

ABSTRACT

Curcumin and Pentagamavunon-0 have been studied as a potential candidate of chemotherapeutic agent, but both of them have low solubility in water and low bioavailability. Various strategies have been made to overcome the limitations of the use of curcumin and PGV-0, one of which is formulated in the form of Self-Nano Emulsifying Drug Delivery Systems (SNEDDS). This study was conducted to evaluate the effect of formulation SNEDDS curcumin and SNEDDS PGV-0 to the cytotoxic effects of curcumin and PGV-0 on MCF-7 cells and Vero cells.

In this study, the cytotoxic activity was tested using the MTT assay. Cells that had been treated with the diluted solution were incubated for 24 hours, then MTT reagent was added and the absorbance was read using microplate reader at λ 595 nm. The data was analyzed using linear regression, then IC_{50} value can be calculated.

The results of this study indicated that SNEDDS curcumin and SNEDDS PGV-0 had cytotoxic activity against breast cancer cell line MCF-7 with IC_{50} values of $6,1 \pm 0,10 \mu\text{g/mL}$ and $4,7 \pm 0,36 \mu\text{g/mL}$, whereas IC_{50} values of curcumin and PGV-0 respectively was $43,9 \pm 1,34 \mu\text{g/mL}$ and $40,9 \pm 1,06 \mu\text{g/mL}$, but the increase of the cytotoxic effects of SNEDDS formulations cannot be assessed certainly due to treatment with the no drug-loaded SNEDDS showed cytotoxic effects on MCF-7 cells with IC_{50} values of $6,8 \pm 0,10 \mu\text{g/mL}$. In Vero cells, SNEDDS curcumin and SNEDDS PGV-0 had cytotoxic activity with IC_{50} value of $4,4 \pm 0,06 \mu\text{g/mL}$ and $7,5 \pm 0,42 \mu\text{g/mL}$, whereas IC_{50} values of curcumin and PGV-0 respectively was $33,8 \pm 1,01 \mu\text{g/mL}$ and $41,7 \pm 1,05 \mu\text{g/mL}$, but the increase of the cytotoxic effects of SNEDDS formulations cannot be assessed certainly due to treatment with the no drug-loaded SNEDDS showed cytotoxic effect on Vero cells with IC_{50} values of $7,6 \pm 0,38 \mu\text{g/mL}$.

Key word : MCF-7, SNEDDS Curcumin, SNEDDS PGV-0, cytotoxicity

INTISARI

Kurkumin dan Pentagamavunon-0 telah banyak diteliti sebagai kandidat agen kemoterapi yang potensial, namun keduanya memiliki kelarutan yang rendah dalam air dan bioavailabilitas dalam tubuh yang rendah. Berbagai strategi telah dilakukan untuk mengatasi keterbatasan penggunaan kurkumin dan PGV-0, salah satunya dengan diformulasikan dalam bentuk *Self-NanoEmulsifying Drug Delivery Systems* (SNEDDS). Penelitian ini dilakukan untuk mengevaluasi pengaruh formulasi SNEDDS kurkumin dan SNEDDS PGV-0 terhadap efek sitotoksik kurkumin dan PGV-0 pada sel kanker payudara MCF-7 dan sel normal Vero.

Uji sitotoksik yang dilakukan menggunakan metode MTT *assay*. Sel yang telah diberi perlakuan dengan larutan uji diinkubasi selama 24 jam, kemudian ditambahkan reagen MTT dan dilakukan pembacaan absorbansi dengan *microplate reader* pada λ 595 nm. Data yang didapatkan kemudian dianalisis menggunakan regresi linear, kemudian dilakukan perhitungan IC₅₀.

Hasil penelitian ini menunjukkan bahwa SNEDDS kurkumin dan SNEDDS PGV-0 memiliki aktivitas sitotoksik terhadap sel kanker payudara MCF-7 dengan nilai IC₅₀ sebesar $6,1 \pm 0,10$ $\mu\text{g/mL}$ dan $4,7 \pm 0,36$ $\mu\text{g/mL}$, sedangkan perlakuan kurkumin dan PGV-0 diperoleh nilai IC₅₀ sebesar $43,9 \pm 1,34$ $\mu\text{g/mL}$ dan $40,9 \pm 1,06$ $\mu\text{g/mL}$, namun tingginya aktivitas sitotoksik dari formulasi SNEDDS belum dapat dikaji secara pasti karena pada perlakuan SNEDDS kosong menunjukkan efek sitotoksik terhadap sel MCF-7 dengan nilai IC₅₀ sebesar $6,8 \pm 0,10$ $\mu\text{g/mL}$. Pada sel Vero, SNEDDS kurkumin dan SNEDDS PGV-0 memiliki aktivitas sitotoksik dengan nilai IC₅₀ sebesar $4,4 \pm 0,06$ $\mu\text{g/mL}$ dan $7,5 \pm 0,42$ $\mu\text{g/mL}$, sedangkan perlakuan kurkumin dan PGV-0 diperoleh nilai IC₅₀ sebesar $33,8 \pm 1,01$ $\mu\text{g/mL}$ dan $41,7 \pm 1,05$ $\mu\text{g/mL}$, namun tingginya aktivitas sitotoksik dari formulasi SNEDDS belum dapat dikaji secara pasti karena pada perlakuan SNEDDS kosong menunjukkan efek sitotoksik terhadap sel Vero dengan nilai IC₅₀ sebesar $7,6 \pm 0,38$ $\mu\text{g/mL}$.

Kata kunci : MCF-7, SNEDDS Kurkumin, SNEDDS PGV-0, sitotoksik