

Preparation and in vitro evaluation of evening primrose-based nanoemulsion for the treatment of acne

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Abstract

Introduction:

Evening primrose oil is a rich source of linoleic acid and gamma-linolenic acids and can be quite beneficial for reducing the inflammation caused by acne. Besides, by restoring hormonal balance, evening primrose oil can prevent acne flare ups in women. Among different strategies of delivering oils, nanoemulsions possess improved transdermal and dermal delivery properties in vitro and in vivo. Nanoemulsions, transparent dispersions of oil and water stabilized by an interfacial film of surfactant having the droplet size less than 200 nm, are thermodynamically stable. The aim of the present study is to develop and optimize an evening primrose oil-based nanoemulsion and investigate its physicochemical properties intended for topical applications.

Methods and Results:

The nanoemulsions were prepared by stepwise addition of water to the mixture of Tween 80 and evening primrose oil (as surfactant and oil phase) followed by homogenization and sonication. The mean droplet size, polydispersity index, zeta potential and short and long term stability properties of the optimized preparation were evaluated.

The optimized nanoemulsion was composed of 20% tween 80, 5% evening primrose oil and 75% water. The results showed that the mean particle size of optimized nanoemulsion was 164 nm with a uniform size distribution (PDI < 0.3) and It had a zeta potential of -0.28. The aforementioned nanoemulsion showed the ideal physicochemical stability in a 90 days period

Conclusions:

According to the results of size, zeta potential and stability tests, incorporation of evening primrose oil into a nanoemulsion formulation can be a promising tool for topical administration of this anti-acne medicine. nanoemulsion appears to be a good choice for the treatment of acne and other skin disorders including eczema and psoriasis and may also be used as a vehicle to carry other lipophilic drugs for more effective treatment against acne.

Key words: Nanoemulsions, evening primrose oil, in vitro, optimization, acne