

## **SITOTOKSISITAS NANOEMULSI MINYAK ATSIRI DAUN JERUK PURUT (*Citrus hystrix* D.C.) TERHADAP SEL KANKER PAYUDARA (T47D CELL LINE)**

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### **INTISARI**

Minyak atsiri daun jeruk purut diketahui telah digunakan dalam pengobatan tradisional karena mempunyai kemampuan antikanker. Namun sifat lipofilisitas (larut dalam lemak) dan volatilitas (mudah menguap) minyak atsiri membuat bioavailabilitasnya rendah dalam tubuh. Sistem nanoemulsi diformulasikan untuk meningkatkan bioavailabilitas minyak atsiri. Nanoemulsi minyak atsiri daun jeruk purut dibuat dengan metode emulsifikasi spontan. Karakteristik dan sitotoksitas nanoemulsi minyak atsiri daun jeruk purut lalu diteliti lebih lanjut melalui uji stabilitas termodinamik, viskositas, densitas, dan analisis ukuran partikel. Nanoemulsi minyak atsiri daun jeruk purut yang dihasilkan bersifat stabil secara termodinamik yang ditunjukkan dengan nilai viskositas rendah (124,2 mPa.s pada 100 rpm). Partikel yang dihasilkan berukuran nano yaitu  $18,23 \pm 0,12$  nm. Indeks polidispersitas sebesar  $0,36 \pm 0,01$  menunjukkan nanoemulsi yang dihasilkan bersifat homogen tanpa partikel kontaminan. Uji sitotoksitas nanoemulsi minyak atsiri terhadap sel kanker payudara T47D menunjukkan nilai  $IC_{50}$  yang sangat besar yaitu 10.910  $\mu\text{g/mL}$  dibanding minyak atsiri murni sebesar 95,97  $\mu\text{g/mL}$ . Hal ini disebabkan oleh konsentrasi minyak atsiri yang sangat rendah di dalam nanoemulsi yaitu sebesar 3,75%. Optimasi formula lebih lanjut perlu dilakukan sehingga sitotoksitas nanoemulsi minyak atsiri daun jeruk purut meningkat.

**Kata Kunci : *Citrus hystrix* D.C., minyak atsiri, uji MTT, T47D, nanoemulsi.**

## **CYTOTOXICITY OF NANOEMULSIONS OF KAFFIR LIME (*Citrus hystrix* D.C.) LEAVES ESSENTIAL OIL ON BREAST CANCER (T47D CELL LINE)**

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### **Abstract**

Kaffir lime (*Citrus hystrix* D.C.) essential oil is known for its anticancer activity and has been used in traditional medicine. However, the essential oil has low bioavailability. Therefore nanoemulsion need to be formulated to increase the bioavailability. Kaffir lime essential oil-loaded nanoemulsions was produced by spontaneous nanoemulsification. Furthermore the best essential oil-loaded nanoemulsion formula underwent a series of characteristic tests such as termodinamic stability test, viscosity test, density measurement, and particle size analysis. The essential oil loaded nanoemulsions were found to be themodinamically stable indicated by its viscosity (124,2 mPa.s at 100 rpm. Particle size was  $18,23 \pm 0,12$  nm which can be categorized as nanoemulsion. Polydispersity index value was  $0,36 \pm 0,01$  showed homogeneity of particle size distribution. Cytotoxicity assay using MTT method showed that  $IC_{50}$  value of kaffir lime essential oil nanoemulsions was 10.910  $\mu\text{g/mL}$  of whereas  $IC_{50}$  value of pure kaffir lime essential oil was 95,97  $\mu\text{g/mL}$ . the  $IC_{50}$  value of essential oil nanoemulsions was far from cytotoxic category. This result showed that the essential oil nanoemulsions formula are not toxic compare to pure essential oils. This phenomenon caused by low concetraiton of essential oil in the system (3,75% only). Therefore further study about optimum concentration in nanoemulsion need to be conducted.

**Keywords :** *Citrus hystix* DC, essential oil, MTT assay, T47D, nanoemulsions.