



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Article

Formulation And Evaluation of Herbal Hair Dye Shampoo

Arun Kumar K. V., Asnah K. P.*, C. H. Shabna, Hajara, Mohammed Azharudheen P. A., Afiya

Rajiv Gandhi Institute of Pharmaceutical Sciences and Research, Trikaripur, Kasaragod, Kerala, India

ARTICLE INFO

Published: 06 Nov. 2024

Keywords:

Herbal hair dye, *Indigofera tinctoria*, *Lawsonia inermis*, maceration, shampoo evaluation, in vitro staining.

DOI:

10.5281/zenodo.14044462

ABSTRACT

This study focuses on the formulation and evaluation of a herbal hair dye shampoo using extracts from *Indigofera tinctoria* and *Lawsonia inermis*. These plants were chosen for their natural dyeing properties, providing an alternative to synthetic dyes that often contain harmful chemicals like ammonia and peroxide. The leaves were extracted using the maceration method, and the shampoo was formulated by combining plant extracts with stabilizers and surfactants. Various physicochemical parameters such as total ash, extractive values, and pH were evaluated. The shampoo demonstrated effective in vitro staining, turning white hair strands black, and exhibited good stability, homogeneity, and washability. These findings suggest that herbal hair dyes are a safer, cost-effective, and eco-friendly alternative to synthetic dyes.

INTRODUCTION

Herbal hair dyes have gained popularity due to their minimal side effects compared to synthetic dyes. These dyes are derived from plants such as *Indigofera tinctoria* (Indigo) and *Lawsonia inermis* (Henna), which have been traditionally used for their coloring properties. Synthetic dyes often contain harsh chemicals like ammonia and peroxide, which can damage the hair and scalp. This study aims to formulate a herbal hair dye shampoo and evaluate its efficacy and safety.

MATERIALS AND METHODS

Plant Collection and Authentication

Fresh leaves of *Indigofera tinctoria* and *Lawsonia inermis* were collected from the Kannur and Kasaragod districts of Kerala in March 2024. The plants were authenticated by Dr. Subramanya Prasad K., Assistant Professor, Department of Botany, Nehru Arts and Science College, Kanhangad, Kerala.

Preparation of Plant Extracts

The leaves were shade-dried for 10-15 days and ground into a coarse powder. The powder was extracted using water as a solvent through the maceration method. The extract was filtered and concentrated, yielding 6.01% and 5.98% extract

*Corresponding Author: Asnah K. P.

Address: *Rajiv Gandhi Institute of Pharmaceutical Sciences and Research, Trikaripur, Kasaragod, Kerala, India*

Email ✉: asnahwaris09@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



for *Lawsonia inermis* and *Indigofera tinctoria*, respectively.

Formulation of Herbal Hair Dye Shampoo The herbal shampoo was formulated using the following ingredients:

| SL NO | INGREDIENTS | QUANTITY |
|-------|--------------------------------------|----------|
| 1 | <i>Indigofera tinctoria</i> extract | 2.5g |
| 2 | <i>Lawsonia inermis</i> extract | 2.5g |
| 3 | Sodium Lauryl Sulphate | 10g |
| 4 | Sodium citrate | 1g |
| 5 | Hydroxypropyl Methylcellulose (HPMC) | 3g |
| 6 | Glycerin | 5g |
| 7 | Methyl paraben | 0.18g |
| 8 | Propyl paraben | 0.02g |
| 9 | Perfume | q.s. |
| 10 | Purified water | q.s. |

Evaluation of Shampoo The formulated shampoo was evaluated based on the following parameters:

- Physical properties: Color, transparency, and homogeneity were observed.
- pH: The pH was measured using a digital pH meter at room temperature.
- Wetting time: A canvas disc was floated on a 1% shampoo solution, and the time required for it to sink was recorded.
- Stability studies: The shampoo was stored at various temperatures and humidity levels to assess its stability over three months.

In Vitro Staining Study

The ability of the shampoo to dye hair strands was evaluated using human hair samples.

White hair strands were treated with the shampoo, which successfully stained the hair black.

RESULTS AND DISCUSSION

Phytochemicals present in aqueous extract, petroleum ether, chloroform and ethanol of *Indigofera tinctoria* and *Lawsonia inermis*.

Evaluation of herbal hair dye shampoo

Physicochemical Parameters

The physicochemical properties of the plant extracts were evaluated. The total ash values for *Indigofera tinctoria* and *Lawsonia inermis* were 14.57% and 19.02%, respectively. The pH of the shampoo was found to be 6.67, which is within the ideal range for hair products.

| SL NO | COMPOUNDS | <i>Indigofera tinctoria</i> | | | | <i>Lawsonia inermis</i> | | | |
|-------|---------------|-----------------------------|-----------------|------------|---------|-------------------------|-----------------|------------|---------|
| | | Water extract | Petroleum ether | Chloroform | Ethanol | Water extract | Petroleum ether | Chloroform | Ethanol |
| 1 | Carbohydrates | +++ | + | + | - | +++ | + | + | + |
| 2 | Protein | + | - | - | - | + | - | - | - |
| 3 | Alkaloids | ++ | - | - | + | ++ | - | - | ++ |
| 4 | Flavonoids | + | - | - | + | + | - | - | + |
| 5 | Saponin | + | - | - | + | - | - | - | + |
| 6 | Steroid | - | + | - | ++ | + | + | - | + |
| 7 | Glycoside | +++ | + | + | ++ | +++ | - | - | ++ |
| 8 | Tannins | + | - | - | + | + | - | - | - |



| SL NO | TEST (%w/w) | <i>Indigofera tinctoria</i> (%w/w) | <i>Lawsonia inermis</i> (%w/w) |
|-------|----------------------------------|------------------------------------|--------------------------------|
| 1 | Total ash | 14.572 | 19.02 |
| 2 | Acid insoluble ash | 1.15 | 1.98 |
| 3 | Water soluble ash | 1.43 | 1.59 |
| 4 | Water soluble extractive value | 13.235 | 22.31 |
| 5 | Alcohol soluble extractive value | 21.145 | 19.23 |

A. Staining Efficacy

The in vitro staining study confirmed that the herbal shampoo effectively colored white hair strands, turning them black without causing any hair damage or scalp irritation.

B. Stability

The shampoo remained stable over three months under various conditions, with no significant changes in color, pH, or consistency.

| SL NO | EVALUATION PARAMETER | AT 0 DAYS | AFTER 30 DAYS |
|-------|----------------------|-------------|---------------|
| 1 | Appearance | Brown black | No change |
| 2 | Viscosity | 17848 ±0.64 | 17848±0.64 |
| 3 | Extrudability | Good | Good |
| 4 | pH | 6.67±0.02 | 6.63±0.02 |

C. Homogeneity

It exhibited good homogeneity and washability.

| SL NO | FORMULATION | HOMOGENEITY |
|-------|-------------|-------------|
| 1 | Control | Homogeneous |
| 2 | F1 | Homogeneous |

CONCLUSION

The ultimate aim of the present work was to formulate herbal hair dye shampoo containing aqueous extract of *Indigofera tinctoria*, *Lawsonia inermis*. Plant materials needed for the study were purchased from local vendors. Collected plant materials were authenticated by Faras Bin Muhammed U.P, Msc Agronomy. Physicochemical parameters like ash value, extractive value, and moisture content were evaluated and the extracts were subjected to maceration process by using different solvents (ethanol, chloroform, petroleum ether, water). The extract were subjected to preliminary phytochemical screening. From this major amount of constituents are present in aqueous extract. The herbal medicated hydroshampoo were formulated by using aqueous extract of *Indigofera*

tinctoria, *Lawsonia inermis*. The physical parameters such as colour and appearance were observed and the result showed that the developed herbal hair shampoo was brown black in colour, translucent in appearance and showed good homogeneity. The ash value, pH, viscosity and stability were also performed. The prepared herbal hair dye shampoo showed good results. The invitro staining evaluation of colouring activity was done using hair strands and results were compared. However in the present work herbal formulations reported to have more significant advantages over synthetic formulations. Hence we concluded that herbal hair dye shampoo offers a natural, gentle, effective, cheap, safe and eco friendly option for colouring hair. It provides a healthier alternative to traditional chemical dyes and can help to achieve beautiful, vibrant hair colour.



ACKNOWLEDGEMENTS

It is a delightful moment for us to express our heartfelt gratitude and sincere thanks to our esteemed guide Dr. Arun Kumar KV, Professor, Department of Pharmaceutics, Rajiv Gandhi Institute of Pharmaceutical Science and Research for his constant guidance, valuable suggestions and encouragement. We are deeply indebted to Prof. Dr. M. Paridhavi, MPharm, PhD, FABAP, Principal, Rajiv Gandhi Institute of Pharmaceutical Science and Research, for his valuable advice and support to make the study successful. We also extend our sincere thanks to all teachers, who helped us for the completion of this dissertation.

REFERENCES

1. P. Meenaprabha, V. Kamalakannan, R. Sambathkumar et al. Formulation and evaluation of Herbal Hair dye March 2022.
2. Debjit Bhowmik, Harish Gopinath, B.Pragathi Kumar, S.Duraivel and K.P Sampath Kumar. Advances in Novel Topical Drug Delivery System .The Pharma innovation. 2012;1(9);12-13
3. VD Jadhav, G Talele Swati, A Bakliwal Akshada and GN Chaudhari. Formulation and evaluation of herbal gel containing leaf extract of *Tridax procumbens*. Journal of Pharmaceutical and Biosciences. 2015;3:65-72.
4. Herbal medicine" Cancer Research UK. February 2015. Retrieved 12 November 2018.
5. Kumar S, Akhila A, Naqvi AA, et al. Medicinal plants in skin care 1994;425-30
6. Orfanos CE, Happle R. Hair and hair diseases 1990;19-44.
7. Grieve, Mrs. M.ed. (introduced by Lyle, Mrs .C.F.) A Modern Herbal first pub. Jonathan Cape, London 1931, reprinted 1974&1975.
8. Reddy P.M. A Review on Importance of Herbal Drugs in Cosmetics. International Journal of Advances in Pharmacy and Nanotechnology.)
9. Sharma P.P. Hair structure and its chemistry; chapter 17 and chapter 18. Cosmetics- formulation, manufacturing & quality control. Fourth edition. 315-348.
10. Gerard J Tortora and Bryan Derrickson. Principles of anatomy and physiology. 11:152153.
11. The Wealth of India-Raw materials, volume-3, Council of Scientific and Industrial Research, New Delhi. 14-18.
12. Olusola Adeyanju, Emmanuel S .E. and Akomolafe S. F. Extraction of indigodye from the leaf of *Indigofera tinctoria*. International journal of physical science, volume 6 , 2011.
13. Asma Elaguel , Imen Kallel, Bochra Gargouri et al. Lawsonia inermis essential oil; extraction optimisation by RSM, antioxidant activity, lipid peroxidation and antiproliferative effects . November 14 2019.
14. Biswas AK, Chatli MK, Sahoo J. Antioxidant potential of curry (*Murraya koenigii* L.) and mint (*Mentha spicata*) leaf extracts and their effect on colour and oxidative stability of raw ground pork meat during refrigeration storage. Food Chem. 2012;133:467-4.
15. Patsariya Surendra Kumar and Middha Anil. Antipsoriatic activity of dithanol transdermal proniosomes gel on swiss Albino mice. International Journal of Research and Development in Pharmacy and Life Sciences, 2014;3 (6): 1287-1294.

HOW TO CITE: Arun Kumar K. V., Asnah K. P.*, C. H. Shabna, Hajara, Mohammed Azharudheen P. A., Afiya, Formulation and Evaluation of Herbal Hair Dye Shampoo, *Int. J. of Pharm. Sci.*, 2024, Vol 2, Issue 11, 308-311. <https://doi.org/10.5281/zenodo.14044462>

