IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Formulation and Evaluation of Herbal Anti-Dandruff Shampoo

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Abstract

The present study focuses on the formulation and evaluation of a herbal anti-dandruff shampoo using aqueous extracts of medicinal plant materials. *Tridax procumbens* leaves were subjected to aqueous extraction to obtain bioactive phytoconstituents known for antimicrobial and anti-inflammatory properties. In addition, aqueous extracts of Ritha (*Sapindus mukorossi*) seeds and Fenugreek (*Trigonella foenum-graecum*) seeds were prepared and used as natural surfactant and conditioning agents, respectively. All extracts were qualitatively analyzed using thin-layer chromatography (TLC) to confirm the presence of phytochemical constituents. The aqueous extracts were blended in appropriate proportions to formulate a herbal shampoo. The formulated shampoo was evaluated for physicochemical parameters such as pH, viscosity, foaming ability, detergency, and stability. Anti-dandruff activity was assessed against dandruff-causing fungi, while antibacterial studies were carried out against selected pathogenic bacteria. The results demonstrated satisfactory physicochemical properties, effective antimicrobial activity, and significant anti-dandruff potential, suggesting that the formulated herbal shampoo is a safe, eco-friendly, and effective alternative to synthetic anti-dandruff products.

Keywords: Herbal Shampoo; Anti-dandruff Activity; *Tridax procumbens*; *Sapindus mukorossi*; Natural Surfactants

1. Introduction

Dandruff is a common scalp disorder characterized by flaking, itching, and irritation, primarily associated with fungal infections caused by *Malassezia* species [1]. Conventional anti-dandruff shampoos contain synthetic chemicals such as zinc pyrithione, ketoconazole, and selenium sulfide, which may cause adverse effects including scalp dryness, irritation, and hair damage upon prolonged use [2]. Herbal formulations have gained considerable attention due to their safety, biodegradability, and minimal side effects [3]. Medicinal plants possess antimicrobial, anti-inflammatory, and conditioning properties that are beneficial in managing dandruff and maintaining scalp health [4]. *Tridax procumbens* is traditionally known for its antimicrobial and wound-healing properties and is widely used in herbal hair care formulations [5]. Ritha (*Sapindus mukorossi*) contains saponins that act as natural surfactants, providing cleansing and foaming properties [6]. Fenugreek (*Trigonella foenum-graecum*) seeds are rich in mucilage and proteins that impart conditioning and hair-strengthening effects [7]. The present study aims to formulate a herbal anti-dandruff shampoo using aqueous plant extracts and evaluate its physicochemical properties, antimicrobial activity, and anti-dandruff potential.

2. Materials and Methods

2.1 Collection and Authentication of Plant Materials

Fresh leaves of *Tridax procumbens* shown in figure 1 and seeds of Ritha (*Sapindus mukorossi*) and Fenugreek (*Trigonella foenum-graecum*) were collected from local sources. The plant materials were authenticated by a botanist and washed thoroughly to remove impurities.

Figure 1. *Tridax procumbens* plant

2.2 Preparation of Aqueous Extracts

The plant materials were shade-dried and coarsely powdered. Each powdered material was subjected to aqueous extraction by boiling with distilled water for a specified period. The extracts were filtered, concentrated, and stored at 4 °C until further use [8].

2.3 Phytochemical Analysis by Thin-Layer Chromatography (TLC)

TLC analysis was performed to qualitatively identify the presence of phytoconstituents shown in figure 2, such as flavonoids, saponins, alkaloids, and phenolic compounds. Appropriate solvent systems were used, and spots were visualized under UV light and after spraying with suitable detecting reagents [5].

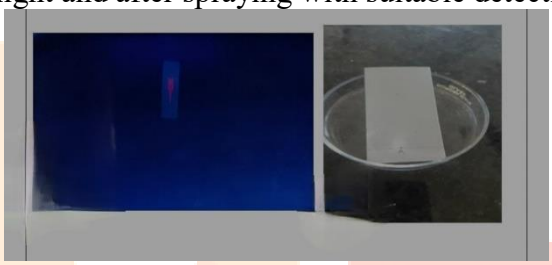

Figure 2 TLC and Paper chromatography of phytoconstituents

2.4 Formulation of Herbal Anti-Dandruff Shampoo

The herbal shampoo was formulated by blending aqueous extracts of *Tridax procumbens*, Ritha, and Fenugreek in suitable proportions shown in figure 3. Natural thickening agents and preservatives were added, and the final volume was adjusted with distilled water. The formulation was stirred continuously to ensure homogeneity.

Figure 3. Herbal shampoo formulation by blending aqueous extracts of *Tridax procumbens*

2.5 Evaluation of Herbal Shampoo

2.5.1 Physicochemical Evaluation

The formulated shampoo was evaluated for pH, viscosity, foaming ability, detergency power, surface tension, and stability under different storage conditions as per standard methods [9].

2.5.2 Antimicrobial and Anti-Dandruff Activity

Anti-dandruff activity was evaluated against dandruff-causing fungi using the agar well diffusion method. Antibacterial activity was assessed against selected pathogenic bacteria. Zones of inhibition were measured to determine antimicrobial efficacy [10].

3. Conclusion

The present study successfully formulated a herbal anti-dandruff shampoo using aqueous extracts of *Tridax procumbens*, *Sapindus mukorossi*, and *Trigonella foenum-graecum*. The formulated shampoo exhibited acceptable physicochemical properties, good foaming and cleansing action, and stability. Significant antifungal and antibacterial activity was observed, indicating effective anti-dandruff potential. The study concludes that herbal shampoo formulations can serve as safe, eco-friendly, and effective alternatives to synthetic anti-dandruff products.

Acknowledgement

The author gratefully acknowledges the encouragement and support provided by Dr. Naresh Chandra, Director of BKBCK, and Dr. Avinash Patil, Principal of BKBCK, for motivating and facilitating research work in the nanotechnology laboratory.

References

1. Ranganathan, S., Mukhopadhyay, T., 2010, Dandruff: the most commercially exploited skin disease, *Indian Journal of Dermatology*, 55(2), 130–134.
2. Pierard, G.E., Pierard-Franchimont, C., 2006, Dandruff and seborrheic dermatitis, *American Journal of Clinical Dermatology*, 7(1), 17–24.
3. Kumar, R., Sharma, A., 2014, Herbal cosmetics: trends and applications, *Journal of Pharmaceutical Sciences*, 6(2), 113–120.
4. Pandey, A., Tripathi, S., 2014, Concept of standardization, extraction and pre-phytochemical screening strategies for herbal drug, *Journal of Pharmacognosy and Phytochemistry*, 2(5), 115–119.
5. Saxena, M., Saxena, J., Pradhan, A., 2012, Phytochemical screening of *Tridax procumbens*, *Journal of Pharmacognosy and Phytochemistry*, 1(1), 42–46.
6. Kirtikar, K.R., Basu, B.D., 2005, Indian medicinal plants, *International Book Distributors*, 2(1), 1220–1225.
7. Srinivasan, K., 2006, Fenugreek (*Trigonella foenum-graecum*): a review, *Food Reviews International*, 22(2), 203–224.
8. Harborne, J.B., 1998, Phytochemical methods: a guide to modern techniques, *Springer*, 3(1), 1–302.
9. Indian Pharmacopoeia Commission, 2018, Quality control methods for cosmetics, *Government of India*, 8(1), 45–60.
10. CLSI, 2012, Performance standards for antimicrobial susceptibility testing, *Clinical and Laboratory Standards Institute*, 32(3), 1–184.