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Formulation And Evaluation of Polyherbal Cream for Psoriasis

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ABSTRACT

The project focuses on the formulation and evaluation of a polyherbal cream intended for the treatment of psoriasis, utilizing natural ingredients known for their therapeutic properties. The selected herbs-Vinca (periwinkle), Ruta (rue), Aloe vera, fenugreek, turmeric, and jojoba oil were chosen for their anti-inflammatory, anti-microbial, and skin-soothing effects. Extracts from these herbs were prepared through the maceration process to retain their active constituents. Using these herbal extracts, a topical cream formulation was developed, incorporating suitable excipients to ensure stability and ease of application. The formulated cream underwent rigorous evaluation for physicochemical properties, such as pH, spreadability, viscosity, and stability. Antimicrobial activity was also assessed to validate its efficacy against skin pathogens often associated with psoriasis. This study highlights the potential of polyherbal formulations as a natural and effective alternative for managing psoriasis symptoms, combining traditional herbal knowledge with modern formulation techniques.

Key words: *Psoriasis, poly herbal cream, skin-soothing effect, anti-bacterial activity.*

INTRODUCTION

The name of the disease is derived from Greek word “psora” which means “itch”. Psoriasis is regarded as an autoimmune disease in which genetic and environmental factors have significant role. Psoriasis is a chronic skin condition that is often associated with systemic manifestations, especially arthritis. Psoriasis can develop at any age, but onset is most likely between 15 and 30 years of age. World Health Organization recognized psoriasis as a serious non-communicable disease and highlighted the distress related to misdiagnosis. Psoriasis is a chronic inflammatory skin disease with a strong genetic predisposition and autoimmune pathogenic traits. The worldwide prevalence is about 2%, but varies according to regions. It shows a lower prevalence in Asian and some African populations, and up to 11% in Caucasian and Scandinavian population [1-3].

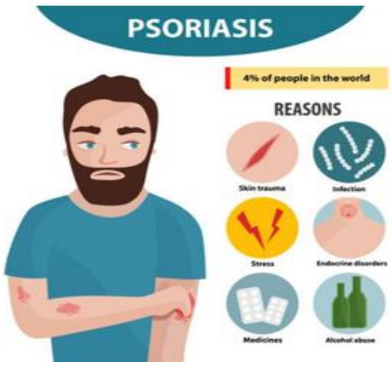

Figure 1: Psoriasis

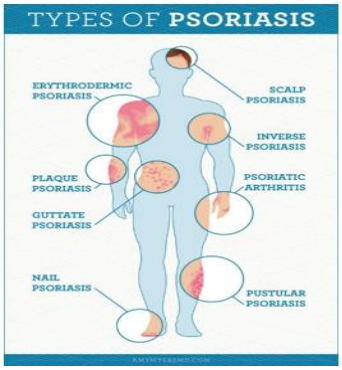

Figure 2: Types of psoriasis

Journal of Advancement in Pharmacognosy
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The dermatologic manifestations of psoriasis are varied; psoriasis vulgaris is also called plaque-type psoriasis, and is the most prevalent type. The terms psoriasis and psoriasis vulgaris are used interchangeably in the scientific literature; nonetheless, there are important distinctions (Figure 1).

Cream is defined as semisolid emulsions which are oil in water (o/w) or water in oil (w/o) type and these semisolid emulsions are intended for external application. Cream is classified as oil in water and water in oil emulsion. It is applied on outer part or superficial part of the skin and its main ability is to remain for a longer period at the site of application. The function of a skin cream is to protect the skin against different environmental condition, weather and gives soothing effect to the skin. There are different types of creams like cleansing, cold, foundation, vanishing, night, massage, hand, and body creams. The main aim of our work is to develop an herbal cream which can give antibacterial activity, for skin irritation, reduce skin diseases, rashes, itching, etc. Unmedicated and medicated creams are highly used for the treatment of various skin conditions or dermatoses. Creams can be ayurvedic, herbal or allopathic which are used by people according to their needs for their skin conditions [4-8].

Polyherbal creams, formulated by combining multiple herbal extracts, are gaining attention for their potential therapeutic and cosmetic benefits. These creams are evaluated for various parameters including physical characteristics, antimicrobial activity, and skin compatibility [9-11]. The aim of the present research focuses on the formulation and evaluation of a polyherbal cream intended for the treatment of psoriasis, utilizing natural ingredients known for their therapeutic applications.

MATERIALS AND METHODS

Extraction of Vinca

- Plant harvesting: Collecting plant material (leaves and flowers).
- Drying: Drying the plant material to remove moisture.
- Grinding: Grinding the dried plant material into a fine powder.
- Solvent extraction: Using a solvent (e.g., methanol, ethanol) to extract alkaloids.
- Filtration: Filtering the extract to remove impurities.
- Concentration: Concentrating the extract through evaporation or other methods.
- Purification: Purifying the extract using techniques like chromatography.

Figure 3: Extraction of Vinca

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
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Extraction of Aloe Vera

- Leaf selection: Selecting fresh aloe vera leaves.
- Leaf cleaning: Washing the leaves to remove dirt and impurities.
- Gel extraction: Opening the leaves and scooping out the gel.
- Filtration: Filtering the gel to remove any remaining impurities.
- Preservation: Adding preservatives or using other methods to extend shelf life.

Figure 4: Extraction of Aloe vera

Extraction of Turmeric

- Solvent selection: Choosing a suitable solvent (methanol).
- Mixing: Mixing turmeric powder with the solvent.
- Heating or stirring: Applying heat or stirring to facilitate extraction.
- Filtration: Filtering the solution to remove insoluble particles.

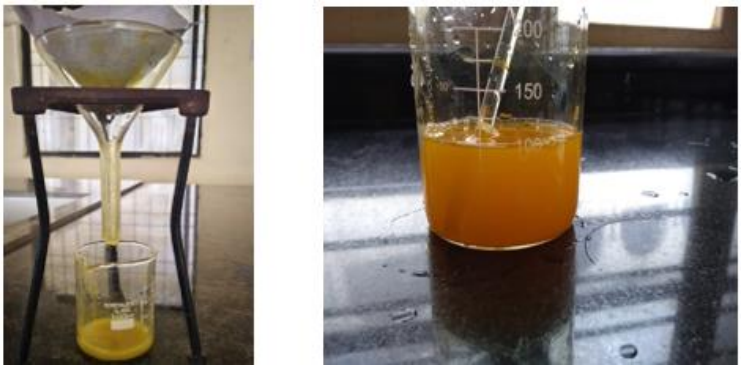

Figure 5: Extraction of Turmeric

Extraction of Fenugreek

- Solvent extraction: Using solvents like water, ethanol, or methanol to extract compounds.
- Infusion: Steeping fenugreek seeds or leaves in hot water.
- Decoction: Boiling fenugreek seeds or leaves to extract compounds.
- Filtration: Filtering the extract to remove impurities.

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
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- Concentration: Concentrating the extract through evaporation or other methods.
- Purification: Purifying the extract using techniques like chromatography [12-15].

Figure 6: Extraction of Fenugreek

Table 1: Excipients and herbal ingredients used with their roles

S. No.	Materials	Category
1	Ruta oil	Active ingredient
2	Aloe vera gel	Active ingredient
3	Fenugreek extract	Active ingredient
4	Turmeric extract	Active ingredient
5	Vinca extract	Active ingredient
6	Jojoba oil	Active ingredient
7	Yellow bees wax	Base
8	Propylene glycol	Moisturizer
9	Methyl paraben	Preservative
10	Propyl Paraben	Preservative
11	Rose water	Flavouring agent & vehicle

Formulation of Cream

Fusion method was used to produce stable emulsions (oil-in-water or water-in-oil) by melting and blending the oil and aqueous phases at elevated temperatures.

- **Oil phase (Heated):** Base (Bees wax), Oils (Jojoba oil, Ruta oil)
- **Aqueous phase (Heated):** Propylene glycol, Preservatives: Methyl paraben, Propyl Paraben, Fragrances: Rose oil, Propylene glycol

Weigh and prepare phases: Accurately weigh all oil-phase and water-phase ingredients separately.

Heat both phases: Heat both phases separately to 70–75°C in a water bath until all solids are melted and dissolved.

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
ISSN: 2582-8401

Combine phases: Slowly add the aqueous phase into the oil phase (or vice versa depending on emulsion type), with continuous stirring to form an emulsion.

Stir during Cooling: Continue stirring while the mixture cools to room temperature to ensure uniformity and prevent separation. Use a homogenizer if available for better emulsion stability.

Final mix and packaging: Stir until fully homogeneous. Transfer into sterile containers and label.

Table 2: Formula for preparation of cream

Materials	FC1 (10 g)	FC2 (20 g)	FC3 (30 g)
Ruta oil	2 g	3 g	4 g
Aloe vera gel	1 ml	2 ml	3 ml
Fenugreek extract	0.2 g	0.4g	0.6 g
Turmeric extract	0.5 g	0.75g	1 g
Vinca extract	0.5 g	0.75 g	1 g
Jojoba oil	1 ml	1.5 ml	2 ml
Yellow bees wax	4.23 g	10.71 g	17.14g
Propylene glycol	0.5 ml	0.75 ml	1 ml
Methyl paraben	0.05 g	0.1 g	0.2 g
Propyl Paraben	0.02 g	0.04 g	0.06 g
Rose water	q.s	q.s	q.s
Materials	FC1 (10 g)	FC2 (20 g)	FC3 (30 g)

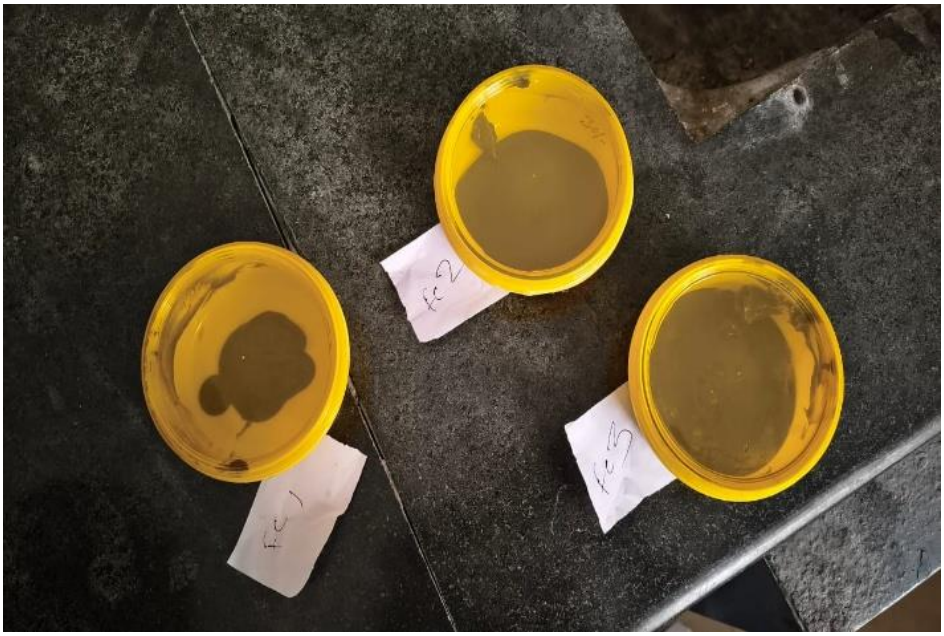

Figure 7: Formulation of cream

Evaluation test for Herbal Cream

The following tests are done for evaluation. They are;

- pH of the cream
- Appearance

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
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- Viscosity
- Acid value
- Saponification value
- Irritancy test
- Spreadability

pH measurement: The pH meter was calibrated using standard buffer solution. About 5g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured using digital pH meter.

Appearance: The appearance of the cream was judged by its colour, pearlescence, roughness and graded.

Acid value: Take 10 gm of substance dissolved in accurately weighed in 50 ml mixture of equal volume of alcohol and solvent ether. The flask was connected to reflux condenser and slowly heated, until sample was dissolved completely. To this, 1 ml of phenolphthalein added and titrated with 0.1N NaOH, until faintly pink colour appears after shaking for 30 sec.

Acid value = N x 5.61/W

Where;

N = Number of ml of NaOH required,
W = Eeight of substance.

Saponification value: Introduce about 2 g of substance refluxed with 25 ml of 0.5N alcoholic KOH for 30 min, add 1 ml of phenolphthalein and titrated immediately with 0.5N HCl.

Saponification value = (b-a) x 28.05/w

Where;

The volume of blank titre in ml = a,
The volume of sample title in ml = b,
The weight of substance in gm = w.

Irritancy test: Mark an area (1sq.cm) on the left-hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 h and reported.

Determination of Spreadability: Spread ability may be expressed by the extent of the area to which the topical application spreads when applied to the affected parts on the skin. The therapeutic efficiency of the formulation also depends upon its spreading value. Sample (about 2 g) was applied in between two glass slides and they were pressed together to obtain a film of uniform thickness by placing 1000 g weight for 5 min. Thereafter a weight (10g) was added to the pan and the top plate was subjected to pull with the help of string attached to the hook. The time in which the upper glass slide moves over the lower plate to cover 10cm is noted. The spreadability (S) can be calculated using the formula:

S = M X LI

Where;

S=Spreadability,
M=Weight tied to upper glass slide,
I=Length moved on a glass slide.

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
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Anti-microbial activity by Cup and Plate Method

Streptococcus - Gram positive bacterial strains were used to study the antibacterial activity. Ciprofloxacin is a standard drug. The medium was prepared by dissolving the specific quantity of the agar in purified water by heating on a water bath and were dispensed in 100ml volumetric conical flask. The conical flasks were closed with cotton plugs and were sterilized by autoclaving at 121° C for 15 min. The contents of the conical flasks were pored aseptically into sterile Petri dish is allowed to solidify. These sterilized medias were used to subculture the bacterial culture (pH-7.2±0.2).

Procedure: Each Petri dish was filled to a depth of 4-5 mm with a nutrient agar medium that was previously inoculated with suitable inoculums of suitable test organism, and then allowed to solidify. The petridish was specially selected with flat bottom and were placed on level surface to ensure that the layer of medium in uniform thickness. To each portion one cylindrical cavity was made in medium with the help of sterile borer. One cavity for test compounds and one cavity for standard. The Petri dishes were incubated at 37°C for 24 h. Diameter of the zone of inhibition was measured and the average diameter for each sample was calculated. The diameter obtained by the test sample was compared with that produced by standard penicillin [16-21].

RESULTS AND DISCUSSION

Evaluation of herbal cream was shown in the below tables.

Table 3: Appearance, pH and irritancy test of herbal cream

Formulation	Appearance	pH	Irritancy
FC1	Green	5.3	No
FC2	Green	5.2	No
FC3	Green	6.2	No

Table 4: Acid and saponification value

Formulation	Acid value	Saponification value	Spreadability (g.cm/sec)
FC1	5.5	4.75	5.6
FC2	5.8	5.13	7.5
FC3	6.2	6.73	10

Table 5: Anti-microbial activity (zone of inhibition)

S. No.	Sample	Zone of inhibition (mm)
1	Standard (Ciprofloxacin)	21
2	FC1	9
3	FC2	12
4	FC3	19

Journal of Advancement in Pharmacognosy
Volume 5 Issue 2, 2025
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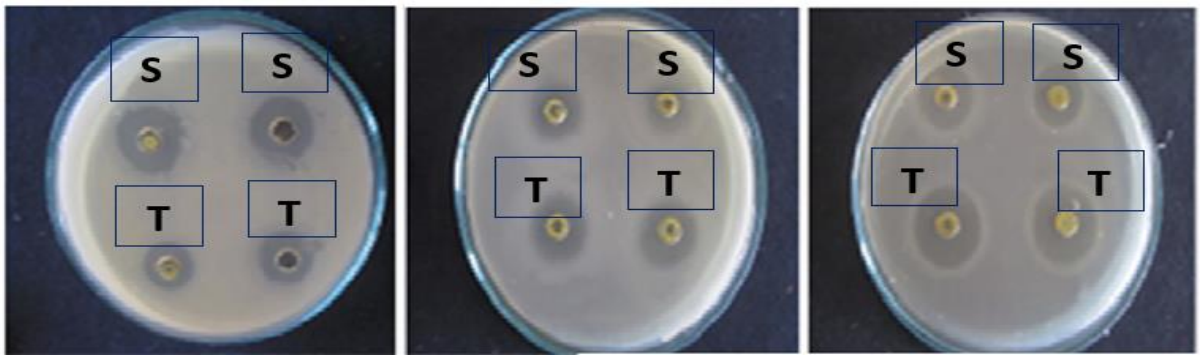

Figure 8: Zone of Inhibition

CONCLUSION

As herbal products are safe in use and has less side effects their demand in the market is increasing. Our aim is to formulate and evaluate an herbal cream using vinca, fenugreek, turmeric extract, aloe vera gel and ruta, jojoba oils. As a conclusion, this polyherbal Formulation has following properties like: Turmeric, Aloe Vera, Ruta oil has strong anti-inflammatory and anti-oxidant properties. Jojoba oil, Fenugreek reduces scaling and redness by providing hydration and nourishment to skin. Vinca will inhibits cell proliferation and redness scales on skin. The formulations are optimized and important parameters like pH, spreadability, viscosity, acid value, saponification value and non-irritancy. A topical herbal cream with anti-bacterial activity were shown in this formulation. The determination of the zone of inhibition, a widely accepted method to assess anti-bacterial activity of substance, was also performed. This test involves measuring the area around a sample where bacterial growth is inhibited. The larger the zone of inhibition, the stronger the antibacterial effect. Based on the above results and discussions, the formulations F1, F2, and F3 were stable at room temperature and can be safely used on the skin. However, the F3 formulation showed best results against the gram positive (Streptococcus) when compared to the individual formulations F1 and F2.

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