colored wool pieces were pasted on a white paper sheet and covered with transparent cellophane sheet then kept in sunlight for 2hrs daily for 30days at the interval of 0, 15 and 30days photographs were taken.

Effect of Natural detergent on colored wool pieces

A 10% w/v aqueous solution of Reetha (*Sapindus mukorrossi*) was prepared. The colored wool pieces were washed with Reetha aqueous solution for one min on alternate days and their photographs were taken on 15 and 30days.

Patch test

A small quantity of paste was applied on the ear back. After 15min this paste was removed and the area was washed carefully. There was no irritation/allergic reaction, if there was irritation/allergic reaction, the application of that formulation was avoided.

RESULTS AND DISCUSSION

The black colour retaining power of the threads for both the formulations retained for 30days at room temperature (Fig. 1). in sun light, the colour stain faded gradually. After 15days, the stains remained half of the original stain; it indicated that UV (ultraviolet spectrum) rays present in sun light affected the hair stain/hair dye (Fig. 2 and 5) and washing of the colored threads with natural detergent on the alternative days affected the stain of the threads. The black colour of the thread dipped in formulation PF-3 completely faded within 30days. In other cases the colour started fading after 8days. The colour intensities of thread dipped in formulation PF-5 became half after 15days (Fig. 3 and 6). Five hair colorant formulations - PF-7, PF-6, PF-5, PF-3 and PF-2, out of eight of both formulations, blackened better colorless sheep wool threads. The black colouring capacity of the formulation PF-7 was maximum. The black colour remained for the longest duration of period when the threads kept at room temperature. In sun light and washed with natural detergent, the order of blackening wool threads of herbal formulations was- PF-7>PF-5>PF-6>PF-3>PF-8>PF-2>PF-4>PF-1. Formulation prepared by alcoholic extract showed higher intensity as well as longitivity of retaining color compare with aqueous extracts based formulations.

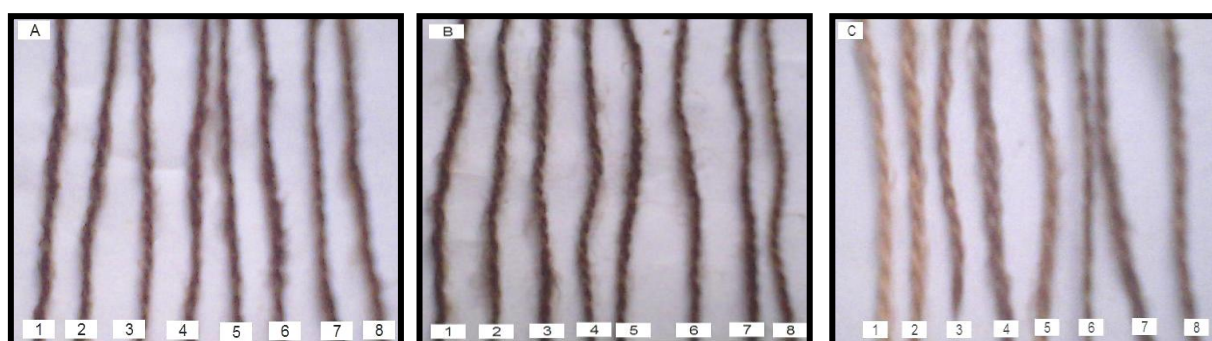


Fig. 1: Photographs of wool pieces treated with formulations containing aqueous extract on (A) zero day (B) fifteen day and (C) thirty day at room temperature.

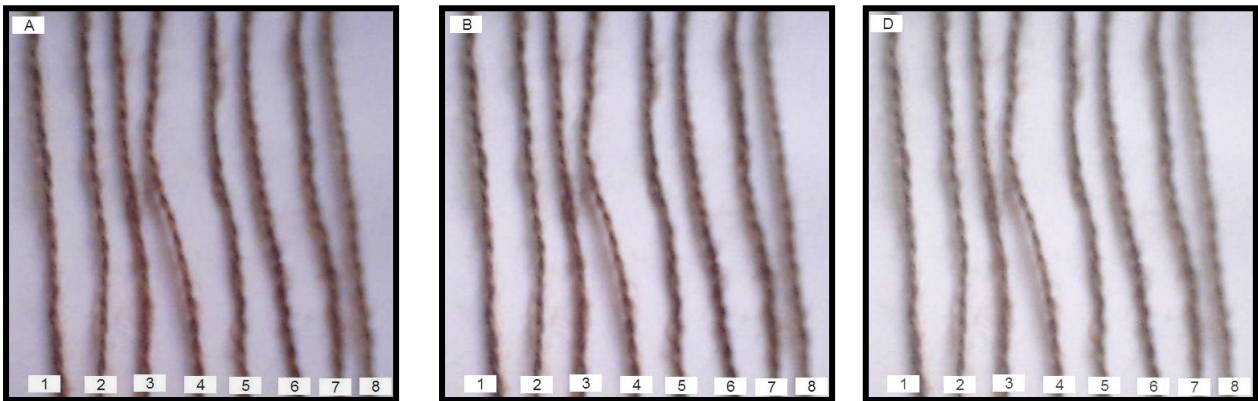


Fig. 2: Photographs of wool pieces treated with formulations containing aqueous extract on (A) zero day (B) fifteen day and (C) thirty day in sun light.



Fig. 3: Photographs of wool pieces treated with formulations containing aqueous extract on (A) zero day (B) fifteen day and (C) thirty day when detergent washed.



Fig. 4: Photographs of wool pieces treated with formulations containing alcoholic extract on (A) zero day (B) fifteen day and (C) thirty day at room temperature.

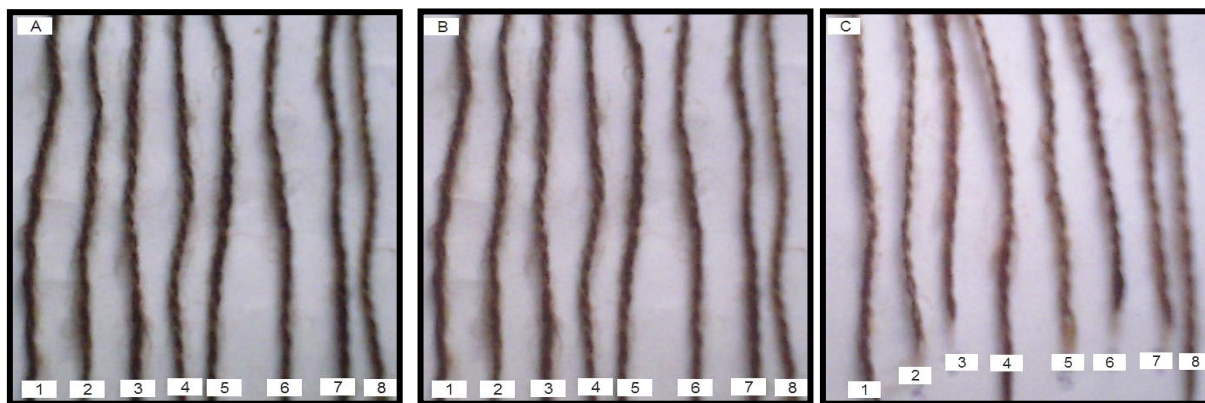


Fig. 5: Photographs of wool pieces treated with formulations containing alcoholic extract on (A) zero day (B) fifteen day and (C) thirty day in sun light.

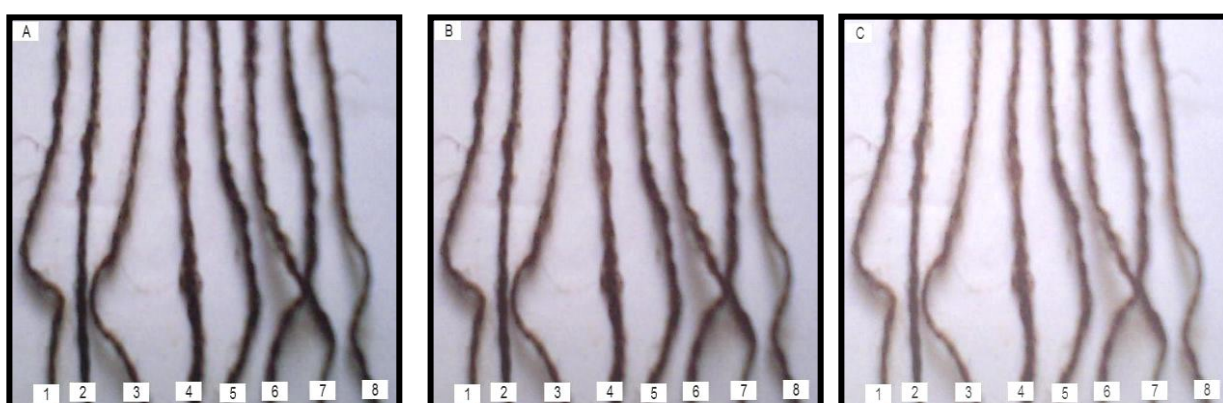


Fig. 6: Photographs of wool pieces treated with formulations containing alcoholic extract on (A) zero day (B) fifteen day and (C) thirty day when detergent washed.

CONCLUSION

From our present study it has been concluded that the maximum colorant action of PF-7 was due to synergetic effect of each plant extracts. The hair colouring action of alcoholic extract was better than aqueous extract was due to its high affinity towards solubilization of plant derived chemicals.

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