

**SKRIPSI SARJANA FARMASI**

**FORMULASI NANOFITOSOM MENGANDUNG EKSTRAK ETANOL  
DAUN PARE (*Momordica charantia* L.) SEBAGAI  
ANTIHIPERPIGMENTASI**



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**2024**

## ABSTRAK

### FORMULASI NANOFITOSOM MENGANDUNG EKSTRAK ETANOL DAUN PARE (*Momordica charantia* L.) SEBAGAI ANTIHIPERPIGMENTASI

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Hiperpigmentasi merupakan masalah kulit yang sering terjadi saat ini. Bahan alam yang secara empiris telah digunakan untuk mengurangi hiperpigmentasi adalah daun pare. Formula dengan bahan aktif ekstrak memerlukan sistem penghantaran untuk sampai ke lokasi target melalui lapisan penghalang stratum korneum. Nanofitosom merupakan kompleks antara ekstrak etanol daun pare (EEDP) dengan fosfolipid yang sifatnya mirip membran sel dan berukuran nano untuk meningkatkan permeasi bahan aktif ke dalam kulit. Penelitian bertujuan untuk memperoleh formula nanofitosom EEDP terbaik dan menguji aktivitas antihiperpigmentasinya. Ekstraksi daun pare dilakukan dengan metode maserasi dan pelarutnya diuapkan agar diperoleh ekstrak kental. EEDP distandardisasi sesuai Farmakope Herbal Indonesia. Nanofitosom EEDP dibuat dalam lima formula dengan memvariasikan konsentrasi kolesterol. Pembuatannya menggunakan metode hidrasi lapis tipis diikuti sonikasi lalu dievaluasi dan diuji aktivitas antihiperpigmentasi secara *in vitro* dengan uji inhibitor tirosinase. Formula nanofitosom EEDP terbaik dipilih berdasarkan uji stabilitas fisik dan ukuran partikel adalah F2 dengan proporsi ekstrak:lesitin:kolesterol (1:1:0,2). F2 menghasilkan ukuran partikel 326,4 nm; polidispersitas indeks 0,522; zeta potensial -13,9 mV; adanya interaksi melalui ikatan hidrogen dari analisis FTIR; efisiensi penjerapan 62,23%; berbentuk sferis; pH 7,43. Hasil uji inhibitor tirosinase EEDP dan nanofitosom EEDP mendapatkan nilai  $IC_{50}$  50,75  $\mu$ g/ml dan 94,81  $\mu$ g/ml yang dibandingkan dengan kontrol positif asam kojat. Disimpulkan bahwa formula terbaik nanofitosom EEDP F2 memiliki aktivitas antihiperpigmentasi.

Kata kunci: ekstrak daun pare, nanofitosom, antihiperpigmentasi, inhibitor tirosinase

## ABSTRACT

### FORMULATION OF NANOPHYTOSOME CONTAINING BITTER MELON LEAF ETHANOL EXTRACT (*Momordica charantia* L.) FOR ANTIHYPERPIGMENTATION

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Hyperpigmentation is a skin problem that often occurs today. A natural ingredient that has been empirically used to reduce hyperpigmentation is bitter melon leaves. Formulas with active extract ingredients require a delivery system to reach the target location through the stratum corneum barrier layer. Nanophytosome is a complex between the ethanol extract of bitter melon leaves (EEDP) and phospholipids which that are similar to cell membranes and are nano-sized to improve the permeation of active ingredients into the skin. The research aims to obtain the best EEDP nanophytosome formula and test its antihyperpigmentation activity. Extraction of bitter melon leaves was carried out by maceration method and the solvent was evaporated to obtain a thick extract. EEDP was standardized according to the Indonesian Herbal Pharmacopoeia. EEDP nanophytosomes were made in five formulas by varying the cholesterol concentrations. They were prepared using a thin layer hydration method followed by sonication, and then evaluated and tested for antihyperpigmentation activity in vitro with a tyrosinase inhibitor assay. The best EEDP nanophytosome formula selected based on the physical stability tests and particle size is F2 with the proportion of extract:lecithin:cholesterol (1:1:0.2). F2 resulted in a particle size of 326.4 nm; polydispersity index 0.522; zeta potential -13.9 mV; the existence of interactions via hydrogen bonds from FTIR analysis; entrapment efficiency 62.23%; spherical shapes; pH 7.43. The test results for the EEDP tyrosinase inhibitor and EEDP nanophytosomes obtained  $IC_{50}$  values of 50.75  $\mu\text{g/ml}$  and 94.81  $\mu\text{g/ml}$  which were compared with the positive control of kojic acid. It is concluded that the best formula of EEDP nanophytosome F2 had antihyperpigmentation activity.

Keyword: bitter melon leaves extract, nanophytosome, antihyperpigmentation, tyrosinase inhibitor