BIOCOMPATIBLE NANOEMULSIONS OF FLUOCINOLONE ACETONIDE FOR IMPROVED TREATMENT OF SCALP PSORIASIS: PHYSICOCHEMICAL AND *IN VITRO* PERFORMANCES

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Despite the wide range of therapies available, an efficient treatment of scalp psoriasis is still challenging task (1). In order to improve the penetration of topical corticosteroids into psoriatic skin and simultaneously, to reduce the likelihood of a patient experiencing adverse effects, an increasing attention has been recently focused on nanocarriers. This study aimed to develop biocompatible nanoemulsions for improved skin delivery of fluocinolone acetonide (FA), using high pressure homogenization, by varying different formulation and process parameters. After physicochemical characterization (droplet size and size distribution, zeta potential (ZP), pH value and electrical conductivity) and stability testing, in vitro release/permeation tests were utilized to estimate whether and to which extent developed nanoemulsions affect FA delivery into/trough the skin, compared to the conventional, commercially available topical product (Sinoderm® cream, Galenika, Serbia). The characterization of developed nanoemulsions revealed the small droplet size in nanometer range <200 nm with polydispersity index below 0.2 and ZP >-30 mV without significant changes during one year of storage at room temperature, irrespective of formulation composition (10 and 20% w/w of oil phase) under optimized process conditions (10 cycles, 800bar, 50ºC). In vitro release/permeation tests with synthetic polycarbonate membranes/porcine ear epidermis demonstrated the superiority of nanoemulsions regarding the FA delivery through the skin compared to Sinoderm® cream as reference. Particularly, lecithin-based nanoemulsion prepared with 10% of oil phase (medium chain triglycerides and oleic acid) represents the promising strategy for improved FA delivery into the psoriatic skin, simultaneously offering easy application on the scalp area and improved patient adherence.

References

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BIOKOMPATIBILNE NANOEMULZIJE FLUOCINOLONACETONIDA ZA POBOLJŠAN TRETMAN PSORIJAZE VLASIŠTA: FIZIČKO-HEMIJSKE I *IN VITRO* PERFORMANSE

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Uprkos relativno velikom broju različitih farmakoterapijskih pristupa, lečenje psorijaze vlasišta još uvek predstavlja veliki izazov (1). Kako bi se poboljšala penetracija topikalno primenjenih kortikosteroida u psorijatične lezije kože, i istovremeno, smanjila verovatnoća pojave neželjenih efekata, tokom poslednjih godina sve veća pažnja je usmerena ka razvoju nanonosača. Stoga, cilj ove studije je bio razvoj biokompatibilnih nanoemulzija za poboljšanu isporuku fluocinolonacetonida (FA) u kožu, primenom homogenizacije pod visokim pritiskom uz variranje različitih formulacionih i procesnih parametara. Nakon fizičko-hemijske karakterizacije (veličina kapi i distribucija kapi po veličini, zeta potencijal (ZP), pH i električna provodljivost) i ispitivanja stabilnosti, *in vitro* ispitivanje oslobađanja i permeacije sprovedeno je kako bi se procenilo da li i u kojoj meri razvijene nanoemulzije utiču na isporuku FA u/kroz kožu u poređenju sa konvencionalnim, komercijalno dostupnim preparatom (Sinoderm® krem, Galenika, Srbija). Karakterizacija razvijenih nanoemulzija potvrdila je prisustvo kapi u nanometarskom opsegu <200 nm, sa indeksom polidisperznosti ispod 0,2 i ZP >-30 mV, bez značajnih promena tokom godinu dana čuvanja na sobnoj temperaturi, nezavisno od sastava formulacije (10 i 20% m/m uljane faze) pri odabranim procesnim parametrima (10 ciklusa, 800bar, 50ºC). *In vitro* ispitivanje oslobađanje/peremacije kroz sintetsku polikarbonatnu membranu/epidermis kože uha svinje ukazalo je na superiornost razvijenih nanoemulzija u pogledu isporuke FA kroz kožu u poređenju sa Sinoderm® kremom kao referentnim uzorkom. Posebno, formulacija nanoemulzija na bazi lecitina izrađena sa 10% uljane faze (trigliceridi srednje dužine lanca i oleinska kiselina) predstavlja obećavajuću strategiju za isporuku FA u psorijatičnu kožu, istovremeno obezbeđujući relativno jednostavnu primenu u predelu vlasišta, i posledično, poboljšanu adherencu pacijenata.

Literatura

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