

Herbal niosomal gel for psoriasis

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ABSTRACT

Psoriasis is a chronic inflammatory skin disease characterized histologically by hyperproliferation and aberrant differentiation of epidermal keratinocytes. A wide range of conventional medical therapies to treat psoriasis is established from topical therapies and systemic medications through phototherapy or combinations of those. However, most of these therapies have a limited efficacy and may cause a number of side effects. Herbal drugs may become an effective treatment for Psoriasis, causing lower cost and less side effects in comparison to other therapies. The novel herbal products or their active constituents could be potentially used for the treatment of Psoriasis. Niosome is one of the Novel Drug Delivery System used as a Topical formulation for skin diseases. It is formed mostly by non-ionic surfactant and cholesterol incorporation as an excipient and its size ranges from 10nm - 100nm. Niosomes have more penetrating capability than the preparations of emulsions. They can improve the therapeutic performance of the drug molecules by protecting the drug from biological environment. Herbal medicines have been used to treat a variety of diseases including skin disorders. Among plant components, water soluble ones including flavonoids, tannins and terpenoids have been reported to have significant therapeutic effects. However, due to their large molecular size and poor lipid solubility, polyphenolic molecules have low bioavailability, are poorly absorbed and are reached at low concentration to sites of action. Therefore, using new drug delivery system like Niosomes would be helpful in topical herbal formulations.

Keywords: Psoriasis, Skin disorder, Herbal Niosomes.

INTRODUCTION

Psoriasis is a common, chronic, non-contagious, auto-immune disease that primarily affects the skin and seen in about 2-3% of population world-wide. The word “psora” comes from Greek word which means “to itch”. Psoriasis, a term which has been in use since 133 AD, was originally grouped with leprosy until the 19th century. It has been suggested that biblical leprosy was, in fact, the disorder known

today as Psoriasis [1]. It is mostly an inheritant disease, characterized by scaly, red and itchy plaques. The most commonly affected areas are the entire scalp and can also spread to the forehead, back of neck or behind ears, chest, arms, elbows, in the armpits, under the breasts, around the genitals, knees, legs, toe nails and finger nails. It affects male and female equally and also affects children, adult, older peoples and may occur at any age of life. It is more common in people between the ages of 15 and 35.

According to National Psoriasis Foundation, Psoriasis is partly due to genetic and partly due to environmental factors [2]. Psoriasis can be categorized as mild, moderate and severe. Mild psoriasis leads to formation of rashes and when it becomes moderate the skin turns scaly. In severe conditions, the red patches may be present on skin surface and become itchy. This affects a person's professional and social life. The normal mechanism

of body is to form new skin cells every month to replace the skin which is shed off. But, in psoriasis the new skin cells grow rapidly within days rather than weeks. This leads to accumulation of dead skin on the skin surface resulting in thick patches of red, dry and itchy skin [3].

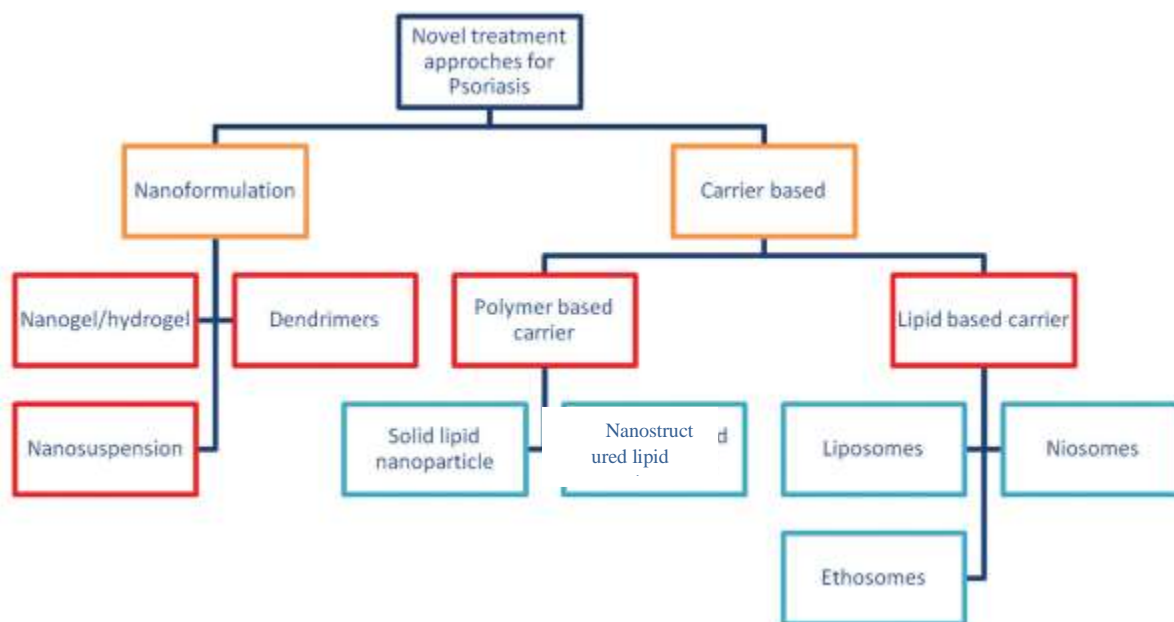
Types of psoriasis

Psoriasis can be classified into six types as follows:



Fig.1: Different Types of Psoriasis

Advances in topical treatment of psoriasis [4]



Novel Drug Delivery Systems for Psoriasis

Conventional therapy has many limitations which include poor drug solubility, insufficient drug concentration due to poor absorption, low permeability, rapid metabolism and elimination, drug distribution to other tissues combined with high drug

toxicity and short half-life [5]. Novel Drug Delivery Systems (NDDS) is a promising strategy to overcome these side-effects and offer many advantages which include increased safety and efficacy, drug targeting specificity and lowering of systemic drug toxicity. Stratum corneum (SC) is the main barrier in percutaneous absorption of topically applied drugs

[2]. Small and relatively narrow size distribution with novel carriers permit site specific delivery to the skin with improved drug solubilisation of hydrophobic drugs and better bioavailability. Nanocarriers play an important role in drug delivery to the target site for control and prevention of the disease [6]. Such carriers have become the first choice to deliver anti-psoriatic drugs, due to their various characteristics such as [11]:

- ❖ Excellent biocompatibility and biodegradability.
- ❖ Non-toxic and degradable nature.
- ❖ Easily eliminated from the body.
- ❖ Stable at physiological and atmospheric conditions.
- ❖ Longer duration of action.
- ❖ Sustained and controlled drug release to the target site.

Niosomes

Niosomes are non-ionic surfactant vesicles containing non-ionic surfactants instead of

phospholipids in the bilayer of liposomes. They are microscopic lamellar structures obtained on hydration of non-ionic surfactant, cholesterol, and other lipids. It is capable of entrapping both hydrophobic and hydrophilic drugs [7]. This novel carrier is used in the formulation of various drugs to enhance the penetration and also to sustain the release of the drug. Advantages include enhanced skin penetration, greater stability, osmotically active and stable, low cost [8]. Niosomes were postulated to penetrate the skin by diffusion reforming new smaller niosome vesicles in the skin, interact with stratum corneum by fusion or adhesion, or modify the stratum corneum structure and making it more permeable. Niosomes are microscopic lamellar structure formed on admixture of a non-ionic surfactant, CH (surfactant of cholesterol), and diethyl ether with subsequent hydration in aqueous media. They behave *in vivo* like liposomes prolonging the circulation of entrapped drug and altering its organ distribution [3].

Examples of Herbal Niosomes [3, 9]

Table - 2: Biological source, Family, Common and Tamil name of Herbal Niosomes

S.NO	BIOLOGICAL SOURCE	FAMILY	COMMON NAME	TAMIL NAME
	<i>Nerium oleander</i>	Apocynaceae	Aralli	Aralli
	<i>Salvia kronenburgii</i>	Lamiaceae	Garden sage	Chimaikkarpuram
	<i>Myrtus communis</i>	Myrtaceae	Myrtle	Kulinaval
	<i>Hypericum perforatum</i>	Hypericaceae	St. John's wort	Vettai Pakku
	<i>Lawsonia inermis</i>	Lyrthaceae	Henna	Marudaani

Applications: [4, 10]

1. Accommodate hydrophilic, lipophilic, as well as amphiphilic drug moieties
2. Flexibility in their structural characteristic
3. Restrict the drug to its therapeutic site so prevent from clearance.
4. Niosomal dispersions in an aqueous phase can be emulsified in a non-aqueous phase to control the release rate of the drug
5. Biodegradable, biocompatible, and non-immunogenic.

CONCLUSION

Herbal medicines have been used to treat a variety of diseases particularly skin disorders. Among plant

components, water soluble ones including flavonoids, tannins and terpenoids have been reported to have significant therapeutic effects. However, due to their large molecular size and poor lipid solubility, polyphenolic molecules have low bioavailability, are poorly absorbed and are reached at low concentration to sites of action. Therefore, using new drug delivery system like Niosomes would be helpful in topical herbal formulations.

Acknowledgements

We would like to offer our special thanks to our Management for their valuable support and full-fledged co-operation in the submission of this paper.

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