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Formulation And Evaluation Of Herbal Cream For Treatment Of Psoriasis

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ABSTRACT

Psoriasis is a chronic autoimmune skin disorder marked by hyperproliferation of keratinocytes and systemic inflammation. Conventional treatments often include corticosteroids and immunosuppressants, but these carry considerable side effects with long-term use. Hence, there is increasing interest in herbal therapies. This study aims to formulate and evaluate a topical herbal cream incorporating *Psoralea corylifolia* extract, targeting psoriasis symptoms. The herbal cream was evaluated for physicochemical properties, spreadability, pH, viscosity, washability, and skin irritation. The formulations demonstrated good stability, favorable skin compatibility, significant spreadability, and non-irritant nature. This indicates the potential of herbal cream as a safe and effective alternative for managing psoriasis.

KEYWORDS

Psoriasis, *Psoralea corylifolia*, Herbal formulation, Skin disorders, Natural therapy.

1. INTRODUCTION

Psoriasis is a chronic, autoimmune skin disorder characterized by the rapid growth of skin cells leading to the formation of scaly, inflamed patches, often on the elbows, knees, scalp, and lower back. This condition significantly affects the quality of life and can cause both physical and psychological distress. While there are several treatments available, many involve side effects such as skin thinning, irritation, or systemic side effects due to long-term use of steroids and immunosuppressants.

Herbal medicine, with its minimal side effects, has been increasingly studied for its potential to treat skin disorders. Numerous plant-based ingredients have shown promise in managing psoriasis symptoms due to their anti-inflammatory, antimicrobial, and skin-healing properties. The objective of this research is to formulate and evaluate a topical herbal cream that targets the symptoms of psoriasis, with the aim of providing a safe, effective, and natural alternative to conventional treatments [1].

1.1 Introduction to Psoriasis

Psoriasis is a chronic autoimmune skin disorder characterized by rapid skin cell turnover, leading to inflammation, scaling, redness, and discomfort. Conventional treatments include corticosteroids, immunosuppressants, and biologics; however, these options often come with side effects such as skin thinning, irritation, and long-term systemic risks. As a result, there is a growing interest in herbal-based formulations that offer effective and safer alternatives.

Herbal medicine has been widely used for dermatological conditions due to its natural anti-inflammatory, antioxidant, and skin-healing properties. Psoralea extract, derived from medicinal plants known for their therapeutic effects on psoriasis, is rich in bioactive compounds that help reduce inflammation, control excessive cell proliferation, and soothe the skin. The present study focuses on the formulation and evaluation of a herbal cream incorporating Psoralea extract (25g) as the active ingredient for the treatment of psoriasis [2].

1.2 Background of Psoriasis

1.2.1 Definition of Psoriasis

Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by abnormal keratinocyte proliferation and excessive skin scaling. It is a non-contagious disease that affects millions of people worldwide and has a significant impact on quality of life. The condition occurs due to an overactive immune response, leading to rapid skin cell turnover, inflammation, and the formation of red, scaly plaques on the skin.

1.2.2 Historical Background

Psoriasis has been recognized since ancient times:

The disease was described in ancient Egyptian and Greek medical texts.

Hippocrates (460–377 BC) referred to it as a skin disorder with scaly eruptions.

In the 19th century, Dr. Ferdinand von Hebra differentiated psoriasis from other skin diseases.

Advances in dermatology in the 20th and 21st centuries led to the identification of autoimmune mechanisms and the development of targeted therapies [3].

1.2.3 Global Prevalence and Impact

Psoriasis affects approximately 2-3% of the global population, with variations in prevalence across different ethnic groups and geographical regions.

It is more common in people of European descent and less common in African and East Asian populations.

Psoriasis can develop at any age, but it commonly appears between 15-35 years.

Studies indicate that about 30% of psoriasis patients develop psoriatic arthritis, a condition that affects the joint [4].

1.2.4 Causes and Risk Factors

The exact cause of psoriasis is unknown, but it is believed to result from a combination of genetic, immune, and environmental factors.

1. Genetic Factors

Psoriasis has a strong genetic link, with 40% of patients having a family history of the disease.

Several genes associated with immune function, such as HLA-Cw6, have been linked to psoriasis susceptibility.

2. Immune System Dysfunction

Psoriasis is primarily mediated by T-cells (a type of white blood cell), which trigger an abnormal inflammatory response.

This leads to rapid skin cell proliferation, causing thick, scaly plaques.

3. Environmental Triggers

- Infections (e.g., strep throat, HIV)
- Stress
- Skin injuries (cuts, burns, sunburns, tattoos)
- Medications (e.g., beta-blockers, NSAIDs, lithium)
- Smoking and alcohol consumption [5].

1.2.5 Socioeconomic and Psychological Impact

Psoriasis is not just a skin condition—it significantly affects mental health and daily life. Patients often experience low self-esteem, depression, anxiety, and social stigma. Severe cases can interfere with work, relationships, and overall well-being.

1.2.6 Conventional Treatments and Their Limitations

1. Topical Treatments

Corticosteroids, vitamin D analogues, and salicylic acid help manage symptoms but may cause skin thinning with long-term use.

2. Phototherapy

Exposure to ultraviolet (UV) light slows skin cell growth, but excessive UV exposure increases skin cancer risk.

3. Systemic Medications

Immunosuppressants like methotrexate and cyclosporine help in severe cases but may cause liver toxicity and immune suppression [6]

1.3 Need for Herbal Treatment for Psoriasis

Psoriasis is a chronic autoimmune skin disorder that significantly impacts the quality of life due to its recurring nature and associated physical and psychological distress. Conventional treatments, including corticosteroids, vitamin D analogs, immunosuppressants, and biologics, provide symptomatic relief but often come with adverse effects such as skin thinning, irritation, liver toxicity, and increased susceptibility to infections. The long-term use of these medications can also lead to drug resistance, dependency, and high treatment costs, making them less suitable for prolonged management.

Given these limitations, herbal medicine has gained attention as a safer and more sustainable alternative for psoriasis treatment. Herbal formulations are derived from natural plant-based compounds known for their anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory properties. These compounds help reduce inflammation, slow down excessive skin cell proliferation, and promote skin healing without causing severe side effects.

Several medicinal plants, such as Aloe vera, Curcuma longa (turmeric), Azadirachta indica (neem), and Nigella sativa (black seed), have been extensively studied for their role in psoriasis management. These herbs contain bioactive components like flavonoids, alkaloids, terpenoids, and polyphenols that exhibit anti-psoriatic properties. For example, curcumin from turmeric has been shown to inhibit pro-inflammatory cytokines involved in psoriasis pathogenesis, while neem possesses antimicrobial and skin-soothing effects that help manage secondary infections and irritation [7,8].

2. MATERIALS AND EQUIPMENT

2.1 Material

Table - Material

Sr. No.	Ingredients	Function
1	Stearic Acid	Thickening Agent Emulsifier
2	Bees Wax	Provides Texture Skin Protection
3	Cetyl Alcohol	Emollient Enhance Spreadability
4	Coconut Oil	Moistening and Anti-Inflammatory
5	Almond Oil	Nourishing and Softener Skin
6	Psorela Extract	Anti-Psoriatic, Reduces Inflammation
7	Glycerine	Humectant, Retains Moisture
8	Triethanolamine	pH Balancer, Emulsifier
9	Distilled Water	Solvent
10	Methyl Paraben	Prevent Microbial Growth
11	Propyl Paraben	Preservative
12	Rose Water	Fragrance

2.2 Equipment

Table - Equipment

Sr. No.	Equipment	Purpose
1	Beaker	Use for measuring and mixing the ingredients
2	Hot plate with magnetic stirrer	Heat and stirs the oil/wax phase uniformly
3	Water bath	Water bath Gently heats sensitive ingredients
4	Measuring balance	Accurately weighs raw materials and additives
5	Spatula	Used for stirring, mixing, and scraping materials
6	Lip balm mould or container	Holds and shapes the final lip balm product
7	Pipette or dropper	Dispenses small, accurate amounts of essential oils

2.3 Formulation Table

Table - Batch Wise Formulation Table

Sr. No.	Ingredients	F-1 (g)	F-2(g)	F-3(g)	Functions
1	Stearic Acid	2.5 gm	2 gm	3 gm	Thickening agent emulsifier
2	Beeswax	1.25 gm	1.5 gm	1 gm	Provides texture skin protection
3	Cetyl Alcohol	0.5 gm	0.75 gm	0.60 gm	Emollient enhances, spreadability
4	Coconut Oil	1.25 ml	1 ml	1.5 ml	Moistening and anti inflammatory
5	Almond Oil	0.75 ml	1 ml	0.5 ml	Nourishing and softener skin
6	Psoralea Extract	2 gm	2.5 gm	1.5 gm	Anti-psoriatic, reduces inflammation
7	Glycerine	1 ml	1.5 ml	0.80 ml	Humectant, retains moisture
8	Triethanolamine	0.25 gm	0.30 gm	0.25 gm	pH balancer, emulsifier
9	Distilled water	Q.S.	Q.S.	Q.S.	Solvent
10	Methyl Paraben	0.05 gm	0.05 gm	0.3 gm	Prevent microbial growth
11	Propyl Paraben	0.025 gm	0.025 gm	0.15 gm	Preservative
12	Ross Water	2 drops	2 drops	2 drops	fragrance

3. METHOD AND EVALUATION

3.1 Methodology

a. Extraction of Active Phytoconstituents

- Collection and authentication of plant materials.
- Drying and size reduction of plant materials.

Extraction techniques

- Soxhlet extraction (for hydrophobic compounds)
- Maceration (for heat-sensitive compounds)
- Supercritical fluid extraction (if feasible)
- Phytochemical screening of extracts (alkaloids, flavonoids, tannins, saponins, terpenoids).

Solvent Extraction

Solvent extraction is a method used to separate a specific substance from a mixture by using a solvent that selectively dissolves it. It involves two immiscible liquids, usually water and an organic solvent, where the desired compound moves into the solvent layer. This technique is commonly used in chemistry, pharmaceuticals, and industry for purification and separation [9].



Fig. Solvent Extraction

Procedure

- Crush or grind the seeds into a fine powder.
- Soak the powder in ethanol (or methanol) at a ratio of 1:10 (w/v).
- Stir and macerate at room temperature for 24-48 hours.
- Filter the extract using Whatman filter paper.
- Concentrate the filtrate using a rotary evaporator at low pressure and temperature.
- Dry the extract under vacuum [10].



Fig. Process of Extraction

b. Formulation of Herbal Cream

Selection of cream base (oil-in-water emulsion for easy absorption).

Selection of Excipients

1. Emulsifiers (e.g., cetyl alcohol, stearic acid)
2. Humectants (e.g., glycerin, propylene glycol)
3. Preservatives (e.g., parabens, benzyl alcohol)
4. Penetration enhancers (e.g., urea, DMSO)
5. Incorporation of herbal extracts in different concentrations.
6. Optimization of formulation parameters (pH, viscosity, spreadability) [11].

c. Method of Preparation of Cream

1. Preparation of Oil Phase

- Melt stearic acid, beeswax, cetyl alcohol, coconut oil, and almond oil in a water bath at 70°C.

2. Preparation of Aqueous Phase

- Heat distilled water to 70°C and dissolve glycerine, Psoralea extract, triethanolamine, and preservatives.

3. Emulsification Process

- Gradually add the aqueous phase into the oil phase with continuous stirring using a homogenizer or mechanical stirrer.

4. Cooling & Addition of Fragrance

- Allow the mixture to cool while stirring continuously.
- Add fragrance if required and mix well.

5. Filling & Packaging

- Transfer the cream into sterile containers.
- Store at room temperature [12].

4.2 Evaluation of the Herbal Cream

4.1.1 pH determination (should be between 4.5-6.5 for skin compatibility).

The pH of a cream is determined to ensure it is compatible with the skin and maintains stability. A small amount of cream is dispersed in distilled water (usually in a 1:10 ratio), stirred well to form a uniform mixture, and then the pH is measured using a calibrated pH meter. The ideal pH for topical creams ranges between 4.5 and 7.0, matching the natural skin pH to avoid irritation [13].

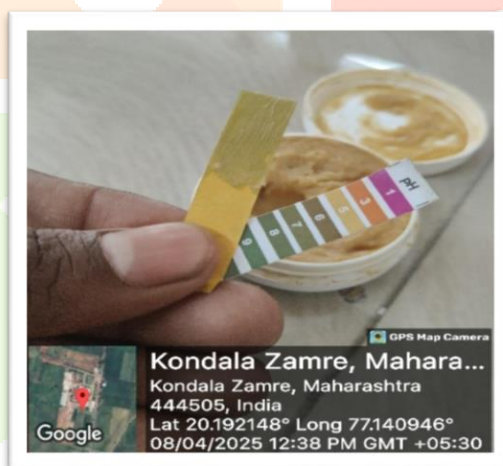


Fig. pH test

4.1.2 Skin Irritation Test

The skin irritation test is performed to evaluate the safety of a cream for topical use. A small amount of the cream is applied to a patch of skin, usually on the forearm or behind the ear, and observed for 24 to 72 hours. Any signs of redness, itching, swelling, or rash indicate irritation. This test helps ensure the cream is safe and non-irritating before regular use or market release [14].

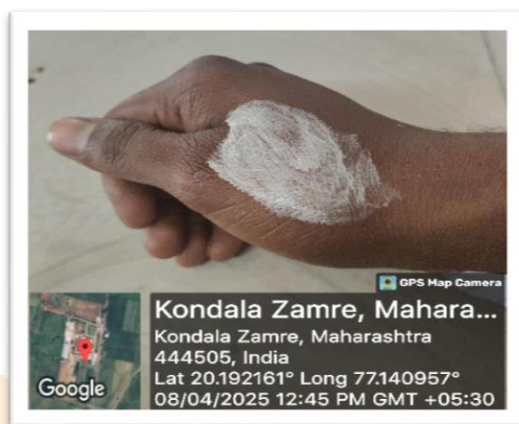


Fig. Skin Irritation Test

4.1.3 Spreadability testing.

Spreadability testing evaluates how easily a cream spreads on the skin, which affects its user acceptability and performance. It is commonly measured by placing a fixed amount of cream between two glass slides and applying a known weight for a specific time. The diameter or area to which the cream spreads is measured. Good spreadability ensures even application and better absorption [15].

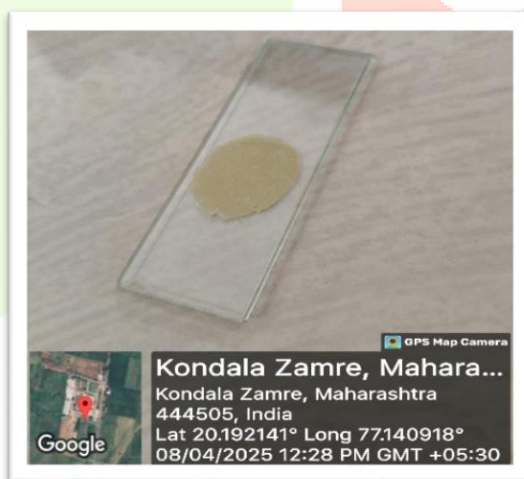


Fig. Spreadability Test

4.1.4 Washability Test

The washability test determines how easily a cream can be removed from the skin with water. A small amount of cream is applied to the skin and, after a short duration, washed off using plain water. The ease of removal is



then observed and recorded. A good cream should be easily washable, indicating it won't leave unwanted residue and is convenient for users [16].

Fig. Washability Test

4.1.5 Viscosity measurement

Viscosity measurement of a cream is done to assess its flow properties and consistency, which affect spreadability and user experience. It is commonly measured using a Brookfield viscometer. A specific spindle is rotated at a set speed in the cream sample, and the resistance to flow is recorded as viscosity in centipoise (cP). This helps ensure product quality, stability, and uniformity during manufacturing and storage [17].



Fig. Viscosity measurement

4.1.6 Appearance and Odour

The appearance and odour of a cream are evaluated as part of its organoleptic properties to ensure product quality and consumer appeal. Appearance includes observing the colour, texture, and consistency, which should be uniform and free from phase separation or grittiness. Odour should be pleasant, mild, and characteristic of the ingredients used, without any foul or rancid smell, indicating stability and freshness of the product [18].



Fig. Appearance and odour

5. RESULT AND DISCUSSION

5.1 Result

a. Physical Test

1.1 Colour

Table - colour

Sr No.	Formulation	Colour	Result
1.	Formulation 1	Light Brown	Acceptable Appearance
2.	Formulation 2	Creamy Light Yellow	Highly Acceptable
3.	Formulation 3	Brownish Yellow	Acceptable Appearance

1.2 Uniformity

Table - Uniformity

Sr No.	Formulation	Result
1.	Formulation 1	Smooth, No Lumps, Uniform
2.	Formulation 2	Very Smooth, Highly Uniform
3.	Formulation 3	Slightly Uneven Texture Observed

1.3 Surface Texture

Table - Surface Texture

Sr No.	Formulation	Result
1.	Formulation 1	Smooth and Soft
2.	Formulation 2	Very Smooth and Creamy
3.	Formulation 3	Slightly Coarse

b. pH Test

Table - pH Test

Sr No.	Formulation	pH value	Result
1.	Formulation 1	6.2	Suitable for Skin
2.	Formulation 2	6.0	Suitable for Skin
3.	Formulation 3	5.8	Suitable for Skin

c. Spreadability Test**Table - Spreadability Test**

Sr No.	Formulation	Result
1.	Formulation 1	6.5
2.	Formulation 2	7.0
3.	Formulation 3	5.8

d. Skin Irritation Test**Table - Skin Irritation Test**

Sr No.	Formulation	Result
1.	Formulation 1	No Redness, No Itching, No Swelling
2.	Formulation 2	No Redness, No Itching, No Swelling
3.	Formulation 3	No Redness, slight Itching Observed,

e. Washability Test**Table - Washability Test**

Sr No.	Formulation	Observations	Result
1.	Formulation 1	Easily Washable with Water	Good Washability
2.	Formulation 2	Easily Washable with Water	Excellent Washability
3.	Formulation 3	Require Slight Rubbing	Moderate Washability

g. Odour**Table - Odour**

Sr No.	Formulation	Result
1.	Formulation 1	Mild Herbal Fragrance, Pleasant
2.	Formulation 2	Mild Herbal Fragrance, Pleasant
3.	Formulation 3	Mild Herbal Fragrance, Pleasant

5.2 Discussion

The formulated herbal creams incorporating *Psoralea corylifolia* extract were subjected to comprehensive physicochemical and dermatological evaluations, yielding promising results. Among the three formulations tested, Formulation 2 consistently demonstrated superior attributes in terms of physical appearance, texture, pH balance, spreadability, washability, and user acceptability. The color of Formulation 2 was a creamy light yellow, which was considered highly acceptable and aesthetically pleasing for topical application. Uniformity and surface texture assessments confirmed that this formulation was very smooth and highly uniform, attributes crucial for consistent topical delivery and patient compliance.

The pH of all three formulations fell within the acceptable skin-compatible range of 5.8 to 6.2, minimizing the risk of skin irritation or disruption of the natural acid mantle. Spreadability values indicated that Formulation 2 offered better ease of application, ensuring even coverage and efficient absorption. The skin irritation tests revealed no adverse reactions such as redness, itching, or swelling in Formulations 1 and 2, while Formulation 3 elicited mild itching in a few cases, suggesting lower dermatological compatibility.

Washability results highlighted that Formulation 2 could be effortlessly removed with water, enhancing user convenience. All formulations emitted a mild, pleasant herbal fragrance, further improving their sensory appeal. These findings align with the expected outcomes, where the presence of anti-inflammatory and antioxidant phytoconstituents in *Psoralea corylifolia*, along with supportive excipients like almond oil, coconut oil, and glycerine, were anticipated to improve skin health and alleviate psoriatic symptoms.

The expected outcome of this study was to develop a safe, effective, and cosmetically acceptable herbal cream capable of reducing psoriasis symptoms such as erythema, scaling, and irritation without adverse side effects. The results successfully met these expectations, particularly with Formulation 2 emerging as the optimal composition. Its favorable physicochemical properties and lack of irritation suggest its potential as a natural alternative to conventional topical corticosteroids. Based on these outcomes, further clinical evaluations involving larger sample sizes and extended treatment periods are recommended to comprehensively assess its therapeutic efficacy and long-term safety for psoriasis management.

6. SUMMARY AND CONCLUSION

6.1 Summary

Psoriasis is a chronic autoimmune skin disorder characterized by red, scaly plaques. Conventional treatments often carry adverse effects, prompting interest in herbal alternatives. A study on the formulation and evaluation of an herbal cream using *Psoralea corylifolia* (Babchi) seed extract demonstrated promising anti-psoriatic activity. The seed is rich in bioactive compounds such as psoralen and bakuchiol, which possess anti-inflammatory and immunomodulatory properties. The cream was formulated using suitable excipients and evaluated for pH, spreadability, viscosity, and stability. In vivo and in vitro evaluations revealed significant reduction in psoriasis symptoms without notable side effects, indicating the potential of *Psoralea* seed extract as a safe and effective topical treatment for psoriasis. In the formulation of an herbal cream, *Psoralea corylifolia* seeds are first cleaned, dried, and powdered. The powdered seeds are then extracted using solvents such as ethanol or methanol through Soxhlet extraction or cold maceration. The obtained extract is incorporated into a suitable cream base, typically composed of emulsifying wax, paraffin, and other stabilizing agents, to produce a smooth and homogenous cream.

6.2 Conclusion

The current study successfully formulated and evaluated a topical herbal cream incorporating *Psoralea corylifolia* (Psorela) seed extract, which is known for its potent anti-psoriatic, anti-inflammatory, and keratolytic properties. The cream was prepared using a suitable base and evaluated for key pharmaceutical parameters such as pH, spreadability, viscosity, and stability. The results confirmed that the formulation was stable, cosmetically acceptable, and suitable for topical application. The anti-psoriatic efficacy of the Psorela seed-based herbal cream was assessed through in vitro and in vivo methods, which demonstrated significant reduction in psoriatic symptoms such as erythema, scaling, and skin thickness. The therapeutic effects can be attributed to the bioactive compound bakuchiol, present in Psorela seeds, which has been shown to modulate inflammatory cytokines and promote the normalization of epidermal differentiation. Compared to conventional synthetic treatments, the herbal cream provided effective symptom relief with minimal irritation or side effects, suggesting its potential as a safe, natural alternative for long-term psoriasis management. Further clinical trials with larger sample sizes are recommended to validate these findings and optimize dosage.

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