

# Design and Development of Nano-Emulgel Using Cow Urine Distillate for Eccentric Treatment of Psoriasis: A Review

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**Abstract:** Psoriasis is an inflammatory skin disease characterized by the appearance of red lesions covered with silvery white flakes (scales) and has a significant prevalence in several countries around the world. It is characterized by red and scaly areas on the skin due to uncontrolled and fast growth of skin cells in combination with an immune system disorder. The disease is usually associated with itching, discomfort and emotional stress, all of which can decrease the quality of life in affected individuals. Topical corticosteroids, vitamin D analogues and systemic immunosuppressants among others are used to manage the symptoms of psoriasis. However, due to these limitations, alternative treatment systems such as herbal and alternative systems of medicine have attracted much attention for their use in management of skin diseases. Of these, one of the most widely cited, cow urine distillate (CUD), has been reported to have antimicrobial, anti-inflammatory, antioxidant and immunomodulatory properties which may be useful in the treatment of skin inflammatory conditions such as psoriasis. Recently, pharmaceutical nanotechnology has introduced new drug delivery systems to optimize topical drug delivery. The nano-emulgel, which combines the advantages of nanoemulsion and gel systems into one drug delivery system, is one such system. These systems have the ability to improve skin penetration, increase the stability of active ingredients and control the rate of drug release. In addition, nano-emulgels are easy to apply, do not feel greasy, and improve patient compliance as compared to conventional topical formulations. Therefore, this review is focused on the pathophysiology of psoriasis, the therapeutic role of cow urine distillate, the advantages of nano-emulgel formulations as a drug delivery vehicle for topical formulations, and the potential role of nano-emulgel formulations containing cow urine distillate as a new and promising approach for treating psoriasis.

**Keywords:** Psoriasis, Nano-Emulgel, Cow Urine Distillate, Herbal Drug Delivery, Nanotechnology, Topical Drug Delivery.

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## I. INTRODUCTION

### ➤ *Psoriasis and Global Prevalence*

Psoriasis is a chronic recurrent inflammatory skin disease, affecting an important percentage of the population, characterized by red thickened plaques of skin, which become covered with silvery-white scaling. <sup>[1]</sup> The condition occurs due to abnormal and accelerated growth of skin cells, which leads to the formation of visible plaques on the skin surface. Psoriasis can affect individuals of all ages, although it commonly appears during early adulthood or middle age. <sup>[2]</sup> Globally, the prevalence of psoriasis is estimated to be around 2–3% of the population, making it one of the most common immune-related dermatological disorders. In addition to physical symptoms such as itching, irritation, and scaling,

psoriasis often impacts the psychological and social well-being of affected individuals. <sup>[3]</sup>

### ➤ *Pathophysiology of Psoriasis*

Psoriasis involves more than just your skin flaring up—it's your immune system acting out of control and leading your body into a chaotic mix of symptoms. Usually, your skin cells grow, die, and fall away in a quiet little cycle. With psoriasis, however, the immune system initiates the release of signals which instruct your skin cells to reproduce too quickly. Before you know it, you find yourself facing dense, flaky areas because keratinocytes accumulate much faster than your body is able to shed them.

And it's not just the stuff you can see—there's a complex array of immune cells, inflammatory responses, genetic

factors, and external triggers as well mixed together below the surface.

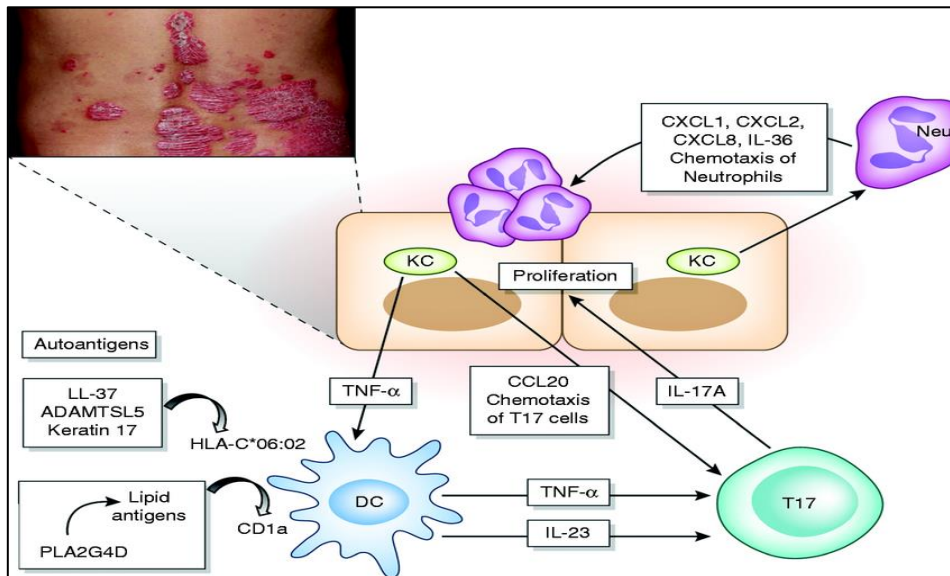


Fig 1 Pathophysiology of Psoriasis

➤ *Role of Inflammatory Cytokines*

Inflammatory cytokines play a big role here. These small proteins—like TNF- $\alpha$ , IL-17, and IL-23—crank up inflammation and push your immune system into constant action. They get that chain reaction going, making skin cells pile up and symptoms hang around. Since they're calling the shots, a lot of modern treatments aim right at them.<sup>[8]</sup> Because of their central role in disease progression, these inflammatory mediators have also become important therapeutic targets in modern psoriasis treatments.<sup>[9]</sup>

➤ *Limitations of Existing Therapies*<sup>[10][11]</sup>

Psoriasis treatments come in all shapes and sizes, but none of them are a magic fix, especially for the long haul.

• *Corticosteroids:*

Topical corticosteroids are usually the first stop—they help with swelling and itching, and they work fast. Use them too much, though, and you get thinned skin, irritation, and after a while, less relief.

• *Retinoids:*

Retinoids, which are basically vitamin A tweaks, slow down skin cell growth. But your skin might pay for it—dryness, irritation, and sun sensitivity make it tough to stick with long-term.

• *Immunosuppressants:*

And then there are immunosuppressants like methotrexate or cyclosporine. People turn to these for tougher cases since they work well, but you've got to watch out—they can affect your liver, your kidneys, and raise your chance of getting infections.

➤ *Need for Safe and Natural Topical Therapies*<sup>[12][13]</sup>

Patients are beginning to seek improved alternatives since conventional therapies involve certain quite annoying

restrictions and side effects. Natural and herbal treatments are gaining a lot of attention—they typically cause fewer problems and people appear to prefer them. Through making topical products that directly address the affected area on your skin, you can truly achieve improved outcomes and keep everything else in your body out of harm's way.

➤ *Nano-Emulgel Technology*

Drugs to the skin. Consider nano-emulgels, as an example—they blend the benefits of nanoemulsions and gels into a single effective formula.<sup>[14]</sup> The tiny droplets in the nanoemulsion assist drugs in penetrating the skin more easily, and the gel provides a product that's stable, viscous enough to handle, and easy to apply. So, using nano-emulgels, you obtain a formulation that spreads more effectively, delivers the medication more efficiently, and significantly contributes in the treatment of diverse skin issues.<sup>[16]</sup>

➤ *Traditional Medicinal Relevance of Cow Urine Distillate*

People have utilized distilled cow urine within Ayurvedic medicine for centuries, and it is said it possesses several therapeutic properties. Scientists have discovered it exhibits microbe-inhibiting, oxidation-preventing, inflammation-reducing, and immune system-modulating effects.<sup>[17]</sup> In Ayurveda, they consider it a bio-enhancer as well—which essentially means it has the ability to enhance the effectiveness of other medicines or their absorption. Due to all these factors, researchers are examining closely distilled cow urine as a potential remedy for skin inflammations such as psoriasis.<sup>[18]</sup> At this point, if you incorporate modern technology—such as embedding this distillate in nano-emulgels—you get a promising innovative solution to assist individuals in managing psoriasis using topical therapies.<sup>[19]</sup>



Fig 2 Cow Urine Distillate

## II. PSORIASIS

### ➤ Definition

Psoriasis is a long-lasting autoimmune disorder that affects the skin. It happens when your immune system misfires and attacks normal skin cells, which makes them grow and pile up way too fast. This leads to thick, scaly patches that can look pretty rough. It’s not something you can catch from someone else, but it tends to stick around for life, coming and going in cycles — sometimes it flares up, sometimes it calms down. [20]

### ➤ Epidemiology

Psoriasis is a common skin condition — about 2 to 3% of the global population are impacted by it. The figures change based on your location, your genetic makeup, and your surroundings. Although anyone can develop psoriasis, it typically appears in people aged 15 to 35. Men and women get it equally, and honestly, it’s not unusual to hear there’s a family history behind it. [21]

### ➤ Types of Psoriasis [22]

#### • Plaque Psoriasis:

This is the most common form of psoriasis, accounting for nearly 80–90% of cases. It is characterized by raised red patches of skin covered with silvery-white scales, usually appearing on the elbows, knees, scalp, and lower back.



Fig 3 Types of Psoriasis

Guttate psoriasis appears as tiny, drop-shaped spots across the trunk, arms, and legs. It usually comes on pretty fast, often after you’ve had a bacterial infection like strep throat. Pustular psoriasis isn’t as common. You’ll see white pustules enclosed within inflamed red skin. Occasionally it simply involves your hands and feet, however it might also disseminate more extensively. Erythrodermic psoriasis is uncommon as well as can be serious. It leads to severe redness as well as inflammation across extensive areas of your skin. Individuals of this kind may encounter serious issues such as dehydration as well as difficulty regulating body heat. Inverse psoriasis tends to show up within skin creases—underarms, the groin area, beneath the breasts, or near the genital area. Rather than thick scales, you receive smooth, inflamed, tender areas. It’s unlike plaque-type psoriasis, that generally results in extensive scaling.

Table 1 Types of Psoriasis and Clinical Features

Type	Characteristics	Common Sites
Plaque psoriasis	Thick red plaques with silvery scales	Elbows, knees, scalp
Guttate psoriasis	Small drop-shaped lesions	Trunk, limbs
Pustular psoriasis	Pus-filled blisters	Hands, feet
Inverse psoriasis	Smooth red patches	Skin folds
Erythrodermic psoriasis	Widespread redness	Whole body

### ➤ Pathophysiology [23]

Psoriasis arises because of a complex combination of genetics, external factors, and a faulty immune system. At its core, the condition causes epidermal cells—skin keratinocytes—to reproduce excessively quickly. That’s why the skin layer forms and flakes so quickly. But it’s not just about the surface. The immune system jumps in, discharging inflammatory agents which initiate a cascade of cytokines. This entire inflammation fuels the out-of-control skin cell growth. Ultimately, you get the typical dense, flaky plaques that those affected by psoriasis understand deeply. [24]

### ➤ Clinical Symptoms

Psoriasis appears in various forms, based on the severity and the type you have. Usually, you see red, raised patches on the skin covered by thick, silvery scales. These areas may itch or sting, and they are frequently inflamed. Occasionally the epidermis becomes dry, develops cracks, and may even bleed. Psoriasis is not confined to one spot — it may appear on the scalp, the elbows, knees, nails, or the lower back area. [25]

### III. CONVENTIONAL TREATMENT OF PSORIASIS

#### ➤ Topical Treatments

- **Corticosteroids:**

Topical corticosteroids are among the most commonly prescribed medications for mild to moderate psoriasis. They help reduce inflammation, itching, and redness by suppressing the immune response in the affected skin areas. [26]

- **Vitamin D Analogues:**

Vitamin D derivatives such as calcipotriol are used to slow down the excessive growth of skin cells. These agents help regulate keratinocyte proliferation and are often used in combination with corticosteroids.

- **Coal Tar:**

Coal tar has been used for many years as a topical therapy for psoriasis. It works by slowing skin cell growth and reducing scaling, itching, and inflammation. [27]

#### ➤ Systemic Treatments [28] [29]

- **Methotrexate:**

Methotrexate is an immunosuppressive drug used in moderate to severe cases of psoriasis. It helps reduce skin cell production and suppresses the immune response responsible for inflammation.

- **Cyclosporine:**

Cyclosporine is another immunosuppressant that is effective in controlling severe psoriasis. It works by inhibiting certain immune cells involved in the inflammatory process.

- **Retinoids:**

Systemic retinoids, which are derivatives of vitamin A, are used to regulate skin cell growth and differentiation. They are particularly useful in certain forms of psoriasis such as pustular psoriasis.

#### ➤ Biological Therapies [30] [31]

Biological therapies represent a newer class of treatments that specifically target immune system components involved in psoriasis. These drugs are usually administered by injection or infusion.

- **TNF Inhibitors:**

Tumor necrosis factor (TNF) inhibitors block the activity of TNF- $\alpha$ , a key inflammatory cytokine involved in the development of psoriasis.

- **IL-17 Inhibitors:**

IL-17 inhibitors work by blocking the activity of interleukin-17, another important cytokine that contributes to inflammation and excessive skin cell growth in psoriasis.

#### ➤ Limitations of Conventional Therapies [32] [33]

Although conventional treatments can effectively control psoriasis symptoms, they are often associated with several limitations. Many of these therapies may cause side effects such as skin irritation, dryness, liver toxicity, kidney damage, or increased risk of infections when used for long periods. In addition, long-term treatment can sometimes lead to reduced effectiveness and poor patient compliance. Because of these challenges, researchers are increasingly focusing on safer and more effective alternatives, including herbal therapies and advanced drug delivery systems.

- **Flow Diagram:**

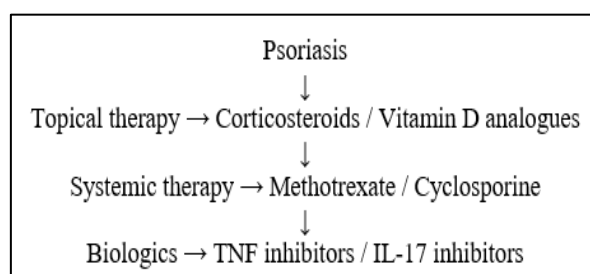


Fig 4 Conventional Treatment Approaches for Psoriasis

### IV. HERBAL AND ALTERNATIVE THERAPIES IN PSORIASIS

#### ➤ Role of Medicinal Plants in Dermatology

Medicinal plants have been used for centuries in the treatment of various skin disorders. Traditional medicine systems such as Ayurveda, Traditional Chinese Medicine, and Unani emphasize the use of plant-derived remedies for maintaining skin health. [34] Many plant extracts contain bioactive compounds like flavonoids, alkaloids, tannins, and terpenoids that possess therapeutic properties. These natural compounds help reduce inflammation, promote skin regeneration, and protect the skin from microbial infections. [35] Because of their relatively lower toxicity and better compatibility with the body, medicinal plants are increasingly being explored as alternative therapies for chronic skin diseases such as psoriasis. [36]

#### ➤ Anti-inflammatory and Immunomodulatory Herbs

Several medicinal plants are known for their anti-inflammatory and immunomodulatory properties, which make them useful in the management of psoriasis. [37] Herbs such as turmeric, neem, aloe vera, and *Azadirachta indica* have been reported to reduce inflammation and regulate immune responses in the body. [38] These plants contain active constituents that inhibit inflammatory mediators and help restore normal skin cell growth. As psoriasis involves excessive immune activation and inflammation, herbal compounds that modulate immune responses may offer beneficial therapeutic effects. [39] [40]

#### ➤ Growing Interest in Natural Products for Skin Diseases

In recent years, there has been increasing interest in natural and plant-based therapies for skin disorders. The limitations and side effects associated with long-term use of synthetic drugs have encouraged researchers to explore safer

alternatives. [41] Natural products are considered promising because they often possess multiple therapeutic properties, including antioxidant, antimicrobial, and anti-inflammatory effects. As a result, herbal formulations and plant-based drug delivery systems are gaining popularity in dermatological research and pharmaceutical development. [42]

➤ *Cow Urine Distillate (CUD)*

• *Historical and Ayurvedic Importance*

Cow urine distillate has been used in traditional Indian medicine for many centuries. In Ayurveda, it is considered a valuable therapeutic substance and is described as a component of “Panchagavya,” which includes various products obtained from cows. [43] Traditional Ayurvedic texts mention the medicinal value of cow urine for the treatment of

several diseases, including infections, metabolic disorders, and skin conditions. It is also believed to act as a bio-enhancer, improving the effectiveness of other therapeutic agents when used in combination. [44]

• *Chemical Composition*

Cow urine distillate contains a variety of chemical constituents that contribute to its medicinal properties. Some of the important components include urea, which has antimicrobial and keratolytic effects. Phenolic compounds present in the distillate contribute to its antioxidant activity. [45] In addition, volatile fatty acids and various essential minerals are also present, which may support metabolic and physiological functions. The combination of these compounds is believed to be responsible for the therapeutic potential of cow urine distillate. [46]

Table 2 Chemical Constituents of Cow Urine Distillate

Component	Biological Role
Urea	Keratolytic activity
Phenolic compounds	Antioxidant
Volatile fatty acids	Antimicrobial
Minerals	Metabolic supp

• *Pharmacological Activities*

Several pharmacological studies have reported multiple biological activities of cow urine distillate. It exhibits antimicrobial properties that help inhibit the growth of pathogenic microorganisms. The anti-inflammatory activity of cow urine distillate may help reduce redness, swelling, and irritation associated with inflammatory conditions. [47] Its antioxidant properties help neutralize free radicals and protect tissues from oxidative damage. In addition, cow urine distillate has been reported to possess immunomodulatory effects, which may help regulate immune responses in various disease conditions. [48]

• *Role in Skin Disorders*

Due to its pharmacological properties, cow urine distillate has been investigated for its potential use in the treatment of skin diseases. It has been reported to promote wound healing by supporting tissue repair and reducing microbial infections. The antifungal activity of cow urine distillate may help in controlling fungal infections of the skin. Furthermore, its anti-inflammatory and immunomodulatory effects suggest that it may have potential benefits in the management of psoriasis and other inflammatory skin disorders. [49]

➤ *Nano-Emulgel Drug Delivery System*

• *Concept of Nanoemulsion*

Nanoemulsions are mixtures of oil and water stabilized by surfactants. The droplets are tiny—so small, they're measured in nanometres. [50] Since they are extremely tiny, nanoemulsions possess a large surface area, helping drugs dissolve more efficiently allowing drugs to cross biological

barriers more smoothly. This causes them to be very useful for delivering medicine across the skin. [51]

• *Concept of Emulgel*

Emulgel is a topical formulation that combines the properties of emulsions and gels. In this system, an emulsion containing the active drug is incorporated into a gel base. [52] The gel component provides better consistency, stability, and ease of application, while the emulsion helps deliver lipophilic drugs effectively. Emulgels are widely used in dermatological formulations because they provide good spreadability and patient acceptability. [53]

• *Nano-Emulgel*

Nano-emulgel is an advanced formulation that integrates nanoemulsion technology with a gel system. In this approach, a nanoemulsion containing the active ingredient is dispersed within a gel matrix. [54] This combination improves drug penetration into the skin and allows controlled release of the active compound. Nano-emulgels are considered promising drug delivery systems for topical treatment of various skin disorders. [55]

• *Advantages*

Nano-emulgels are a step up compared to conventional topical therapies. The minute droplets penetrate the skin more readily, so the medication is absorbed more effectively. The gel keeps everything stable and smooth, so it's easy to put on. Plus, these preparations gradually release the active ingredients, keeping the effects going longer. Honestly speaking—people generally dislike adhesive or slick creams, therefore the grease-free sensation makes them significantly more comfortable prompting people to genuinely use them. [56]

Table 3 Advantages of Nano-Emulgel

Advantage	Description
Enhanced skin penetration	Nano-sized droplets
Controlled drug release	Sustained therapeutic effect
Improved stability	Gel matrix support
Patient compliance	Non-greasy formulation

➤ *Components of Nano-Emulgel*

• *Oil Phase*

The oil phase plays an important role in the formulation of nano-emulgels. Natural oils or herbal oils are commonly used because they can dissolve lipophilic drugs and may also

possess additional therapeutic properties beneficial for skin health.<sup>[57]</sup>

Table 4 Components of Nano-Emulgel Formulation

Component	Example	Function
Oil phase	Herbal oil	Drug solubilization
Surfactant	Tween 80	Emulsion stabilization
Co-surfactant	Propylene glycol	Droplet size reduction
Gelling agent	Carbopol	Viscosity and stability

• *Surfactants and Co-Surfactants*

Surfactants and co-surfactants are essential for stabilizing the nanoemulsion system. Commonly used surfactants include Tween and Span, while propylene glycol is often used as a co-surfactant. These agents reduce surface tension between the oil and water phases, allowing the formation of stable nano-sized droplets.<sup>[58]</sup>

polymers include Carbopol, hydroxypropyl methylcellulose (HPMC), and xanthan gum. These agents provide the required viscosity and consistency for topical application.<sup>[59]</sup>

• *Gelling Agents*

Gelling agents are used to convert the liquid nanoemulsion into a gel-based formulation. Commonly used

• *Active Ingredient*

In the present formulation, cow urine distillate acts as the active therapeutic ingredient. Its pharmacological properties, including antimicrobial, anti-inflammatory, and antioxidant activities, may contribute to the therapeutic effectiveness of the nano-emulgel formulation.<sup>[60]</sup>

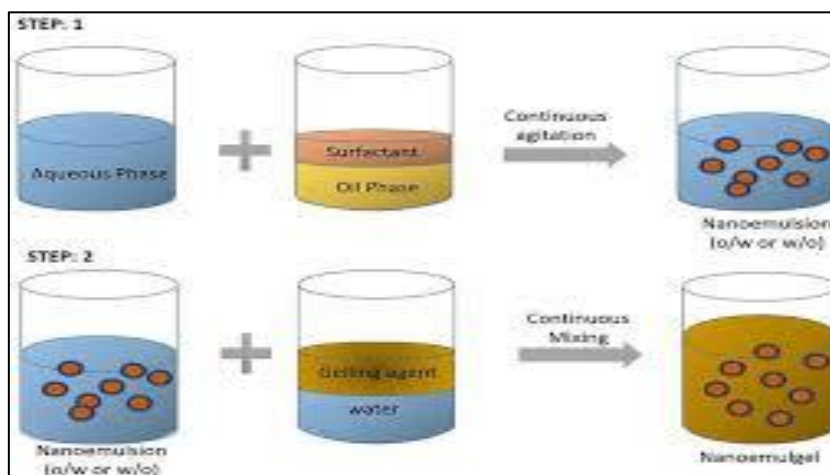


Fig 5 Structure of Nano-Emulgel System

V. FORMULATION STRATEGIES FOR NANO-EMULGEL

➤ *Preparation of Nanoemulsion*

There are several methods to create nanoemulsions, and it largely depends on the droplet size and stability you require. High-pressure emulsification is a commonly used technique—basically, it subjects the mixture using intense mechanical pressure to reduce the droplet size. Ultrasonication employs an alternative method and harnesses

sonic power to break everything up into extremely small nano-sized particles. Next, there is the method of phase titration, where one carefully blends the distinct ingredients collectively, permitting the nanoemulsion to form on its own and keep stable.<sup>[61]</sup>

➤ *Incorporation into Gel Base*

Once the nanoemulsion is prepared, it is incorporated into a gel base to form a nano-emulgel. This is usually achieved by slowly mixing the nanoemulsion with a

previously prepared carbopol gel under continuous stirring to ensure uniform distribution of the droplets. [62]

➤ *Optimization Parameters*

During formulation development, several parameters must be optimized to obtain a stable and effective nano-emulgel. Important factors include droplet size, which influences drug penetration, the polydispersity index that indicates uniformity of droplet distribution, and pH, which must be compatible with the skin to avoid irritation. [63]

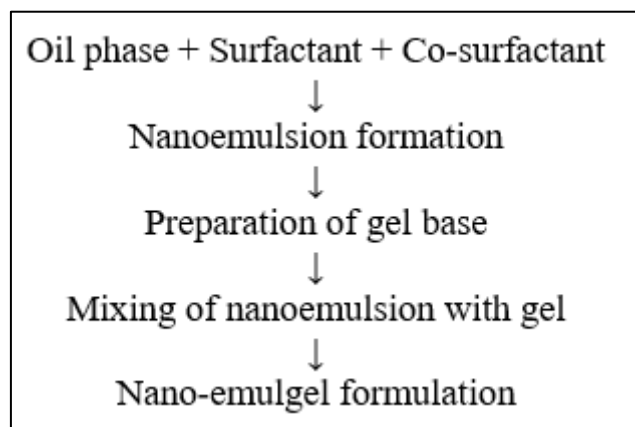


Fig 6 Preparation Process of Nano-Emulgel

➤ *Evaluation Parameters of Nano-Emulgel*

• *Physical Evaluation*

Physical evaluation of the nano-emulgel includes examination of appearance, color, and homogeneity. The pH of the formulation is measured to ensure compatibility with skin. Viscosity is also determined because it influences spreadability and stability of the formulation. [64]

Table 5 Evaluation Parameters of Nano-Emulgel

Parameter	Method
Appearance	Visual inspection
pH	pH meter
Particle size	Dynamic light scattering
Zeta potential	Zeta analyzer
Drug content	UV spectrophotometry
Spreadability	Glass slide method

➤ *Mechanism of Anti-Psoriatic Action*

The anti-psoriatic effect of nano-emulgel formulations may be attributed to several mechanisms. The formulation may exert anti-inflammatory effects by reducing inflammatory mediators involved in psoriasis. [71] It may also help decrease the release of cytokines that trigger excessive skin cell proliferation. The antioxidant properties of the active components can protect skin cells from oxidative stress and tissue damage. [72] Additionally, the nano-carrier system enhances dermal penetration of the active ingredient, allowing better delivery of therapeutic compounds to the affected skin layers and improving overall treatment effectiveness. [73]

• *Nanoparticle Characterization*

Nanoparticle characterization involves measurement of particle size and zeta potential. Particle size analysis helps determine the distribution of nano-sized droplets, while zeta potential provides information about the stability of the nanoemulsion system. [65]

• *Drug Content*

Drug content analysis is performed to determine the amount of active compound present in the formulation. This ensures uniform distribution of the active ingredient throughout the nano-emulgel. [66]

• *Spreadability and Extrudability*

Spreadability tests determine how easily the formulation can be applied on the skin surface. Extrudability studies evaluate the ease with which the nano-emulgel can be squeezed out from a tube or container during application. [67]

• *In-Vitro Drug Release*

In-vitro drug release studies are conducted to determine the rate at which the active compound is released from the nano-emulgel formulation under controlled laboratory conditions. [68]

• *Ex-Vivo Skin Permeation Studies*

Ex-vivo permeation studies are carried out using animal or human skin samples to evaluate how effectively the drug penetrates through the skin layers. [69]

• *Stability Studies*

Stability studies are performed to assess the physical and chemical stability of the nano-emulgel under different storage conditions such as variations in temperature and humidity. [70]

➤ *Recent Research on Nano-Emulgel for Dermatological Diseases*

• *Nano-Emulgel for Psoriasis*

In recent years, nano-emulgel formulations have gained attention as promising topical drug delivery systems for the management of psoriasis. [74] Researchers have explored the incorporation of anti-inflammatory drugs, herbal extracts, and natural bioactive compounds into nano-emulgel systems to improve therapeutic outcomes. Due to the small droplet size of nanoemulsions, these formulations enhance drug penetration through the skin barrier and allow better delivery of active compounds to the affected tissues. [75] Several studies have reported that nano-emulgels can reduce inflammation, scaling, and redness associated with psoriatic

lesions while improving drug stability and patient compliance.<sup>[76]</sup>

- *Nano-Emulgel for Eczema*

Nano-emulgel systems have also been investigated for the treatment of eczema, another common inflammatory skin disorder. Eczema is characterized by itching, redness, dryness, and irritation of the skin.<sup>[77]</sup> Conventional creams and ointments often show limited penetration and may not provide sustained relief. Nano-emulgels can enhance the delivery of anti-inflammatory agents and moisturizing compounds into deeper layers of the skin. This improved penetration helps reduce inflammation and restore the protective barrier of the skin more effectively.<sup>[78]</sup>

- *Nano-Emulgel for Acne*

Acne vulgaris is a widespread dermatological condition caused by excessive sebum production, bacterial infection, and inflammation of hair follicles. Nano-emulgel formulations have been developed to deliver antibacterial and anti-inflammatory agents directly to the affected skin areas.<sup>[79]</sup> Because of their small droplet size and improved spreading properties, nano-emulgels can penetrate clogged pores and deliver active compounds more efficiently. As a result, they may help reduce bacterial growth, inflammation, and formation of acne lesions.<sup>[80]</sup>

- *Herbal Nano-Delivery Systems*

Herbal nano-delivery systems are increasingly being explored in modern pharmaceutical research. Many plant-derived compounds have therapeutic potential but may show poor solubility or limited skin penetration when used in conventional formulations.<sup>[81]</sup> Nanotechnology-based delivery systems such as nano-emulsions, nano-gels, and nano-emulgels can overcome these limitations by improving stability, solubility, and bioavailability of herbal compounds.<sup>[82]</sup> These systems provide a promising approach for developing safer and more effective herbal formulations for the treatment of various skin diseases.<sup>[83]</sup>

- *Advantages of Cow Urine Distillate Nano-Emulgel*

The incorporation of cow urine distillate into a nano-emulgel formulation offers several potential advantages in dermatological therapy. One of the main benefits is that it provides a natural and cost-effective treatment option derived from traditional medicinal sources.<sup>[84]</sup> The nano-emulgel system enhances topical drug delivery by improving the penetration of active compounds into the skin layers. This allows the therapeutic agents to act directly at the site of inflammation. Another important advantage is the reduction of systemic side effects, since the formulation is applied locally and minimizes systemic absorption.<sup>[85]</sup> Additionally, cow urine distillate may act as a bio-enhancer and work synergistically with other active ingredients, potentially increasing the overall therapeutic effectiveness of the formulation.<sup>[86]</sup>

## VI. CHALLENGES AND LIMITATIONS

Despite the potential benefits, the use of cow urine distillate nano-emulgel formulations also presents certain

challenges. One of the major concerns is the need for proper standardization of cow urine distillate to ensure consistent quality and composition.<sup>[87]</sup> Variations in source, collection, and processing methods may influence its chemical profile and therapeutic properties. Another challenge involves regulatory approval, as formulations containing traditional or animal-derived components may require extensive evaluation to meet pharmaceutical safety standards.<sup>[88]</sup> Furthermore, although preliminary research suggests promising therapeutic potential, there is still a lack of sufficient clinical studies to confirm the safety and effectiveness of these formulations in human patients.<sup>[89]</sup>

## VII. FUTURE PERSPECTIVES

Future research in this area may focus on the development of advanced nano-delivery systems that can further improve the stability, penetration, and therapeutic efficiency of topical formulations.<sup>[90]</sup> Conducting well-designed clinical trials in psoriasis patients will be essential to establish the safety and efficacy of cow urine distillate-based nano-emulgel formulations. In addition, the integration of traditional medicinal knowledge with modern pharmaceutical technology may lead to the development of commercially viable herbal nano-formulations for the treatment of psoriasis and other skin disorders.<sup>[91]</sup>

## VIII. CONCLUSION

Psoriasis continues to be a challenging dermatological condition that requires effective long-term management. Although several conventional treatments are available, many of them are associated with limitations such as side effects and reduced patient compliance. Nano-emulgel systems represent an innovative approach for improving topical drug delivery by enhancing skin penetration and providing controlled release of therapeutic agents. Cow urine distillate, known for its various pharmacological properties, has shown potential as a natural therapeutic agent. The combination of cow urine distillate with nano-emulgel technology may therefore offer a novel and promising strategy for the management of psoriasis, although further scientific research and clinical validation are needed to fully establish its therapeutic value.

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