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OPTIMASI FORMULA DAN UJI AKTIVITAS ANTIKOSIDAN NANOEMULSI MINYAK BIJI ANGGUR (*Vitis vinivera* L.)

ABSTRAK

Latar Belakang: Minyak biji anggur merupakan ekstrak buah anggur yang berkhasiat sebagai antioksidan alami karena kandungan asam lemak tak jenuh dan tokoferol yang lebih tinggi dibandingkan minyak kedelai dan zaitun. Penelitian ini bertujuan menentukan formula optimum nanoemulsi menggunakan variasi Tween 80 dan PEG 400 serta mengevaluasi aktivitas antioksidan.

Metode : Penelitian eksperimental laboratorium dengan formulasi fase minyak, fase air, surfaktan, dan kosurfaktan. Penentuan konsentrasi surfaktan dan kosurfaktan menggunakan aras rendah dan aras tinggi metode *simplex lattice design*. Nanoemulsi dikarakterisasi fisik dengan parameter ukuran partikel, PDI, % transmitan, organoleptis, pH, viskositas, *cycling test* dan uji aktivitas antioksidan metode DPPH diinterpretasikan dengan nilai IC_{50} . Data hasil dianalisis menggunakan SPSS Versi 25.

Hasil: Minyak biji anggur mengandung flavonoid, tanin, dan saponin sebagai metabolit sekunder. Nanoemulsi minyak biji anggur memiliki komposisi optimum dengan konsentrasi minyak 5%, tween 80 30%, dan PEG 400 10%. Nanoemulsi memiliki ukuran partikel rata-rata 32,77 nm, PDI 0,255, % transmitan 99,499%, pH 7,07, dan viskositas 262 cP, uji stabilitas menunjukkan perubahan organoleptis dan % transmitan. Aktivitas antioksidan minyak biji anggur dan nanoemulsi minyak biji anggur menunjukkan IC_{50} rata-rata 32,488 ppm dan 76,090 ppm.

Kesimpulan: Formula optimum nanoemulsi minyak biji anggur yang dihasilkan memiliki karakteristik fisik tidak stabil dengan nilai IC_{50} 76,090 ppm masuk kategori antioksidan kuat.

Kata Kunci: Minyak Biji Anggur, Nanoemulsi, *Simplex Lattice Design* , Antioksidan.

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**FORMULA OPTIMIZATION AND ANTICOCIDATOR ACTIVITY TESTING OF
GRAPSEED OIL NANOEMULSIONS (*Vitis vinifera L.*)**

ABSTRACT

Background: Grape seed oil is an extract derived from grapes that acts as a natural antioxidant due to its higher content of unsaturated fatty acids and tocopherols compared to soybean and olive oils. This study aimed to determine the optimum formulation of nanoemulsion using variations of Tween 80 and PEG 400 and to evaluate its antioxidant activity.

Methods: Experimental laboratory research with formulations consisting of an oil phase, aqueous phase, surfactant, and co-surfactant. The concentrations of the surfactant and co-surfactant were determined using low and high levels of the simplex lattice design method. The nanoemulsion was physically characterized based on particle size, PDI, % transmittance, organoleptic properties, pH, viscosity, cycling test, and antioxidant activity test using the DPPH method, interpreted by IC_{50} values. The resulting data were analyzed using SPSS Version 25.

Results: : Grape seed oil contains flavonoids, tannins, and saponins as secondary metabolites. The grape seed oil nanoemulsion has an optimum composition with 5% oil, 30% Tween 80, and 10% PEG 400. The nanoemulsion has an average particle size of 32.77 nm, a PDI of 0.255, % transmittance of 99.499%, pH of 7.07, and viscosity of 262 cP. Stability testing showed changes in organoleptic properties and % transmittance. The antioxidant activity of grape seed oil and its nanoemulsion showed average IC_{50} values of 32.488 ppm and 76.090 ppm, respectively.

Conclusion: . The optimum grape seed oil nanoemulsion formula obtained exhibited unstable physical characteristics, with an IC_{50} value of 76.090 ppm, classified as a strong antioxidant.

Keywords: Grape Seed Oil, Nanoemulsion, Simplex Lattice Design, Antioxidant