**International Journal of Pharmacy and Analytical Research (IJPAR)**

***IJPAR |Vol.14 | Issue 2 | Apr - Jun -2025***

**www.ijpar.com**

**ISSN: 2320-2831**

DOI : https://doi.org/10.61096/ijpar.v14.iss2.2025.401-405

**Research**

# Formulation And Evaluation Of Alkanna Tinctoria Extract Based Poly Herbal Hair Dye Shampoo

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Published on: 30 Jun 2025

Published by:
DrSriram Publications



## Abstract

When it comes to highlighting a person's beauty and personality, hair is essential. Due to a variety of genetic and environmental variables, everyone experiences the natural process of greying their hair after a certain age. Due to their superior activity and fewer adverse effects compared to synthetic medications, people use herbal formulations. The current study has a strong emphasis on creating and assessing herbal hair dye shampoo formulations. A shampoo base to encourage hair cleaning and a variety of natural extracts for the colouring effect are used to make the herbal hair dye shampoo. Alkanna tinctoria, hibiscus, coffee powder, lemon juice, rose oil, Reetha extract (foam), shikakai extract, fenugreek extract, hibiscus extract, henna powder, and distilled water are all included in the created composition. Numerous commercially available hair products, including shampoos and hair colours, contain dangerous compounds that are harmful to human skin and hair. Additionally, processed goods rather than natural materials are used in the preparations. Thus, it is necessary to create ready-to-use, side-effect-free formulations with raw medications that have not been processed and just trace amounts of synthetic substances. When used over time, the prepared herbal hair dye shampoo exhibits permanent colouring and functions well as a shampoo without generating any negative skin reactions. It is stable, efficient, and user-friendly.

**Keywords:** Greying of Hair; Henna; Alkanna tinctoria; Aloe Vera; Hibiscus; Coffee; Lemon; Fenugreek; Rose Oil; Reetha; Shikakai; Cosmetics; Side Effects; Crude Drug.

## INTRODUCTION

Natural dyes are made without the use of chemicals using material from plants, animals, or insects. In the past, dyes with deeper, more resilient colors were created by combining two or more metals with naturally

occurring organic material. The primary phytoconstituent in the natural dyes we use is tannin. Tannins are also excellent for coloring hair and extending the time between colours. Ayurveda uses a variety of plants and herbs to make cosmetics that protect the skin from the effects of the outside world while also being aesthetically pleasing. Herbs' natural ingredients provide the body with beneficial minerals and nutrients without causing any negative side effects [1]. Shampoo is a product that contains surfactant in the right form and is used to remove surface pollutants. It may be solid, liquid, or powder. Without endangering the user's health, it removes oil, dirt, and skin debris from the hair, shaft, and scalp. Shampoos are composed of special care chemicals that target hair, cleansing agents, stabilizers and comforting additives, and conditioners that give the product a shiny, soft finish. Since herbal hair dyes don't contain ammonia and peroxide, which are frequently present in synthetic dyes, more and more people are using them. The study's goals are to create a herbal hair coloring shampoo and assess its safety and effectiveness.

**Aim & objectives**

To formulate and evaluate herbal dye shampoo by using herbal extracts and shampoo base.

- Creation of a polyherbal hair dye using an aqueous extract of Alkanna tinctoria. Assessment of a polyherbal hair coloring using an aqueous extract of Alkanna tinctoria.
- To create a natural hair dye shampoo that will prevent damage to hair while also encouraging hair growth.
- To create a natural hair dye shampoo that will prevent damage to hair while also encouraging hair growth.
- To create a herbal hair dye shampoo that works well while containing very little synthetic chemical.
- To create a shampoo and dye combination that is more effective, has no negative effects, and causes less damage to human skin and hair.
- To assess a number of factors, including rheological characteristics, phytoconstituents, physiochemical, organoleptic, patch, and stability testing, among others.

## Methods and evaluation

**Collection & authentication**

The materials used in the present study were purchased from the local market, and authenticated by DR.V. Ravi dried and powdered for further use. The below mentioned are the details of the plant material used for the formulation of Herbal hair dye shampoo.

**Method of extraction**

- **Extraction of *Alkanna tinctoria*:** A beaker containing the *Alkanna tinctoria* powder and distilled water was put on the heating mantle. After boiling, it was cooled. The formed liquid was then filtered, and centrifuged for 20 minutes in a centrifuge machine, and the liquid's supernatant was used to prepare the formulation.
- **Aloe vera gel extraction:** The gel was taken from the aloe vera plant and blended into a smooth liquid using a mixer. And the clear Aloe Vera gel was collected.
- **Extraction of Shikakai:** A beaker containing the Shikakai powder and distilled water was put on the heating mantle. After boiling, it was cooled. The formed liquid was then filtered, and centrifuged for 20 minutes in a centrifuge machine, and the liquid's supernatant was used to prepare the formulation.
- **Extraction of Reetha:** Reetha powder was weighed and dissolved in distilled water in formed liquid was filtered and centrifuged in a centrifuge machine and a supernatant layer of liquid after centrifugation was taken. The supernatant layer was subjected to an aerated floating process with the help of an aerator to produce bubbles. The bubbles were collected and allowed to settle to form saponin extract. This extract was used for preparing the formulation.
- **Extraction of Hibiscus:** A beaker containing the Hibiscus powder and distilled water was put on the heating mantle. After boiling, it was cooled. The formed liquid was then filtered, and centrifuged for 20 minutes in a centrifuge machine, and the liquid's supernatant was used to prepare the formulation.
- **Extraction of Fenugreek:** A beaker containing the Fenugreek powder and distilled water was put on the heating mantle. After boiling, it was cooled. The formed liquid was then filtered, and centrifuged for 20 minutes in a centrifuge machine, and the liquid's supernatant was used to prepare the formulation.
- **Decoction of coffee powder, by using a heating mantle:** Coffee powders have been precisely measured and combined with distilled water in a beaker to boil until a concentrated extract is obtained. The formulation is then made using this extract.

**Formulation**

**Shampoo base preparation**

In a beaker containing extracts of Reetha, Shikakai, Fenugreek, Hibiscus ana Aloe vera were added. To make up the volume, distilled water was also added.

**Dye preparation**

*Alkanna tinctoria* extract along with coffee powder decoction extract, lemon juice, fine henna powder was combined and lastly few drops of rose oil were added and dye was formulated a by mixing all these ingredients.

**Dye shampoo ingredients**

**Table 1: Dye shampoo ingredients**

| S.NO | INGREDIENTS | USES |
|---|---|---|
| 1 | *Alkanna tinctoria* Extract | Natural dying agent |
| 2 | *Lawsonia Innermis Extract* | Used as colouring agent and dying agent |
| 3 | Coffee Powder Extract | Natural dying agent |
| 4 | Reetha Extract | Surfactant & Anti-Dandruff agent |
| 5 | Aloe vera Extract | Anti-Inflammatory & Natural moisturiser |
| 6 | Hibiscus Extract | Promotes hair growth |
| 7 | Shikakai Extract | Ani-fungal, Nourish follicles & Anti-dandruff |
| 8 | Fenugreek Extract | Anti-dandruff agent |
| 9 | Lemon Juice | Preservative |
| 10 | Rosemerry oil | Fragrance & Preservative |

**Dye shampoo formulation with different concentration**

**Table 2: Dye shampoo formulation with different concentration**

| S.NO | INGREDIENTS | F1 | F2 | F3 |
|---|---|---|---|---|
| 1 | Alkanna Tinctoria Extract | 15 | 14 | 13 |
| 2 | Lawsonia innermis Extract | 15 | 14 | 14 |
| 3 | Coffee Extract | 5 | 4 | 5 |
| 4 | Reetha Extract | 15 | 13 | 17 |
| 5 | Aloe vera Extract | 5 | 4 | 5 |
| 6 | Hibiscus Extact | 5 | 4 | 4 |
| 7 | Shikakai Extract | 8 | 9 | 8 |
| 8 | Fenugreek Extract | 5 | 6 | 4 |
| 9 | Lemon Juice | 1 | 1 | 1 |
| 10 | Rosemerry oil | 1 | 1 | 1 |
| 11 | Distilled Water | 25 | 30 | 28 |

**Evaluation criteria**

**Physical characteristics**: Homogeneity, color, and transparency were noted.

**pH:** A digital Ph meter operating at room temperature was used to measure the pH.

**Cleaning action:** In a beaker containing 200 ml of distilled water, 1 gram of shampoo was added. 5 grams of wool yarn were placed in grease and added to the mixture of shampoo and water, maintaining the temperature of water at 350C. For 4 minutes, the flask was shaken 50 times each minute. The solution of water and dye shampoo was removed. The sample of wool yarn was taken out, dried, and weighed. The amount of grease removed was determined by using the following equation: DP = 100[1- (T/C)], In which, DP is the percentage of de tergency power, C is the weight of sebum in the control sample and T is the weight of sebum in the test sample.

**Foam ability and foam stability:** The foaming ability of dye shampoo was determined using the cylinder shake method. 50 ml of 1% dye shampoo solution was taken into a 250 ml graduated cylinder. The cylinder was shaken 10 times, and covered with a hand. The volumes of foam were recorded af ter every 1-minute shaking. The foam volume was calculated only. The volumes of foam immediately after shaking were recorded at 1-minute intervals and this was done for 4 minutes.

**Patch Test:** This test involves dabbing a small amount of the aqueous solution of dye shampoo behind the ear or on the inner elbow in an area of 1 sq. cm and leaving it to dry. Signs of irritation, swelling, and redness were observed for regular intervals up to 24 hours.

**Ash value:** 5 ml of dye shampoo weighed in a crucible was placed in a muffle furnace at 600ºC to determine ash value.

**Stability studies:** The thermal stability of formulations was studied by placing them in glass vials by storing them under the following conditions of temperature as 3-5ºC, 25ºC RH=60%, 45 ºC RH= 75% and were later analysed after 3 months.
**Dyeing effect:** The formulation was applied for 15 minutes and washed followed by observing the hair colour. The same bundle of hair was then subjected to washing after 15 days and hair colour was observed.

## RESULT AND DISCUSION

**Physical appearance/visual inspection**

**Table 3: Physical appearance**

| S. NO | PARAMETER | OBSERVATION |
|---|---|---|
| 1 | Colour | Brownish |
| 2 | Odour | Characteristic |
| 3 | Foam | Good |
| 4 | Fluidity | Good |
| 5 | Homogeneity | No particulate mater present |
| 6 | Clarity | Clear |

**Determination of Ph**
The pH of the formulated dye shampoo was found to be 5.72, which is near to the pH of the skin by pH meter determined at room temperature 25oC. pH of the skin ranges from 4.8 to 6.0 which is slightly acidic and the pH of the dye shampoo falls under this range.
**Determination of percent of solid contents**
It is claimed that a shampoo with an excessive amount of solids will be difficult to work into the hair or remove. The test will pass if the lower solid content is between 20 and 30%. Lower solid content makes the shampoo watery and swiftly removes hair. It is discovered that 22.53% of the formulated color shampoo contains solids.

**Cleaning Action**
The cleaning action of formulated dye shampoo was calculated by applying grease on wool yarn. The percentage of detergency of formulated dye shampoo is found to be 25.96%.

**Foam ability and foam stability**

**Table 4: Stability**

| Time in minutes | Foam volume |
|---|---|
| 0 minutes | 80ml |
| 1minutes | 79ml |
| 6minutes | 79ml |

**Patch test**

**Table 5: Patch test**

| S.NO | PARAMETER | RESULT |
|---|---|---|
| 1 | Irritation | Negative |
| 2 | Swelling | Negative |
| 3 | Redness | Negative |

**Ash value**
The formulated dye shampoo ash value was found to be 17%.

**Stability studies**
During the three-month storage period, the formulation's accelerated stability and acceptability, along with its organoleptic qualities, such as colour and odour, demonstrate the created formulation's chemical and physical stability.

**Dyeing effect**
After application of formulated herbal dye shampoo for 15 minutes and immediate washing to produce a brownish colour.

## CONCLUTION

In conclusion, the increasing preference for natural, plant-based hair care products, especially herbal shampoos, highlights the growing demand for safer, more holistic alternatives to synthetic options. Herbal shampoos, formulated with natural ingredients such as Ratanjot, Lawsonia Inermis, Coffee powder, Reetha, Aloe vera, Hibiscus Shikai Fenugreek Rosemerry oil, Lemon juice offer numerous benefits, including effective cleansing, conditioning, and promoting overall hair health. These ingredients not only help in addressing common hair concerns like dandruff, dryness, and hair loss but also provide nourishment and protection from environmental damage without the risk of irritation or side effects. The study emphasizes the importance of replacing harmful synthetic chemicals with safe, natural alternatives that are both effective and gentle on the hair and scalp. By prioritizing the use of natural ingredients, herbal shampoos present a promising solution for individuals seeking a more natural and holistic approach to hair care. Their ability to maintain hair health while minimizing damage makes them an ideal choice for people with sensitive scalps or those looking for a safer alternative to conventional shampoos. Thus, herbal shampoos represent a sustainable, beneficial, and effective alternative in the growing trend towards natural and plant-based cosmetic products.

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