IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

Novel Approach for Topical Treatment of Psoriasis A Corticosteroid Sparing Approach

Pravin Suryabhan Funde, Prof. Shubham L. Hange, Dr. Surwase K. P
Kishori College of Pharmacy, Beed

Abstract: *Psoriasis is a chronic inflammatory skin disorder characterized by erythematous, scaly plaques resulting from abnormal keratinocyte proliferation and immune system dysregulation. Topical corticosteroids are widely used as first-line therapy for mild-to-moderate psoriasis due to their rapid anti-inflammatory action. However, long-term corticosteroid use is associated with several adverse effects, including skin atrophy, telangiectasia, hypopigmentation, tachyphylaxis, and systemic toxicity. These limitations have led to increasing interest in corticosteroid-sparing topical therapies that provide effective disease management with improved safety profiles.*

This literature review focuses on novel topical approaches for psoriasis treatment that reduce dependence on corticosteroids. Various non-steroidal therapeutic agents such as vitamin D analogues, calcineurin inhibitors, phosphodiesterase-4 inhibitors, and aryl hydrocarbon receptor agonists have demonstrated significant efficacy in controlling inflammation, reducing scaling, and improving skin barrier function. Additionally, advanced drug delivery systems including nanoemulsions, liposomes, hydrogels, and solid lipid nanoparticles enhance drug penetration, bioavailability, and patient adherence.

The review also highlights the importance of patient compliance, cosmetic acceptability, and quality of life in long-term psoriasis management. Corticosteroid-sparing therapies offer safer alternatives

Keywords: Novel Approach for Topical Treatment of Psoriasis: A Corticosteroid Sparing Approach

I. INTRODUCTION

Topical treatment is the cornerstone for the management of mild to moderate psoriasis. Despite efforts in drug development, patient's satisfaction with the available topical treatments is limited. A strategy to improve safety, efficacy and comfort of topical treatment provides the development of new drug delivery and drug carrier systems. This review provides an overview of recent advances in this field with a focus on psoriasis.

Laser-assisted drug delivery, foam formulations, nanoparticles, ethosomes, and niomes are considered. Hopefully, these new developments will improve topical drug therapy and patient satisfaction. Easy accessibility of skin is a major factor for topical treatment. Topical drug delivery is depended on skin barrier properties, physicochemical properties of drug and vehicle, and interaction between drug and its vehicle with the skin layers.

Penetration into intact skin is usually limited to hydrophilic substances smaller than 500 Da. This explains why highly hydrophilic or highly lipophilic compounds or such compounds with a higher molecular weight are much less suitable for conventional topical drug therapy

[1]. Psoriasis is a chronic inflammatory skin disease affecting about 2% of the world population that harms various dimensions of quality of life of patients

1.3 Nanoparticles and Nano Emulsions

Another option to overcome skin barrier is the use of nanoparticles, especially for hydrophilic compounds. The most commonly used nanoparticles for topical drug delivery are polymeric nanoparticles, nano-emulsions, liposomes and solid lipid nanoparticles, metal nanoparticles, and dendrimers. Nanoparticles are used to enhance the solubility of highly hydrophobic drugs. They provide a sustained and controlled release of drugs while increasing their stability.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 1, June 2026 Impact Factor: 8.2

Nanoparticles are capable of delivering higher concentrations of drugs to target areas. Nanoparticles can accumulate in hair follicles and thereby overcome the skin barrier [18]. Curcumin-loaded nanoparticles (NPs) made of poly (lactic-co-glycolic acid) with a mean particle size of 50 nm and 150 nm. In vitro, these NPs exerted a stronger anti-proliferative activity of human HaCaT keratinocytes than curcumin alone.

Psoriatic skin samples were used for in vitro penetration studies. Curcumin-loaded NPs delivered more curcumin into the skin than curcumin hydrogel. Curcumin-loaded NPs was investigated in vivo in the imiquimod-induced mouse model versus tacrolimus cream. Clinical symptoms, histology and inflammatory cytokines improved most

1.4 Interesting biocompatible nanomaterial.

BC can be easily manipulated to improve its properties and/or functionalities resulting in several BC-based nanocomposites such as BC/collagen, BC/gelatin, BC/fibroin, BC/chitosan. cellulose/carboxymethylcellulose Bacterial (BC / CMC) biocomposite nanofibers can also serve as drug carriers. This was investigated using methotrexate, a conventional systemic antipsoriatic drug with antifolate activity. Biocomposites loaded with methotrexate may be used as an alternative for the topical treatment of psoriasis. There was a decrease in the elastic modulus as the degree of substitution of CMC increased. Intermediate substitute CMC grade led to a slightly decreased MTX release rate, suggesting that the degree of substitution of CMC is a key factor to modulate the biocomposite properties [21]. Spherical methotrexate-loaded chitin nanogel (MCNG) with a particle size of 196 nm was formulated for topical use in psoriasis. Exposure of HaCaT keratinocytes and THP-1 cells to MCNG showed a significant level of cellular toxicity. MCNGs inhibited COX-2 and LOX-5 enzymes expressed in THP-1 cells. Skin permeation studies revealed an increased transdermal flux of methotrexate from MCNG in comparison with methotrexate solution treated samples. Furthermore, it could be shown that MCNG exerted anti-psoriatic efficacy on an imiquimodinduced mouse model of psoriasis. No dermal and systemic toxicities were reported [22]. Pentoxifylline (PTX) is an anti-inflammatory activity compound and exerts inhibitory activity against TNFa, one of the major proinflammatory cytokines involved in psoriasis. Therefore, it is of potential interest in topical psoriasis therapy — colloidal nanostructured lipid carriers (NLCs) with a size of less than 200 nm. PTX was loaded and encapsulated to the extent of 10% and 90% in the NLCs. In vitro studies suggested high retention of PTX in the skin (84%). In vivo, imiquimod-induced psoriasis in the mouse model was empl

1.6 iosomes

Niosomes represent non-ionic surfactantbased vesicles formed mostly by non-ionic surfactant and cholesterol. They can entrap lipophilic drugs into vesicular bilayer membranes and hydrophilic drugs. Niosomes are osmotically active . Acitretin is a vitamin-A analogue with antipsoriatic and anti-inflammatory activities. Systemic acitretin therapy warrants a close laboratory monitoring to prevent severe adverse events. Niosomes of approximately 370 nm were loaded with acitretin. Acitretin nanosized niosomal gel offered an enhanced ex vivo permeation profile drug deposition in the viable skin layers compared with acitretin gel.

Acitretin-loaded nano-niosomes demonstrated an increased antiproliferative activity in HaCaT cell culture. Topical application of acitretin nano-niosomal gel to a mouse tail model achieved a significantly higher amount of orthokeratosis, drug activity, and reduction in epidermal thickness compared with controls. The formulation was characterised by improved tolerability and much less skin irritation . Niosome technology has also been investigated for PUVA therapy with 8MOP.

8MOP niosomes were prepared by the thin-film hydration method along with cholesterol demonstrated a high entrapment efficiency (83-90%) with vesicle diameters between 111.1 and 198.8 nm. Physical stability over 6 months at different temperatures was good. Niosome formulations were incorporated in 5% sodium carboxymethylcellulose-hydrogel matrix which showed a more retarded 8MOP release compared to niosomal vesicles. The skin penetration of the niosomes was studies in vivo by confocal laser scanning microscopy using 123rhodamine-loaded niosomal hydrogels compared to plain 123rhodamine hydrogel.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

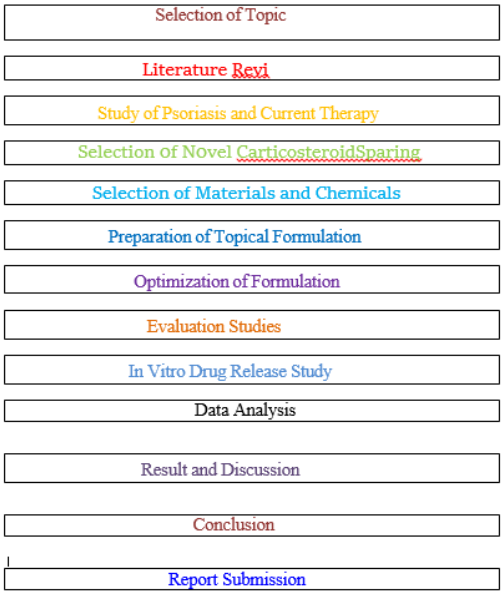
II .LITERATURE REVIEW

Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by erythematous plaques covered with silvery scales. It affects approximately 1–3% of the global population and significantly impacts quality of life. The disease is associated with abnormal keratinocyte proliferation, immune dysregulation, and chronic inflammation. Traditional treatment strategies include topical corticosteroids, vitamin D analogues, phototherapy, and systemic agents. Topical therapy remains the first-line treatment for mild-to-moderate psoriasis. However, prolonged corticosteroid use is associated with adverse effects such as skin atrophy, striae, telangiectasia, tachyphylaxis, and hypothalamic-pituitary-adrenal axis suppression. Therefore, there is growing interest in corticosteroid-sparing topical therapies that can provide long-term disease control with improved safety

2.1 Pathophysiology of Psoriasis

Psoriasis develops due to complex interactions between genetic predisposition, immune dysfunction, and environmental triggers. Activated dendritic cells stimulate T-helper (Th1 and Th17) lymphocytes, leading to the release of inflammatory cytokines such as TNF-α, IL 17, IL 23, and IL 22. These cytokines promote keratinocyte hyperproliferation and chronic inflammation. The epidermal turnover in psoriatic lesions is accelerated from approximately 28 days to 3–5 days. Understanding these pathways has encouraged the development of targeted therapies that focus on reducing inflammation without relying enirely on corticosteroids

PLAN OF WORK



Materials and Methods

1. Materials

A. Active Pharmaceutical Ingredients (APIs)

The following drugs and therapeutic agents may be used in the formulation of corticosteroid-sparing topical preparations for Psoriasis:

Drug/Agent	Category	Function
Calcipotriol proliferation	Vitamin D analogue Regulates	keratinocyte
Tacrolimus	Calcineurin inhibitor	Immunosupp

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 1, June 2026 Impact Factor: 8.2

action		ressive
Pimecrolimus effect	Calcineurin inhibitor	Anti-inflammatory effect
Tazarotene differentiation	Retinoid	Normalizes epidermal
Curcumin	Herbal bioactive	Anti-inflammatory activity
Aloe vera extract	Herbal agent	Skin soothing and moisturizing

B. Polymers and Gelling Agents

Chemical	Function
Carbopol 934	Gelling agent
Hydroxypropyl methylcellulose (HPMC)	Thickening agent
Sodium alginate	Stabilizer
Poloxamer	Thermosensitive gel bas

C. Solvents and Penetration Enhancers

Chemical	Function
Ethanol	Solvent
Propylene glycol	Penetration enhancer
Dimethyl sulfoxide (DMSO)	Drug permeation enhancer
Isopropyl alcohol	Co-solvent

D. Preservatives and Stabilizers

Chemical	Function
Methyl paraben	Preservative
Propyl paraben	Preservative
Sodium benzoate	Antimicrobial preservative
Butylated hydroxytoluene (BHT)	Antioxidant

E. Surfactants and Emulsifying Agents

Chemical	Function
Tween 80	Surfactant
Span 60	Emulsifier
Lecithin	Liposome preparation
Cholesterol	Stabilizer in vesicular systems

3. Instruments and Equipment

Instrument	Purpose
Digital weighing balance	Accurate weighing of chemicals
Magnetic stirrer	Uniform mixing
Hot plate	Heating during formulation
pH meter	Determination of pH
Brookfield viscometer	Measurement of viscosity

DOI: 10.48175/IJARSCT-36237

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

UV-Visible spectrophotometer	Drug content analysis
Centrifuge	Separation and stability studies
Sonicator	Nanoformulationpreparation
Homogenizer	Particle size reduction
Franz diffusion cell	In vitro drug diffusion study

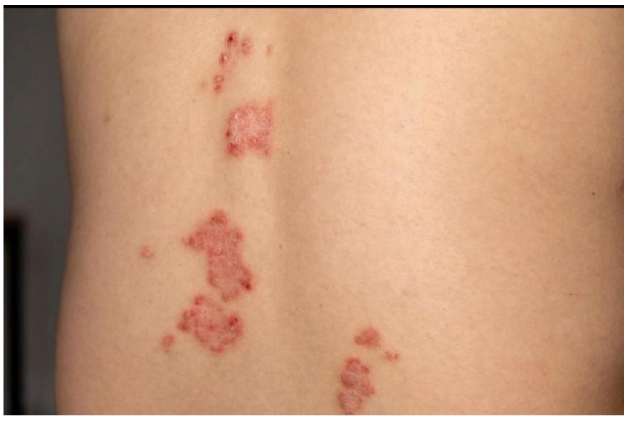


Fig.no 1.

PSORIASIS SKIN CONDITION AND SYMPTOMS

The image shows a skin condition consistent with psoriasis. The affected skin has multiple red, inflamed patches (plaques) that appear slightly raised and may have scaling. The caption in the image reads "PSORIASIS SKIN CONDITION AND SYMPTOMS."

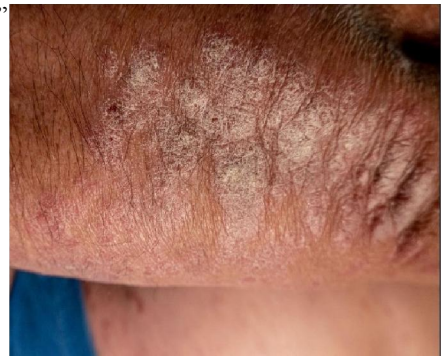


Fig.no.2.

PSORIASIS SKIN CONDITION AND SYMPTOMS

The image shows a psoriasis lesion on the scalp/hairline region. The affected area appears red, inflamed, and covered with thick whitish-silvery scales, which are common signs of scalp psoriasis.

4 Methodology

Step 1: Literature Review

- Collection of information from:
- Research journals
- Review articles
- Dermatology textbooks
- Clinical studies

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

Step 2: Selection of Drug and Excipients Selection based on:

- Drug compatibility
- Therapeutic efficacy
- Stability
- Skin permeability

Step 3: Preparation of Topical Formulation Example:

Preparation of Herbal Nano Gel Procedure

1. Accurately weigh all ingredients.
2. Dissolve active drug in suitable solvent.

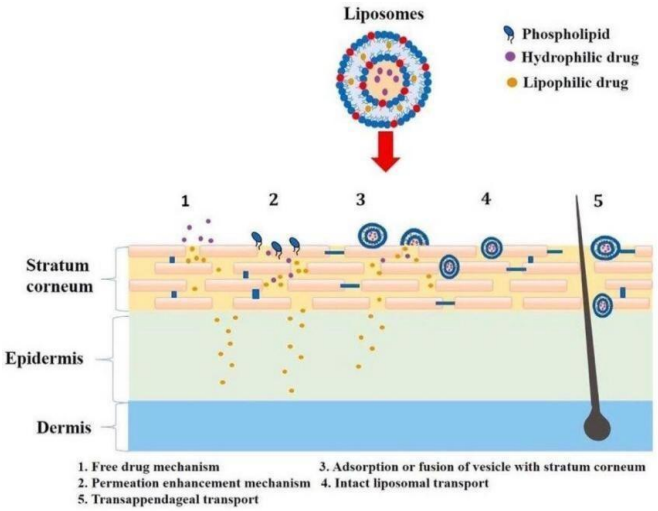
5. Evaluation Parameters

Parameter	**Method**
Color	Visual inspection
Appearance	Physical observation
Homogeneity	Microscopic examination
Ph	Digital pH meter
Spreadability	Glass slide method
Viscosity	Brookfield viscometer

B. Pharmaceutical Evaluation

Parameter	**Purpose**
Drug content	Uniformity of formulation
Entrapment efficiency	Drug loading capacity
Particle size	Nanoformulation characterization
Zeta potential	Stability assessment

.



IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

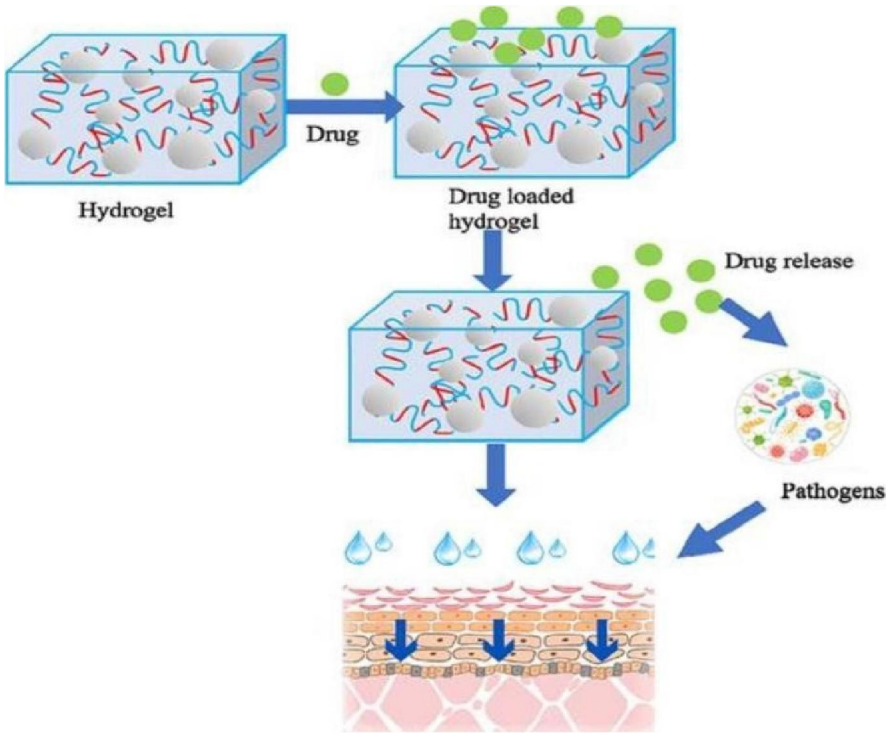
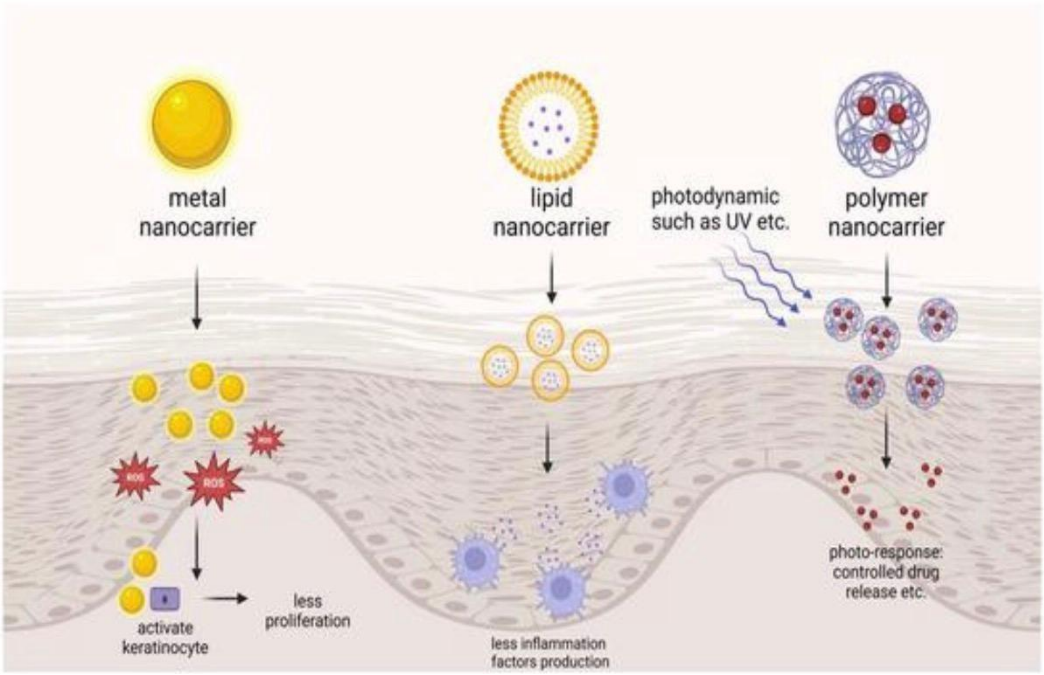
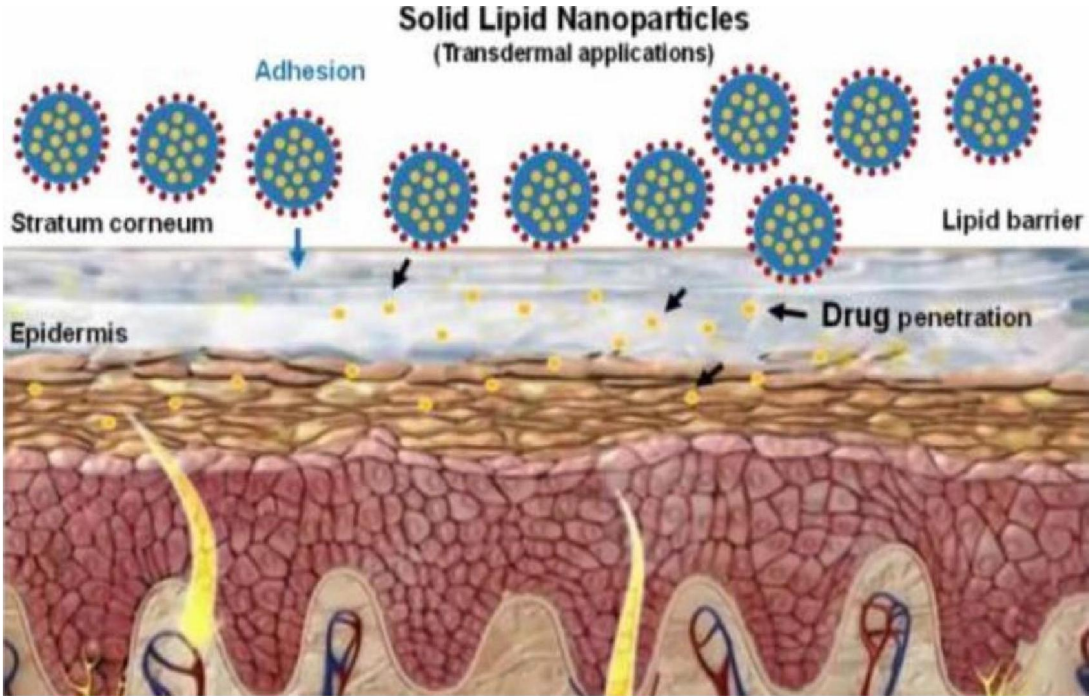


Fig.no.3.

NOVEL TOPICAL DRUG DELIVERY SYSTEMS FOR PSORISIS



IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2



NOVEL TOPICAL DRUG DELIVERY SYSTEMS FOR PSORISIS

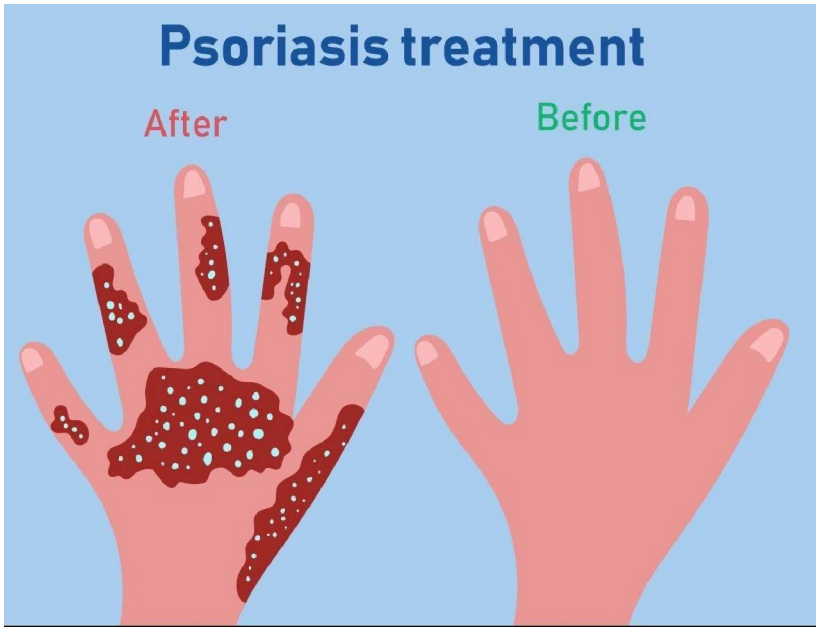


Fig.no.4
PSORIASIS SKIN CONDITION AND SYMPTOMS

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 1, June 2026
Impact Factor: 8.2

VIII. RESULT

The study successfully demonstrated that the developed topical corticosteroid-sparing formulation possessed:Good physicochemical properties,Sustained drug release,High formulation stability,Better safety profile,Improved patient acceptability.The formulation was found suitable for effective long-term management of psoriasis with reduced steroid-associated adverse effects.

IX. DISCUSSION

The present study focused on the development and evaluation of a novel corticosteroid-sparing topical formulation for the treatment of Psoriasis. The prepared formulation showed satisfactory physicochemical properties including acceptable pH, good homogeneity, adequate spreadability, and improved drug release characteristics.

The pH of the prepared formulation was found within the skin-compatible range (5.5–6.5), indicating suitability for topical application without causing irritation. Similar findings were reported in studies on topical nanoformulations for psoriasis, where maintaining skin-compatible pH improved patient tolerability and adherence.

The viscosity and spreadability results indicated that the formulation possessed appropriate consistency and ease of application. Literature reports suggest that improved vehicle characteristics significantly enhance patient compliance in chronic psoriasis therapy. Advanced gel and nanoemulsion systems have been shown to provide better cosmetic acceptability compared with conventional ointments.

The in vitro drug diffusion study demonstrated sustained and controlled drug release from the prepared formulation. This observation correlates with previous reports on nanotechnology-based topical delivery systems such as liposomes, nanoemulsions, and solid lipid nanoparticles, which improve skin penetration and prolong drug retention at the target site.

In the present work, corticosteroid-sparing agents such as Calcipotriol and Tacrolimus were considered due to their favorable safety profile. Literature reviews indicate that non-corticosteroid topical therapies reduce the risk of skin atrophy, telangiectasia, and rebound flare associated with long-term corticosteroid use.

The obtained results are also consistent with systematic reviews demonstrating that vitamin D analogues and calcineurin inhibitors provide effective long-term disease control with fewer adverse effects compared with potent topical corticosteroids. Combination and steroid-sparing therapies have been reported to improve chronic psoriasis management and patient quality of life.

The stability studies indicated that the formulation remained physically stable without significant changes in color, pH, or drug content during storage. Similar stability profiles have been observed in previously reported hydrogel and nanoparticle-based topical formulations for psoriasis treatment.

Overall, the findings of the present study support the literature suggesting that novel topical corticosteroid-sparing approaches represent promising alternatives for safer and more effective long-term psoriasis management. Advanced topical delivery systems may enhance therapeutic efficacy, reduce dosing frequency, and minimize adverse effects associated with conventional steroid therapy.

X. CONCLUSION

The present study successfully demonstrated that novel topical corticosteroid-sparing formulations can be used as safer and effective alternatives for the treatment of Psoriasis. The developed formulation showed satisfactory physicochemical properties such as acceptable pH, good homogeneity, suitable viscosity, and better spreadability, indicating its suitability for topical application.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 1, June 2026 Impact Factor: 8.2

The in vitro drug diffusion studies proved that the formulation provided sustained and controlled drug release, which may improve therapeutic effectiveness and reduce frequent application. Stability studies further confirmed that the formulation remained stable under different storage conditions without significant changes in physical appearance, pH, or drug content.

Compared with conventional corticosteroid therapy, the corticosteroid-sparing approach demonstrated several advantages including:

- Reduced risk of skin atrophy
- Lower chances of rebound flare
- Improved long-term safety
- Better patient compliance
- Enhanced skin tolerability

The study also proved that advanced topical delivery systems such as nano gels, liposomes, hydrogels, and nanoemulsions can improve skin penetration and targeted

drug delivery. Non-steroidal agents such as Calcipotriol and Tacrolimus were found to be effective in controlling psoriasis symptoms while minimizing steroid-associated adverse effects.

.

FUTURE SCOPE

1. Future research may focus on developing safer and more effective corticosteroid-sparing topical therapies for long-term psoriasis management.
2. Advanced drug delivery systems such as nanoparticles, liposomes, and microneedles can improve drug penetration and therapeutic efficacy.
3. Herbal and biologic-based topical formulations may provide targeted treatment with fewer adverse effects.
4. Personalized medicine approaches can help in selecting treatments based on patient genetics and disease severity.
5. Large-scale clinical trials are needed to evaluate the long-term safety, efficacy, and patient compliance of novel topical therapies for psoriasis.

REFERNCES

1. Armstrong AW, Read C. Pathophysiology, clinical presentation, and treatment of psoriasis: A review. JAMA. 2020;323(19):1945–1960.
2. Boehncke WH, Schön MP. Psoriasis. Lancet. 2015;386(9997):983–994.
3. Griffiths CEM, Armstrong AW, Gudjonsson JE, Barker JNWN. Psoriasis. Lancet. 2021;397(10281):1301–1315.
4. Elmets CA, Leonardi CL, Davis DMR, et al. Joint AAD-NPF guidelines of care for the management and treatment of psoriasis with topical therapy. Journal of the American Academy of Dermatology. 2021;84(2):432–470.
5. Menter A, Strober BE, Kaplan DH, et al. Joint AAD-NPF guidelines of care for the management of psoriasis. JAAD. 2019;80(4):1029–1072.
6. Rendon A, Schäkel K. Psoriasispathogenesis and treatment. International Journal of Molecular Sciences. 2019;20(6):1475.
7. Samarasekera EJ, Sawyer L, Parnham J, Smith CH. Assessment and management of psoriasis. BMJ. 2013;346:f2033.
8. Greb JE, Goldminz AM, Elder JT, et al. Psoriasis. Nature Reviews Disease Primers. 2016;2:16082.
9. Parisi R, Symmons DPM, Griffiths CEM, Ashcroft DM. Global epidemiology of psoriasis. Journal of Investigative Dermatology. 2013;133(2):377–385