

**FORMULASI DAN EVALUASI SELF NANO EMULSIFYING  
DRUG DELIVERY SYSTEM (SNEDDS) EKSTRAK UMBI  
WORTEL (*Daucus Carota L*) SEBAGAI ANTIBAKTERI  
TERHADAP *Escherichia coli***

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**ABSTRAK**

Wortel mengandung senyawa flavonoid, tannin, dan saponin yang dapat dimanfaatkan sebagai antibakteri. Perkembangan teknologi formulasi diperlukan untuk meningkatkan aktivitas antibakteri. Ekstrak umbi wortel memiliki sifat tidak larut dalam air dan bioavailabilitasnya rendah. Formulasi SNEDDS (*Self Nano Emulsifying Drug Delivery System*) dengan metode *simplex lattice design*, diharapkan mampu meningkatkan bioavailabilitas dan aktivitas antibakteri. Penelitian ini bertujuan untuk mengetahui formula optimum SNEDDS ekstrak umbi wortel dengan komposisi minyak, surfaktan, dan kosurfaktan. Karakterisasi SNEDDS dilakukan dengan uji *drug loading*, uji turbiditas, uji solubilitas, dan uji stabilitas. Evaluasi SNEDDS dilakukan dengan uji *droplet size*, potensial zeta, *emulsification time*, uji organoleptis, uji pH, uji viskositas dan uji disolusi. Kemudian dilakukan uji aktivitas antibakteri terhadap *escherchia coli* dengan tiga perlakuan berbeda, SNEDDS ekstrak umbi wortel, ekstrak umbi wortel. dan SNEDDS murni dengan 3 kali replikasi pada konsentrasi 5%, 10% dan 20%. Ciprofloxacin 20 mg/mL sebagai kontrol positif dan aquadest sebagai kontrol negatif. Formula optimum yang digunakan yaitu tween 80 (5) : PEG 400 (1) dan minyak cucut botol (1). Karakteristik SNEDDS ekstrak umbi wortel yang diperoleh berupa ukuran tetesan dengan rata-rata 15,00 nm, PI 0,261, zeta potensial -25,15 mV, emulsification time 26,4 detik dan transmitan 99,49%. Uji fisik SNEDDS ekstrak umbi wortel yang dihasilkan jernih berwarna kuning, pH 7,01, viskositas 326 cps, disolusi SNEDDS ekstrak umbi wortel pada menit ke-60 terdisolusi 73,59%. Pengujian aktivitas antibakteri SNEDDS ekstrak umbi wortel dengan konsentrasi 20% menghasilkan 9,8mm, ekstrak umbi wortel murni 20% menghasilkan 5,6mm, SNEDDS murni 7,8mm dan kontrol positif 35,50mm.

**Kata kunci:** ekstrak umbi wortel, SNEDDS, antibakteri

**FORMULATION AND EVALUATION OF SELF NANO EMULSIFYING  
DRUG DELIVERY SYSTEM (SNEDDS) CARROT TUBER EXTRACT  
(*Daucus Carota L*) AS ANTIBACTERIAL AGAINST *Escherichia coli***

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**ABSTRACT**

Carrots contain flavonoids, tannins and saponins which can be used as antibacterials. The development of formulation technology is needed to increase antibacterial activity. Carrot root extract is insoluble in water and has low bioavailability. The SNEDDS (Self Nano Emulsifying Drug Delivery System) formulation with the simplex lattice design method is expected to increase bioavailability and antibacterial activity. This study aims to determine the optimum formula for SNEDDS carrot root extract with the composition of oil, surfactant and cosurfactant. SNEDDS characterization was carried out by drug loading test, turbidity test, solubility test, and stability test. Evaluation of SNEDDS was carried out by droplet size test, zeta potential, emulsification time, organoleptic test, pH test, viscosity test and dissolution test. Then tested the antibacterial activity of *Escherichia coli* with three different treatments, SNEDDS carrot root extract, carrot root extract. and pure SNEDDS with 3 times replication at concentrations of 5%, 10% and 20%. Ciprofloxacin 20 mg/mL as a positive control and distilled water as a negative control. The optimum formula used is tween 80 (5) : PEG 400 (1) and bottled razor oil (1). The characteristics of the SNEDDS carrot root extract obtained were droplet size with an average of 15.00 nm, PI 0.261, zeta potential -25.15 mV, emulsification time 26.4 seconds and transmittance 99.49%. Physical test SNEDDS carrot root extract produced clear yellow color, pH 7.01, viscosity 326 cps, SNEDDS carrot root extract dissolution in the 60th minute dissolved 73.59%. Testing the antibacterial activity of SNEDDS carrot root extract with a concentration of 20% yielded 9.8mm, 20% pure carrot root extract yielded 5.6mm, pure SNEDDS 7.8mm and positive control 35.50mm.

**Keywords:** carrot root extract, SNEDDS, antibacterial