Formulation and *In-vitro* Evaluation of Poly Herbal Anti-dandruff Hair Spray

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***Abstract*—Hair plays an important role in enhancing the overall appearance of an individual. Due to factors such as pollution, stress, improper diet, hormonal imbalance, and excessive use of chemical-based cosmetics, hair problems like hair fall, dandruff, dryness, scalp irritation, and premature greying have become common. Conventional hair sprays contain synthetic polymers, alcohols, and preservatives which may cause adverse effects on prolonged use. Hence, the demand for safer herbal cosmetic formulations has increased.**

The present study focuses on the formulation and in-vitro evaluation of a purely herbal hair spray using medicinal herbs such as Jatamansi (*Nardostachys jatamansi*), Neem (*Azadirachta indica*), Lemon (*Citrus limon*), and Coriander (*Coriandrum sativum*). The herbal extracts were prepared by the maceration method using alcohol as solvent. The formulated hair spray was evaluated for physical appearance, pH, spray pattern, stability, and scalp compatibility. The results indicated that the herbal hair spray was stable, safe, and effective, providing both styling and therapeutic benefits. Thus, the formulation can serve as a safer alternative to synthetic hair sprays.

***Keywords*—Lemon peel, Jatamansi, Neem, Coriander**

I. INTRODUCTION

Hair is one of the vital parts of our body and it influences the overall appearance of person. Hair is a protein filament that grows from follicles found in the dermis. Hair is one of the most important of our body that improves the overall appearance of person. The hair fall, dandruffs, split ends, grey hair are the major problem associated with hair (1). In India the traditional process is the preparation of hair oils put together with various hair growth promoting drugs. Indian women are known for their long, shiny and healthy hair, so it is not surprising that hair care features prominently in their self-care rituals. The Charaka Samhitha (the definitive book on Ayurvedic medicine) describes the importance of oiling the hair and scalp to maintain good hair health and prevent hair loss (2). Hair growth is a district and multifaceted process that includes a continuous cycle of growth, resorption, test and renewal. The hair is 'feb' by blood vessels at the base or the follicle, which give it the nourishment it needs grow. Between starting to grow and falling out years later, each hair passes through four stages: anagen, catagen, telogen and exogen. Every hair isn't different stages of growth cycle. The growth of hair is cyclic phase divided into following – anagen (growth), catagen(involution), and telogen(rest). Pigmentation problems, dandruff and falling of hair are associated problems with hair (3).However, due to factors such as pollution, stress, improper diet, hormonal imbalance, excessive use of chemical cosmetics, and microbial infections, hair problems like hair fall, dandruff, dryness, scalp irritation, and premature greying have become very common in today's population.

To overcome these problems, a wide variety of hair care products such as hair oils, shampoos, conditioners, serums, gels, and hair sprays are available in the market. Hair sprays are commonly used cosmetic formulations intended to hold hair in place, improve texture, provide shine, and enhance styling. Most of the commercially available hair sprays contain synthetic polymers, alcohols, preservatives, and propellants which may cause adverse effects such as scalp irritation, dryness of hair, allergic reactions, and long-term damage on continuous use.

In recent years, there has been a growing interest in herbal cosmetics due to increased awareness regarding the side effects of synthetic products. Herbal hair care formulations are considered safer, more compatible with the scalp, eco-friendly, and suitable for long-term use. Several herbal ingredients such as Jatamansi (*Nardostachys*

jatamansi), Neem (*Azadirachta indica*), Lemon (*Citrus limon*), and Coriander (*Coriandrum sativum*) are well known in traditional medicine systems for their beneficial effects on hair and scalp. These herbs possess properties such as hair growth promotion, antimicrobial activity, dandruff control, strengthening of hair roots, and improvement of scalp health.

Although some herbal hair sprays are available in the market, they are limited in number, costly, and often contain synthetic additives along with herbal extracts. Therefore, there is a need to develop an effective *purely herbal hair spray formulation* that provides styling benefits along with therapeutic advantages, without causing harmful effects to the hair and scalp.

The present research work focuses on the *formulation and evaluation of a herbal hair spray* using selected herbal ingredients such as jatamansi, neem, lemon, and coriander. The formulation is prepared by extracting the active constituents of these herbs through the *maceration method using alcohol* as a solvent. The developed herbal hair spray is expected to provide multiple advantages over conventional marketed products, including improved scalp compatibility, reduced hair damage, additional hair nourishment, antimicrobial protection, and better consumer safety. This study aims to formulate a stable, effective, and economical herbal hair spray as a safer alternative to synthetic hair spray formulations available in the market.

II. MATERIALS & METHODS: (4)

Ingredients	Biological source	Family	Uses	Qty Taken
Neem 	*Azadirachta indica A. Juss*	Meliaceae	• Antifungal • Antibacterial • Antimicrobial • Reduces Scalp Itchiness & Irritation • Helps Prevent Further Hair Damage	10 gm
Jatamansi 	*Nardostachys jatamansi*	Caprifoliaceae	• Antimicrobial & Antifungal Support • Soothes Itchy, Irritated Scalp • Balances Sebum and Scalp Oils • Conditions & Nourishes Hair • Promotes Overall Scalp Health	10gm
Coriander 	*Coriandrum sativum*	Umbelliferae	• Anti-dandruff action • Scalp cleansing • Prevents scalp dryness • Strengthens hair roots • Improves hair texture & shine	10 gm

Lemon 	*Citrus limon*	Rutaceae	• Removes excess oil (sebum control) • Cleanses the scalp • Reduces scalp itching • Maintains scalp pH • Adds shine & freshness	10 gm
Thyme oil 	*Thymus vulgaris*	Labiatae	• Antibacterial property • Soothes itchy & inflamed scalp • Improves scalp circulation • Acts as a natural preservative • Reduces dandruff flakes	2-3 drops

Table No.1 Composition of Poly Herbal Anti-dandruff Hair Spray

III. METHODOLOGY

Weigh accurately powdered crude drugs.

↓

Transfer the powdered drug into a clean and dry container.

↓

Add measured quantity of ethanol to it.

↓

Seal the container properly to prevent evaporation of ethanol and protect from air and light.

↓

Keep the mixture at room temperature for 7 days.

↓

Stir the mixture daily to enhance extration the efficiency.

↓

After the maceration period, filter the mixture using muslin cloth.

↓

Collect the filtrate, which contains the extracted active constituents.

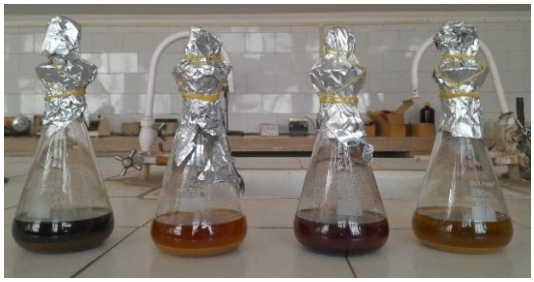

Fig No1. Extraction Day 7

IV. RESULTS

Physical Tests:

Sr.no	Test	Observation
1	Colour	Pale yellow
2	Odour	Alcoholic
4	Viscosity	
5	pH determination	4 to 5
6	Spreadability	1.23
7	Skin irritation test	No irritation

Table No.2 Physical Tests

Chemical Tests:

Sr. no.	Test	Observation
A .	Test for carbohydrate	
1	Molish test	+
2	Hydrolysis	+
3	Fehling's test	+
4	Barforeds	+
B.	Test for flavonoids	
5	Lead acetate test	+
6	With NaOH	+
C.	Test for glycoside	
7	Killer test	+
8	Borntragers test	+
D.	Test for tannins	
1	Test for FeCl3	+
2	Lead acetate	+
3	Gelatin solution	+

Table No.3 Chemical Tests

V. DISSCUSSION

The overall evaluation of the Poly Herbal Anti-dandruff hair spray formulation indicates that it possesses satisfactory physical and chemical characteristics suitable for topical application. The pale yellow colour and alcoholic odour confirm the presence of herbal constituents and a suitable solvent system that allows quick drying. The pH range of 4–5 is ideal for the scalp, helping to maintain the natural acidic environment and inhibiting the growth of dandruff-causing microorganisms. Good spreadability ensures uniform application over the scalp and hair surface. The absence of skin irritation demonstrates that the formulation is safe for regular scalp use. Phytochemical screening confirmed the presence of carbohydrates, flavonoids, glycosides, and tannins. These phytoconstituents are known for their antioxidant, antimicrobial, and astringent properties. Flavonoids and tannins, in particular, play an important role in reducing scalp inflammation and controlling dandruff. Glycosides contribute to scalp nourishment and strengthening of hair roots. Overall, the results suggest that the formulation is stable, scalp-friendly, and effective, and it shows good potential as an polyherbal antidandruff hair spray formulation.

VI. CONCLUSION

The present research successfully demonstrated the formulation and in-vitro evaluation of a polyherbal anti-dandruff hair spray using natural ingredients such as jatamansi, neem, lemon, coriander, and thyme oil. The formulated spray showed acceptable physicochemical characteristics, including suitable pH, good spreadability, pleasant appearance, and absence of skin irritation, indicating its safety for scalp application. Phytochemical screening confirmed the presence of bioactive constituents like flavonoids, tannins, glycosides, and carbohydrates, which are known to contribute to antimicrobial and scalp-protective effects. The inclusion of neem, coriander, and thyme oil provided effective anti-dandruff and antifungal activity, which was the primary focus of the formulation. Overall, the study concludes that the developed herbal hair spray is beneficial for scalp health, effective in controlling dandruff, and safe for regular use, while also offering a natural alternative to synthetic hair sprays that may cause irritation or long-term damage. Thus, this formulation holds strong potential as a safe, economical, and effective herbal anti-dandruff

cosmetic product.

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