

# Formulasi, Karakterisasi, dan Uji Penetrasi In Vitro dan In Vivo Gel Mengandung Linstrenol = Formulation, Characterization, and In Vitro and In Vivo Penetration Study of Transfersom Gel Containing Lynestrenol.

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## Abstrak

### <b>ABSTRAK</b><br>

Linstrenol merupakan derivat hormon progestin yang dapat menekan produksi hormon estrogen dan progesteron sehingga ovulasi tidak terjadi. Akan tetapi bioavailabilitas linstrenol dalam sediaan oral 65% dengan waktu paruh 5-6 jam, dan efek samping rasa tegang pada payudara. Penelitian ini bertujuan untuk meningkatkan penetrasi subkutan linstrenol dengan formulasi transfersom. Optimalisasi linstrenol dalam transfersom dilakukan dengan variasi lipid surfaktan (fosfolipid-Tween 80) dengan perbandingan 90:10 (F1) dan 80:20 (F2). Karakterisasi transfersom linstrenol meliputi ukuran partikel, indeks polidispersitas, potensial zeta dan efisiensi penjerapan. Hasil optimalisasi terbaik diformulasikan dalam gel untuk uji penetrasi subkutan in vitro dan in vivo. Uji penetrasi subkutan in vitro dilakukan dengan sel difusi Franz dan uji in vivo dilakukan menggunakan tikus putih betina galur Sprague Dawley. Hasil optimalisasi terbaik transfersom yaitu F2 dengan ukuran partikel  $73,113 \pm 1,340$  nm, indeks polidispersitas  $0,312 \pm 0,03$ , potensial zeta  $-32,166 \pm 1,64$  mV, dan efisiensi penjerapan  $89,668 \pm 0,602\%$ . Penetrasi subkutan gel transferom linstrenol secara in vitro lebih tinggi dibandingkan gel non transfersom dengan nilai fluks  $40,02 \pm 5,236$  ng/cm<sup>2</sup>. Pada hasil uji in vivo konsentrasi linstrenol dalam plasma dari sediaan gel transfersom linstrenol lebih tinggi dari sediaan gel non transfersom dengan nilai area under the curve (AUC) sebesar 24.336 ng/mL jam. Berdasarkan hasil tersebut dapat disimpulkan bahwa formula gel transfersom dapat meningkatkan penetrasi subkutan dan ketersediaan hayati linstrenol bila dibandingkan dengan formula gel non transfersom.

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### <b>ABSTRACT</b><br>

Lynestrenol is a progestin hormone derivative that can suppress the production of endogenous estrogen and progesterone hormones (ovaries) so that ovulation does not occur. However, bioavailability of linstrenol in oral preparations 65% with half life of 5-6 hours, and side effects of tension in the breast. This aim of this study was to improve subcutaneous penetration of lynestrenol by transfersome formulation. Lynestrenol transfersome was optimalizaed by lipid:surfactant variation 90:10 (F1) and 80:20 (F2). The characterization of lynestrenol transfersome were particle size, polydispersity index, zeta potential, and entrapment efficiency. The best result of optimalization was formulated into gel dosage form for in vitro subcutaneous penetration and in vivo study. In vitro subcutaneous penetration study conducted using cell diffusion

Franz and in vivo study conducted using female white rats Sprague Dawley strain. The best optimization transferosome was F2 with particle size of  $73.113 \pm 1.340$  nm, polydispersity index of  $0.312 \pm 0.03$ , zeta potential of  $-32.166 \pm 1.64$  mV, and entrapment efficiency of  $89.091 \pm 0.310$  %. Subcutaneous penetration of lynestrenol transferosomal gel in in vitro higher than non transferosomal gel with flux  $40.02 \pm 5.236$  ng/cm<sup>2</sup>.. The result of in vivo study showed that lynestrenol in plasma from lynestrenol transferosomal gel was higher than non transferosomal gel with area under the curve (AUC) 24336ng/mL.hour. It could be concluded that formula transferosomal gel increased subcutaneous penetration and bioavailability of lynestrenol compared with non transferosomal gel.