

Formulation and Evaluation of a Polyherbal Hair Dye Cream of the Aqueous and Ethanolic Plant Extracts of *Hibiscus rosasinensis*, *Coffea arabica*, *Syzygium aromaticum*, and *Cinnamomum zeylanicum*

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Abstract

Polyherbal hair dye products are preferred over synthetic products due to their several benefits. Literature reported flowers of *Hibiscus rosasinensis*, seeds of *Coffea arabica*, buds of *Syzygium aromaticum*, and bark of *Cinnamomum zeylanicum* extracts seem to have high colour intensity. Hence, this study aimed to prepare a Poly Herbal Hair Dye (PHHD) cream using aqueous and alcoholic extracts of above plants. Aqueous and ethanolic extracts were obtained after maceration. PHHD creams (A,B,C) were prepared mixing each extract with the cream base. A hair color developer was prepared to improve the colour retention of the hair by adding hydrogen peroxide in 3% ,6% and 9% concentrations, separately. The formulated PHHD creams and the developer were evaluated for organoleptic and physicochemical properties. The hair colorant effect of each cream and their combinations with the hair color developers were evaluated using human gray hair. Formulated creams were characterized by microscopic analysis, stability test, analyzing the effect of sunlight, natural detergent and room temperature on coloured gray hair. Descriptive analysis was done using SPSS 23. The ethanolic extract exhibited high color intensity. All the types of hair color developers had the same colour effect on gray hairs. Nine percent of developers had the longest duration (45 days) of colour retaining ability. The six percent of developers were selected as the suitable developer considering its median peroxide level and the duration of colour retention. Hence, it could be concluded that the combination of PHHD B (Ethanolic) with 6% developer would be suitable for hair dyeing due to its high colour intensity, colour retention time (30 days) and the level of hydrogen peroxide.

Keywords: *PHHD, Physicochemical properties, Hair colorant effect*