

Formulasi, karakterisasi, dan uji penetrasi in vitro transfersom epidermal growth factor dalam sediaan emulgel = Formulation, characterization, and in vitro penetration test of epidermal growth factor loaded transfersomal emulgel

Astried Leonyza, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20489618&lokasi=lokal>

Abstrak

Epidermal Growth Factor (EGF) merupakan polipeptida yang mendorong terjadinya proses pertumbuhan, proliferasi, dan diferensiasi sel, juga digunakan sebagai kosmetik anti-aging. Akan tetapi, EGF memiliki ukuran molekul yang besar sehingga dapat menyulitkan penetrasinya ke kulit. Penelitian ini bertujuan untuk membuat dan mengkarakterisasi transfersom rhEGF dalam sediaan emulgel dan mempelajari profil penetrasinya ke kulit. Pada penelitian ini dilakukan optimasi formula transfersom dengan perbandingan antara fosfolipid dan surfaktan yang berbeda. Hasil menunjukkan bahwa formula TF3 dengan perbandingan 80:20 merupakan formula dengan karakteristik terbaik, sehingga formula ini digunakan untuk mengenkapsulasi rhEGF. Transfersom rhEGF dibuat sebanyak tiga formula, dengan konsentrasi rhEGF yang berbeda-beda. Karakteristik terbaik dimiliki oleh formula TF-EGF1 dengan konsentrasi rhEGF 0,025%, yaitu bentuk vesikel sferis, Zaverage $128,1 \pm 0,66$ nm, indeks deformabilitas $1,254 \pm 0,02$, indeks polidispersitas $0,109 \pm 0,004$, potensial zeta $-43,1 \pm 1,07$ mV, dan efisiensi penjerapan $97,77 \pm 0,06\%$. Ketiga formula diformulasikan ke dalam sediaan emulgel (ETF1 - ETF3) dan diuji penetrasi in vitro dengan emulgel rhEGF non-transfersom (ENTF) sebagai pembanding. Hasil menunjukkan bahwa formula ETF1 menunjukkan peningkatan fluks terbesar, yaitu 5,56 kali dibandingkan formula ENTf. Oleh karena itu, emulgel transfersom rhEGF memiliki potensi untuk digunakan sebagai kosmetik anti-aging.

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Epidermal Growth Factor (EGF) is a polypeptide that promotes the process of growth, proliferation, and cell differentiation, also used as an anti-aging cosmetics. However, EGF has a large molecular size that can make it difficult to penetrate the skin. This study aims to create and characterize rhEGF transfersom in emulgel preparations and study its penetration profile into the skin. In this study, optimization of transferom formulation was carried out with several ratios between phospholipid and surfactants. The results show that the TF3 formula with a ratio of 80:20 was the formula with the best characteristics, so it was used to encapsulate rhEGF. rhEGF transfersomes were made in three formulas, with different rhEGF concentrations. The best characteristics were obtained by the formula TF-EGF1 with 0.025% rhEGF concentration, which had spherical vesicle, Zaverage of 128.1 ± 0.66 nm, deformability index of 1.254 ± 0.02 , polydispersity index of 0.109 ± 0.004 , zeta potential of -43.1 ± 1.07 mV, and encapsulation efficiency of $97.77 \pm 0.06\%$. The three formulas were formulated into emulgel preparations (ETF1 - ETF3) and tested in vitro with non-transferom rhEGF emulgel (ENTf) as a comparison. The results showed that the ETF1 formula showed the largest increase in flux, which was 5.56 times compared to the ENTf formula. Therefore, rhEGF transfersomal emulgel has the potential to be used as an anti-aging cosmetic.