

**FORMULATION AND EVALUATION OF POLYHERBAL GEL FOR MANAGEMENT OF SCALP PSORIASIS**Gitanjali Nana Patil\*<sup>1</sup>, Chetana Sanjay Patil<sup>2</sup>, Dinesh Bhimrao Nikume<sup>3</sup>, Chetan Patil<sup>4</sup>, Harshada Bhupendra Patil<sup>5</sup>, M. M. Sayyed<sup>6</sup> and Dr. Ravindra Patil<sup>7</sup>Student<sup>1,2,3,4,5</sup>, Assist. Proff\*<sup>6</sup> and Principal\*<sup>7</sup>  
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**ABSTRACT**

Scalp psoriasis is a chronic inflammatory skin condition that needs gentle and effective treatment. The scalp is the most commonly affected area in people with psoriasis, with about 80% experiencing flare-ups there. The presence of hair, limited accessibility, and the unsatisfactory cosmetic results of topical treatments generally result in low compliance rates and patient dissatisfaction. Regimens are complex and Recently, efforts have been devoted to optimizing treatments for scalp psoriasis with a focus on improving both efficacy and patient-reported outcomes. This study extracted from turmeric (*Curcuma longa*), calendula (*Calendula officinalis*), and *Avena sativa*, which have anti-inflammatory and soothing properties. The gel was formulated for low to non-irritating use when applied topically to the scalp. The was tailored to guarantee stability, compatibility with the pH range, and desirable release of the active ingredients. The system gel properties were evaluated such as texture, viscosity, and pH. The Results indicated that the gel was uniform, non-greasy, and its pH was compatible with the skin. The gel's viscosity and spreadability were also shown to be suitable for topical.

**KEYWORDS:** Scalp psoriasis, Cucurmin, *Avena sativa*, calendula, symptomatic relief, Topical gel formulation, anti-inflammatory.

**1. INTRODUCTION**

Psoriasis is a constantly recurring inflammatory disorder identify by the presence of prominent, red patches enveloped in thick, silvery-white scales. This condition can severely impact both physical and mental health, altering one's quality of life in ways skin to conditions such as cancer, diabetes, and depression. Even though psoriasis can appear at various stage of life, there are significant spikes in its occurrence, particularly around the ages of 20 and 60.<sup>[1]</sup>

**The various types of psoriasis include<sup>[1]</sup>**

1. Plaque psoriasis
2. Guttate psoriasis
3. Pustular psoriasis
4. Inverse psoriasis
5. Nail psoriasis
6. Scalp psoriasis
7. Erythrodermic psoriasis



Plaque psoriasis



Guttate psoriasis



Pustular psoriasis



Inverse psoriasis



Nail psoriasis



Scalp psoriasis



Erythrodermic psoriasis

### Scalp psoriasis

The scalp is the most often affected area in people with psoriasis, with about 80% experiencing flare-ups there. Scalp psoriasis requires special evaluation, because of the complexity of its treatment and its negative effects on subjective well-being. In addition to the physical manifestations of pain and itching, scalp involvement in psoriasis can lead to significant psychosocial burden. The existence of hair, limited obtainability, and the unsatisfactory beauty aids results of surface treatments generally result in low compliance rates and patient dissatisfaction. Regimens are complex and largely driven

by patient preference. Recently, efforts have been devoted to optimizing medical attention for scalp psoriasis with a focal point on improving both efficacy and patient-reported outcomes. Scalp psoriasis is specified by red, thickened plaques, often associated. It is crucial to note that scalp psoriasis can lead to significant notable discomfort and communal anxiety.<sup>[1,6]</sup>

### Symptom

Scaly, red bumpy patches, silvery white scalp, dandruff like flaking, dry scalp, Itching hair loss.<sup>[1]</sup>



Scalp psoriasis

Itch is experienced by 67–97% of individuals diagnosed with psoriasis. Notably, itching of the scalp has been observed in as many as 80% of psoriasis patients, with a direct correlation identified between the severeness of scalp sores and the intensity of itching. Several techniques have been proposed to account for pruritus in scalp psoriasis, including hyper innervations, nerve-mediated inflammation, imbalances in neuropeptides, dysfunction of the peripheral opioid signaling, cytokine release, and vascular irregularities.<sup>[6]</sup>

### Polyherbal Gel

This polyherbal gel aims to soothe and relieve the discomfort of scalp psoriasis. It combines the properties of various herbs with the calming properties of oatmeal extract to target itching, scaling, and inflammation. The formulation seeks to provide a natural approach to

promoting scalp health and reducing the visible symptoms of psoriasis. Ultimately, the goal is to offer an appropriate and effectual way to manage scalp psoriasis and improve overall scalp condition.<sup>[1,6]</sup>

### 2. Materials

Turmeric extract, Avena sativa extract, Calendula extract, Carbomer, Phenoxyethanol, Triethanolamine.

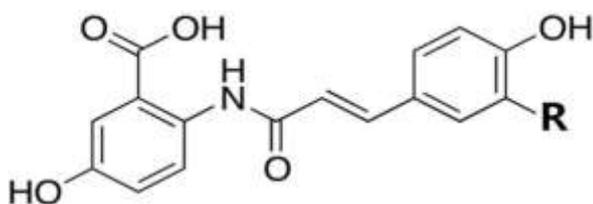
**Herbs description**<sup>[4,5]</sup>**1. Turmeric****Turmeric**

**Structure Synonym:** Curcuma, Curcuma longa, Haldi, Yellow Ginger.

**Biological Source:** Turmeric is originate in from the rhizome of the Curcuma longa plant, which is a perennial herb native to India and Southeast Asia.

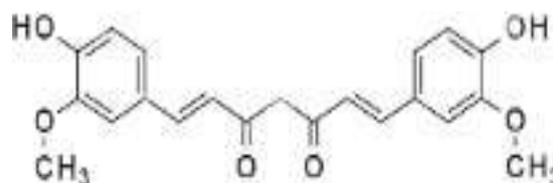
**Chemical Constituent:** Curcumin (60-70%): a polyphenolic compound, Demethoxycurcumin (10-20%), Bisdemethoxycurcumin (5-10%), Volatile oils (2-5%): including Turmerone, Atlantone, and Zingiberene, Resins and other compounds (10-20%): including sugars, proteins, and other polyphenolic compounds.

**Anti Psoriasis application-** Reducing Inflammation  
Inhibiting Keratinocyte Proliferation  
Improving Skin Barrier Function  
Reducing Oxidative Stress  
Promoting Wound Healing.<sup>[4,5]</sup>

**2. Avena sativa****Avena sativa**

Avn A    R = H  
Avn B    R = OCH<sub>3</sub>  
Avn C    R = OH

Avenanthramides (A,B,C)

**Curcumin Chemical**

**Synonym:** Oat, Oat herb, Oat straw

**Biological Source:** - Avena sativa is a plant species that be linked to the grass family. It is a type of cereal grain that is commonly used as a food source and in herbal medicine.

**Family:** Poaceae.

**Chemical Constituent:** Avenanthramides (polyphenolic compounds), Flavonoids (apigenin and luteolin), Saponins (avenacosides), Alkaloids (trigonelline), Glycosides (avenin)

**Anti-Psoriasis Application:** Avena sativa has been traditionally used to treat skin conditions, including psoriasis. Avena sativa is attributed with anti-inflammatory, antioxidant, and soothing properties for anti- psoratic purposes. The avenanthramides present in Avena sativa have been shown to inhibit the creation of pro- inflammatory cytokines and enzymes, which can help to lower inflammation and alleviate symptoms of psoriasis.<sup>[4,5]</sup>

**3. Calendula officinalis****Calendula officinalis**

**Synonym:** Pot Marigold, Scotch Marigold.

**Biological source:** C. officinalis, The dried flower head of C. officinalis, an annual herb whose native habitat is in the Mediterranean region and Western Europe and belongs to the Asteraceae family.

**Chemical Constituent:** Flavonoids (e.g. quercetin)

isorhamnetin), Terpenoids (e.g. calendadiol, calendaldehyde), Saponins, Carotenoids (e.g. lutein, zeaxanthin), Triterpenoids (e.g. oleanolic acid, ursolic acid),

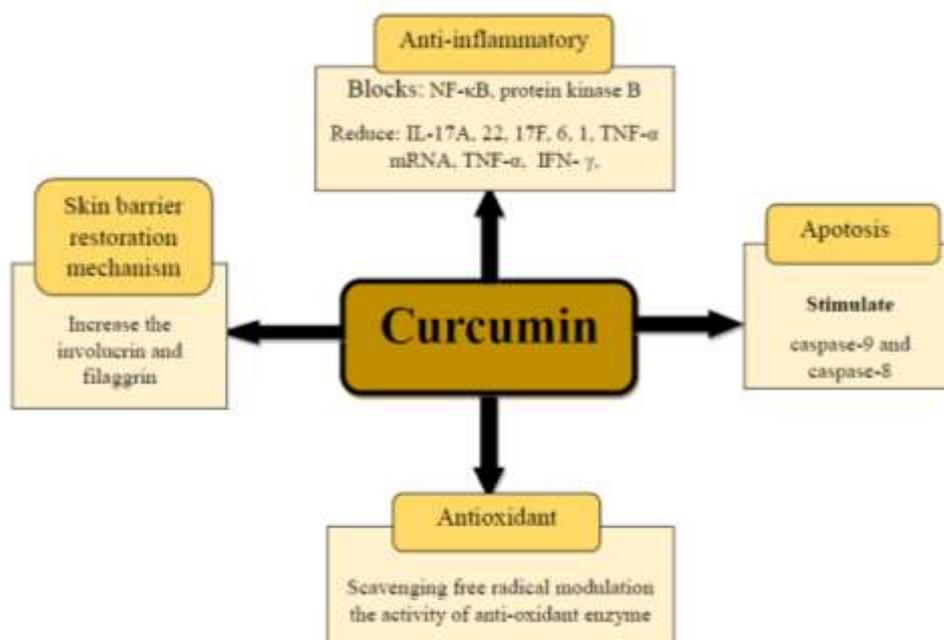
**Anti-Psoriasis Application:** Attributable to its anti-inflammatory, antimicrobial, and antioxidant properties, calendula flower has been used for the treatment of skin disorders including psoriasis.<sup>[4,5]</sup>

- **Mechanism of Herbs in the Scalp Psoriasis**<sup>[6,12,13,14,39]</sup>

1) **Turmeric (Curcumin)**

Mitochondrial degeneration raises the numeral of cell nuclei, Cytochrome c releases, Caspase-9 and caspase-8

stimulate, NF- $\kappa$ B action and protein kinase B (PKB) is also inhibited, and Extracellular regulated kinases 1/2 is inhibited. Bring down the phosphorylation levels of Akt and ERK, Lower the levels of IL-17A, 22, 17F, 6, 1, and TNF- $\alpha$  mRNA, TNF- $\alpha$ , and IFN- $\gamma$ , whereas rise the involucrin and filaggrin, In HaCaT cells, increase the expression of TRAIL- R1/R2 whereas conceal the production of TNF- $\alpha$  induced IL-6/IL-8.<sup>[11]</sup>



2) **Avena sativa**

- **Anti-inflammatory:** Avena sativa has anti-inflammatory properties, which help to lower redness, bulge, and stinging associated with scalp psoriasis.
- **Antioxidant:** Avena sativum has antioxidant properties, which assist to protect the skin from destruction brought by free radicals.
- **Emollient:** Avena sativum has emollient properties, which assist to soothe and moisturize the skin.
- **Immunomodulatory:** Avena sativa may have immunomodulatory effects, which help to regulate the immune system and reduce inflammation.<sup>[36]</sup>

3) **Calendula officinalis**

- **Anti-inflammatory effect:** Calendula officinalis contains triterpenoids, such as oleanolic acid and ursolic acid, which have anti-inflammatory properties that assist to lower redness, swelling, and stinging relate with scalp psoriasis.
- **Antioxidant effect:** Calendula officinalis contains

flavonoids, such as quercetin and isorhamnetin, which have antioxidant properties that help preserve the skin from damage brought by free radicals, which can exacerbate scalp psoriasis.

- **Wound healing activity:** Polysaccharides present in Calendula officinalis, like glucans promote the healing of wounds and repair of tissues, reducing risk of infection and promoting healthy skin.
- **Immune system modulation:** Calendula may help modulate the immune system, decreasing an abnormal immune reaction that promotes scalp psoriasis.
- **Anti-microbial:** Calendula officinalis is beneficial for its anti-microbial property, as it can help inhibit the growth of bacteria or other microbes that can aggravated scalp psoriasis.<sup>[35]</sup>

3. **Methods**

• **Method of extraction**

1. **Turmeric extract**

Take 5gm of turmeric powder on a weigh balance, after

weighing the ingredient accurately, then Glycerine one is 20ml add to turmeric powder. The mixture is put into a glass container, which is glass in nature, sterile to minimize the risk of contamination. This in turn triggers active turmeric to secrete during the 2 days of maceration. compounds into the glycerine. A concentrated liquid solution of turmeric extract is prepared, which can be which is commonly used in many skincare products.<sup>[37]</sup>



**Turmeric extract.**

## 2. Avena Sativa

The ingredient used is measured on a weighing balance, with 10gm of Avena Sativa taken. The extract of Avena Sativa is subsequently added to 100ml of water, used in a clean and sterile container. This mixture is boiled with the decoction technique to let the Avena Sativa blossom in the water. The boiling process is continued to reduce the liquid down to the intended extract. So, what is the Avena Sativa extract that results in then cooled and filtered so no solids remain.<sup>[36]</sup>



**Avena Sativa extract.**

## 3. Calendula officinalis

Marigold flowers are sourced from the local market. Calendula is collected, and the sepals removed flowers to ensure the blossoms are used. Calendula

Flowers are dried in ambient light for preservation their active compounds. Weighing balance 25 gm of the dried Calendula flowers is taken correct quantity or measurement of ingredient. Then add the Calendula flowers to 350ml of water in a clean and sterile container. Using the Decoction method, the mixture is boiled, which allows the Calendula flowers to and release their active compounds into the water. The process of boiling is continued till the liquid concentrates and the extract you want is obtained. The resulting Calendula extract is concentrated to form an effective Supplemental and a so-called concentrated liquid solution.<sup>[35]</sup>



**Calendula officinalis.**

### ▪ Preparation of Polyherbal gel

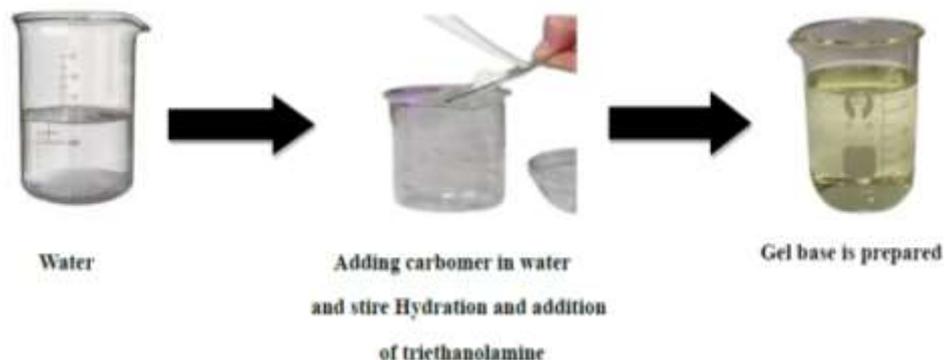
#### Step 1: Preparation of Gel Base

According to the formula, mix Carbomer with water. The mixture is tempered to a particular time and temperature to permit the carbomer to take up the water and swell. Triethanolamine lower pH, is subsequently added to the mixture pH and gel consistency. It is mixed well with the mixture and transparent gel is prepared.<sup>[1,3,9,38]</sup>

#### Step 2: Preparation of Gel

Start by adding the Avena Sativa extract to your gel base, then the Calendula extract and finally the Turmeric extract. One by one, each extract is poured in, and mixed thoroughly after each drop. After all the extracts have been added, Phenoxyethanol is added to the gel as a preservative to obviate the growth of microorganisms. The blend is then stirred well to ensure a uniform blend, and the polyherbal gel is prepared.

## Step 1



## Step 2

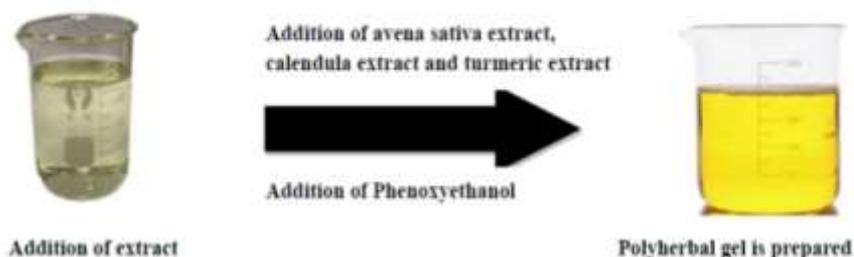
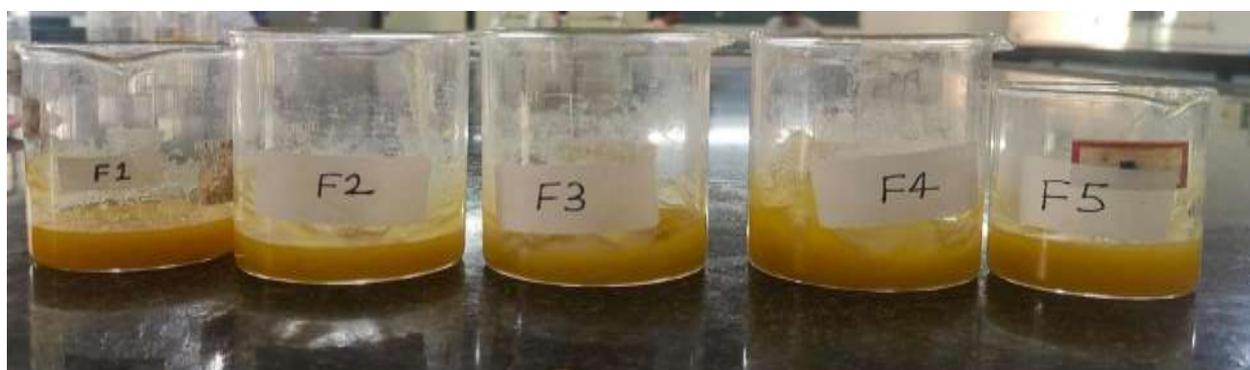


Table 3.1: Formula of polyherbal gel.

Ingredients	F1	F2	F3	F4	F5
Turmeric extract	0.3 gm	0.3 gm	0.4 gm	0.4 gm	0.5 gm
Calendula flower extract	1.5 gm	1.8 gm	1.2 gm	1.5 gm	1.8 gm
Avena sativa extract	2.1 gm	2.4 gm	2.7 gm	2.5 gm	2.9 gm
Carbomer 934	0.36 gm	0.48 gm	0.36 gm	0.36 gm	0.48 gm
Water	23.9 gm	22.5 gm	23.5 gm	23.9 gm	22.1 gm
Phenoxyethanol	0.3 gm				
Triethanolamine	q.s	q.s	q.s	q.s	q.s



Formulations F1, F2, F3, F4, F5.

## 4. Evaluation of Polyherbal Gel

Various physical properties of the formulated polyherbal gel were evaluated, encompassing aspects like color, appearance, homogeneity, grittiness, viscosity, spreadability, pH stability, skin irritation, and additional criteria related to the gel.<sup>[1,3,8,9]</sup>

## 1. Organoleptic characteristics

The organoleptic characteristics of the polyherbal gel were evaluated by visual examination.<sup>[1]</sup>

## 2. Homogeneity &amp; Grittiness

Determination of herbal scalp gel was performed by sorting the gel between the thumb and forefinger and the

sample homogeneity or the appearance of aggregates was checked.<sup>[9]</sup>

### 3. pH Test

The pH of the polyherbal gel was determined utilizing a digital pH meter. A sample of the polyherbal gel was taken and placed in a beaker. The pH meter probe was then dip into the sample, and the pH reading was recorded.<sup>[10]</sup>

### 4. Viscosity Test

The viscosity of the gel formulations was measured using a Brookfield viscometer with spindle number 4, set to a speed of 10 revolutions per minute.<sup>[4]</sup>

### 5. Spreadability Test

The spreadability was determined by taking 0.5 gm of gel on one glass plate and covering it with another plate. A weight of 500 gm was applied, and the gel spread to a length of 1.5 cm per 0.8 seconds.<sup>[40]</sup>

Spreadability was estimated using the following formula:

$$S = M \times L / T$$

Where,

S = Spreadability M = Weight

L = Length

T = Time (in sec.)

### 6. Stability Test

Stability testing was conducted over a period of three months in accordance with ICH guidelines, at temperatures of  $30^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and  $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , with relative humidity levels of  $65\% \pm 5\%$  and  $75\% \pm 5\%$  respectively, to assess middle and accelerated stability. The formulations were evaluated for variations in color, appearance, spreadability, pH, and drug content.<sup>[32]</sup>

### 7. Skin Irritation Test

The skin irritation test was supervised on 10 healthy human subjects. A small amount of the polyherbal gel formulation was applied. After 48 hours, the site was examined for signs of irritation.<sup>[22]</sup>

## 5. RESULTS<sup>[1,3,8,9]</sup>

### 1. Organoleptic characteristics

The polyherbal gel formulation exhibited a uniform, translucent pale yellow color, a smooth and even texture, and a mild, sweet aroma characteristic of Calendula flower extract.<sup>[1]</sup>

**Table 5.1: Organoleptic characteristics of formulation F1-F5.**

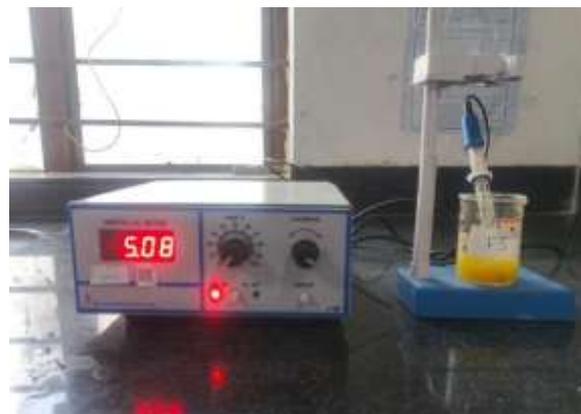
Formulation	F1	F2	F3	F4	F5
Physical appearance	Transparent yellow gel				
colour	Yellow	Yellow	Yellow	Yellow	Yellow
texture	Smooth	Smooth	Smooth	Smooth	Smooth
Aroma	Sweet aromatic				

### 2. Homogeneity & Grittiness

All the advanced formulations were proven for uniformity by visual examination. They were proven for their image and occupancy of some lumps, flocculates, or aggregates. **Homogeneity:** They were proven for their and some lumps, flocculates or aggregates Definitive and poor quality homogeneity: Polyherbal gel was found Sustaining sub-models that adapt to particular tasks, provided a clear basis for similar tasks across the board to be homogeneous with respect to a uniform texture and consistency. No sign of separation, no settling, or aggregation were observed. **Grittiness:** The polyherbal gel was assessed for grittiness by a tactile method. The gel was deemed smooth, non-gritty, and without identifiable particulate matter or coarse texture.<sup>[9]</sup>

### 3. pH Test

The scalp gel was evaluated for pH and was found to be 5, also it was slightly acidic to neutral. This pH range is similar to the natural pH of the skin and scalp so they help to maintain the natural acid mantle of skin which provides a barrier against diseases barrier function. A gentle, non-irritating formulation with a pH compatible with the scalp.<sup>[10]</sup>



**Table 5.2: pH of formulation F1-F5.**

Formulation code	pH
F1	5.01
F2	5.07
F3	5.02
F4	5.02
F5	5.08

### 4. Viscosity Test

The viscosity obtained by using the Brookfield viscometer ranged from 138.8 to 149.2 cps. This

guarantees the ideal viscosity and flow for instant, painless coverage. Moreover, the viscosity is far lower than the desirable threshold of about 15,000 cps for visually exciting properties.<sup>[10,14]</sup>

**Table 5.3: Viscosity of formulation F1-F5.**

Formulation code	Viscosity
F1	140.8 ± 0.1
F2	148.5 ± 1.0
F3	138.8 ± 0.25
F4	142.2 ± 0.4
F5	149.2 ± 0.8

### 5. Spreadability Test

This test measures how easily the gel formulation spreads on a surface. A spreadability test is used to measure the spreadability of the gel to be appropriate for particular application. The spreadability of the polyherbal gel was found 937.5 g cm/s, which showed that it had optimal spreadability and easy of. application on the scalp.<sup>[40]</sup>

### 6. Skin Irritation Test

The skin irritation test is done for assessing the irritancy potential of the topical formulation gel in skin, adverse

reactions such as skin rashes, redness, etc. This is indeed a key test to ascertain the safety and tolerability of the formula intended for use on the skin. Skin safety tests confirmed that the polyherbal gel formulation is non-irritant.<sup>[22]</sup>

### 6. DISCUSSION

The developed formulation of required polyherbal gel is the synergism of Turmeric extract, Calendula flower extract, and Avena sativa extract, which improves both anti-inflammatory and antioxidant properties. The F5 composition showed the best consistency and extract richness, making it the best-performing variant. Polyherbal gel with Carbomer as gelling agent allowed for optimal viscosity and texture for easy application and maximum absorption into skin. Triethanolamine addition is important to maintain the gel's pH and texture properties, and thus as well as review data from early studies of its stability and efficacy. A blend of Turmeric extract, Calendula flower extract, and Avena sativa extract, giving a complete line for scalp psoriasis prevention/development. Turmeric extract, rich in curcumin, exhibits powerful anti-inflammatory and antioxidant.



**Polyherbal gel F5**

### 7. CONCLUSION

This study reveals that a topical gel formulation containing turmeric, calendula, and Avena has potential sativa extracts in the topical medical care of scalp psoriasis. It was a gel formulation found to be smooth, nongreasy and nonirritating and have a pH compatible with the skin. These natural extracts is likely to offer a synergistic health benefit in an effort towards anti-inflammatory and enhancing skin health quality. This study offers a novel approach to treating scalp psoriasis, and indicates that this topical gel You are with us on this long journey to harness the power of nature that led us to suspect that you can use the extract if not go for the full on formulation as an adjunct to current therapies. More investigation is needed to completely assess the clinical effectiveness and safety of this gel formulation, but the findings of this study are promising and identify a new potential treatment for patients with scalp psoriasis.

### 8. REFERENCE

1. Formulation and Evaluation of Herbal Hair Gel for Psoriasis Devshree. Y. Patel<sup>1\*</sup>, Dr. Javesh. K. Patil<sup>2</sup>, Dr. Sunila A. Patil<sup>3</sup>, Sulbha G. Patil<sup>4</sup> 1 Student, Dept. of QA, College of Pharmacy, Shahada, Maharashtra, India 2,3 Associate Professor, Dept. of QA, College of Pharmacy, Shahada, Maharashtra, India 4 Assistant Professor, Dept. of QA, College of Pharmacy, Shahada, Maharashtra, India.
2. Management of scalp psoriasis: current perspectives Kim Blakely<sup>1</sup>Melinda Gooderham<sup>2</sup>1Faculty of Medicine, University of Toronto, Toronto, ON, Canada; 2Skin Centre for Dermatology, Peterborough, ON, Canada.
3. FORMULATION AND EVALUATION OF HERBAL HAIR GEL Alina Mary Alin<sup>\*</sup>, Alma Elizabeth John, Bettina Anna Abraham, Mekhamol

- K.U., Saleekha M., Neema Aniyam Nazareth College of Pharmacy, Othara, Thiruvalla, Pathanamthitta, Kerala-689546.
4. Khandelwal, K. R., Kokate, C. K., Pawar, A. P., & Gokhale, S. B. (1996). Practical pharmacognosy techniques and experiments (pp. 9). Pune: 3rd ed. Nirali Prakashan.
  5. Ayurvedic Pharmacopoeia, 1st edition. Government of India. Ministry of health and family welfare department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy, New Delhi, 2007; 3: 25-26.
  6. Scalp Psoriasis: A Literature Review of Effective Therapies and Updated Recommendations for Practical Management Megan Mosca. Julie Hong. Edward Hadel. Nicholas Brownstone. Tina Bhutani. Wilson Liao Received: February 17, 2021 / Published online: April 24, 2021.
  7. Scalp Itch: A Systematic Review Norma Elizabeth Vázquez-Herreraa Divya Sharmab Nouf Mohammed Aleidc Antonella Tostid a Tecnológico de Monterrey, Campus Monterrey, Monterrey, Mexico; bWarren Alpert Medical School of Brown University, Providence, RI, USA; cDepartment of Dermatology, Prince Sultan Military Medical City, Riyadh, Saudi Arabia; dFredric Brandt Endowed Professor of Dermatology, University of Miami, Miami, FL, USA.
  8. The treatment of psoriasis via herbal formulation and nanopolyherbal formulation: A new approach Tejal Yadav<sup>1</sup> ID, Hemant Kumar Singh Yadav<sup>1</sup> ID, Abhay Raizaday<sup>2</sup> ID, Md Sabir Alam<sup>3\*</sup> ID <sup>1</sup>Gyan Vihar School of Pharmacy, Suresh Gyan Vihar University, Jaipur, Rajasthan, India <sup>2</sup>Department of Pharmaceutics, College of Pharmacy, JSS Academy of Technical Education, Noida, Uttar Pradesh, India <sup>3</sup>SGT College of Pharmacy, SGT University, Gurgaon-Badli Road Chandu, Budhera, Gurugram, Haryana-122505, India.
  9. Design, Development and Evaluation of Herbal Gel for Treatment of Psoriasis Patil S.C.\*<sup>1</sup>, Gadade D.D.<sup>1</sup>, Rath P.B.<sup>1</sup> <sup>1</sup>Shri Bhagwan College of Pharmacy, Cidco, N-6, Aurangabad, India.
  10. DEVELOPMENT AND EVALUATION OF HERBO SYNTHETICGEL: A NOVEL TREATMENT FOR PSORIASIS Vinay Pandit \* <sup>1</sup>, Anurag Kumar <sup>1</sup>, Tarun Kumar Sharma <sup>1</sup>, CPS Verma <sup>2</sup> and Shiv Kumar Kushawaha <sup>3</sup> <sup>1</sup>Department of Pharmaceutics <sup>1</sup>, Department of Pharmacognosy <sup>2</sup>, Department of Pharmacology <sup>3</sup>, Laureate Institute of Pharmacy, Kathog, Distt, Kangra - 177101, Himachal Pradesh, India.
  11. Papp, K., Berth-Jones, J., Kragballe, K., Wozel, G., & de la Brassinne, M. Scalp psoriasis: A review of current topical treatment options. Journal of the European Academy of Dermatology and Venereology (JEADV), 2007; 21(11): 1151–1160. <https://doi.org/10.1111/j.1468-3083.2007.02424.x> Journal name: Journal of the European Academy of Dermatology and Venereology (JEADV, 21(11): 1151–1160. DOI: 10.1111/j.1468-3083.2007.02424.x
  12. Di Nardo, V., Gianfaldoni, S., Tchernev, G., Wollina, U., Barygina, V., Lotti, J., Daaboul, F., & Lotti, T. Use of Curcumin in Psoriasis. Open Access Macedonian Journal of Medical Sciences, 2018; 6(1): 218–220. <https://doi.org/10.3889/oamjms.2018.055> Journal name: Open Access Macedonian Journal of Medical Sciences, 6(1): 218-220. DOI: <https://doi.org/10.3889/oamjms.2018.055>
  13. Kumari, P., & Bais, S. (2023). Formulation and Pharmacological Evaluation of Herbal Gel Containing Curcuma longa. International Journal of Pharmaceutical Sciences, 287. <https://doi.org/10.36922/itps.287> Article Title: Formulation and Pharmacological Evaluation of Herbal Gel Containing Curcuma longa Journal Name: International Journal of Pharmaceutical Sciences DOI: <https://doi.org/10.36922/itps.287>
  14. Suryakumari, C., Reddy, A. D., Rajarajeswari, N., & Sailaja, K. Formulation and Evaluation of Polyherbal Gel Containing Jackfruit, Banana Peel, Aloe Vera, Neem, Curcumin, for the Treatment of Psoriasis Disease. Journal of Pharmacy and Pharmaceutical Research, 2021; 6(5): 1-10.
  15. Nayak, A., Rani, M., & Gupta, A. Formulation and evaluation of polyherbal gel for the treatment of psoriasis. Journal of Herbal Medicine and Toxicology, 2020; 14(1): 25-30.
  16. Garg, T., & Yadav, N. Herbal formulations and their role in the management of scalp psoriasis. Phytotherapy Research, 2018; 32(6): 1041-1053. <https://doi.org/10.1002/ptr.6019>.
  17. Mishra, D., & Kumar, S. Polyherbal formulations in the treatment of inflammatory skin disorders: A review. International Journal of Pharmaceutical Sciences and Research, 2019; 10(5): 2154-2161
  18. Pandey, S., & Sharma, P. Therapeutic potential of polyherbal gel in the treatment of psoriasis: A scientific overview. Journal of Herbal Pharmacotherapy, 2021; 21(2): 129-136. <https://doi.org/10.1080/15229005.2020.1846841>.
  19. Mishra, P., & Kumar, R. Evaluation of anti-psoriatic activity of polyherbal gel formulations. International Journal of Pharmaceutics, 2021; 589: 119860. <https://doi.org/10.1016/j.ijpharm.2020.119860>.
  20. Singh, A., & Tiwari, A. Development and evaluation of polyherbal gel formulation for the treatment of psoriasis. Journal of Cosmetic Dermatology, 2021; 20(7): 2025-2032. <https://doi.org/10.1111/jocd.13649>.
  21. Kaur, H., & Gupta, R. Polyherbal gel formulations in the management of inflammatory skin disorders: A review on efficacy and stability. Indian Journal of Pharmaceutical Education and Research, 2020; 54(2): 374-381. <https://doi.org/10.5530/ijper.54.2.79>.
  22. Nayak, A., & Sahoo, S. Evaluation of polyherbal gel

- containing plant extracts for the treatment of psoriasis. *International Journal of Pharmaceutical Sciences and Research*, 2020; 11(5): 2219-2227.
23. Mishra, P., & Sharma, A. Development and evaluation of herbal polyherbal gel for the treatment of dermatological disorders. *Journal of Applied Pharmaceutical Science*, 2019; 9(7): 123-128.
  24. Patel, V., & Choudhary, M. Polyherbal gels for topical treatment of skin disorders: A review. *Phytomedicine*, 2020; 69: 153227. <https://doi.org/10.1016/j.phymed.2020.153227>.
  25. Singh, P., & Verma, S. Formulation and characterization of polyherbal gels for topical application in dermatological diseases. *Journal of Drug Delivery Science and Technology*, 2021; 64: 102548. <https://doi.org/10.1016/j.jddst.2021.102548>.
  26. Kaur, R., & Yadav, N. Polyherbal gel formulations in psoriasis treatment: A clinical perspective. *Journal of Herbal Medicine*, 2019; 19: 100278. <https://doi.org/10.1016/j.hermed.2019.100278>.
  27. Bose, S., & Roy, D. Polyherbal gel formulations: A new approach for the treatment of psoriasis. *International Journal of Research in Pharmaceutical Sciences*, 2020; 11(2): 234-239.
  28. Sinha, S., & Garg, T. Herbal gels and their use in dermatological diseases: A detailed review. *Pharmacognosy Reviews*, 2021; 15(30): 11-16. [https://doi.org/10.4103/phrev.phrev\\_59\\_21](https://doi.org/10.4103/phrev.phrev_59_21).
  29. Hussain, A., & Khan, S. Development of polyherbal gel for treatment of chronic inflammatory skin disorders. *Pharmacology & Pharmacy*, 2021; 12(8): 230-240. <https://doi.org/10.4236/pp.2021.128022>.
  30. Kumari, A., & Sinha, A. The role of polyherbal formulations in the treatment of psoriasis: A review. *Asian Pacific Journal of Tropical Disease*, 2019; 9(5): 204-209. <https://doi.org/10.4103/2222-1808.260039>.
  31. Chandran, R., & Das, S. Herbal gel formulations for the treatment of psoriasis: A review. *Asian Journal of Pharmaceutics*, 2021; 15(3): 356-363. <https://doi.org/10.22377/ajp.v15i3.3372>
  32. Das, K.; Dang, R.; Machale, M. U.; Formulation and Evaluation of A Novel Herbal Gel Of Stevia Extract. *Iranian Journal of Dermatology*, 2010; 12: 117-122.
  33. ICH harmonised guideline. validation tripartite of analytical procedures: Text And Methodology Q2(R1) Current Step 4 version., Parent Guideline dated 27 October 1994.
  34. Topical Turmeric Microemulgel in the Management of Plaque Psoriasis; A Clinical Evaluation Golnaz Sarafian<sup>a</sup>, Minoo Afshar<sup>b</sup>, Parvin Mansouri<sup>c</sup>, Jinous Asgarpanah<sup>d</sup>, Kosar Raoufinejad<sup>a</sup>, Mehdi Rajabi<sup>a,\*</sup>
  35. A Comparative Bio-Evaluation and Chemical Profiles of *Calendula officinalis* L. Extracts Prepared via Different Extraction Techniques By Gunes A<sup>1</sup>, Gokhan Zengin<sup>1</sup> Kouadio Ibrahime Sinan<sup>1</sup>, Mohamad Fawzi Mahomoodally<sup>2,3,\*</sup>, Marie Carene Nancy Picot-AllainOguz Cakır<sup>4</sup> Souheir Bensari<sup>5</sup>, Mustafa Abdullah Yilmaz<sup>6</sup> Monica Gallo<sup>7,\*</sup> and Domenico Montesano<sup>8</sup>.
  36. Extraction of avenanthramides from oats (*Avena sativa*) using pressurized hot water Extraction Mark Pålsson, David<sup>LU</sup>(2022) KEMR10 20221 Department of Chemistry
  37. Optimization of the extraction of curcumin from *Curcuma longa* rhizomes Author links open overlay panel Viviane P. Paulucci, Renê O. Couto, Cristiane C.C. Teixeira, Luis Alexandre P. Freitas Faculdade de Ciências Farmacêuticas de Ribeirão Preto, Universidade de São Paulo, Brazil
  38. World Journal of Pharmaceutical Research Pappu et al. World Journal of Pharmaceutical Research SJIF Impact Factor 8.084 Volume 9, Issue 14, 763-776. Research Article ISSN 2277- 7105 OFLOXACIN POLYHERBAL TOPICAL GEL Pappu Kr. Chaurasiya\*, Praveen Kumar Ashok, Deepika Joshi and Pratima Jayasawal Gyani Inder Siingh Institute of Professional Studies, Dehradun.
  39. Turmeric tonic as a treatment in scalp psoriasis: A randomized placebo-control clinical trial Parichehr Bahraini PharmD, Mehdi Rajabi PhD, Parvin Mansouri MD, Golnaz Sarafian PharmD, RezaChalangari MD, Zahra Azizian MD First published: 01 April 2018 <https://doi.org/10.1111/jocd.12513>
  40. QbD-Enabled Development of Quercetin Dihydrate-Loaded Nanostructured Lipid Carriers: In vitro Characterization, Safety and Efficacy Assessment in Androgenetic Alopecia Mice Model Research Published: 03 February 2025 Volume 15, article number 216, (2025) Meenaz M. Sayyed Tulshidas S. Patil Tanaya D. Khairnar, Nayan A. Gujarathi, Abhijeet Aher & Yogeeta O.Agrawal