

INTISARI

RIP MJ-C dalam tanaman *Mirabilis jalapa* L diperoleh melalui proses purifikasi menggunakan fase diam CM-Sepharose CL-6B. Untuk melindungi RIP MJ-C dari pengaruh degradasi, dibutuhkan suatu sistem nanopartikel menggunakan polimer kitosan rantai pendek dan pektin metilasi rendah, yang dikonjugasikan dengan antibodi anti EpCAM 9C4 untuk meningkatkan selektifitas dan efektifitas terhadap sel kanker payudara T47D.

Ekstraksi daun *M. jalapa* L dilakukan dengan teknik pencampuran media cair, yaitu dapar fosfat pH 7,2. Hasil ekstraksi daun *M. jalapa* L dipurifikasi menggunakan metode kromatografi penukar ion, menghasilkan RIP MJ-C. RIP MJ-C sebelum dan setelah diliofilisasi dielektroforesis untuk menguji aktivitasnya. Formula optimum nanopartikel ditentukan dengan metode desain faktorial 2^2 , menggunakan perangkat lunak *Design Expert*® versi 7.1.5. Formula nanopartikel RIP MJ-C menggunakan polimer kitosan rantai pendek dan pektin metilasi rendah yang terkonjugasi anti EpCAM diuji efek sitotoksitasnya dengan metode MTT assay.

Hasil ekstraksi daun *M. jalapa* L sebanyak 1718,5 gram menghasilkan RIP MJ-C sebanyak 1,656 gram. Berdasarkan optimasi didapatkan formula optimum dari kombinasi kitosan rantai pendek 0,06% dan pektin 0,02%. Karakteristik nanopartikel yang dihasilkan meliputi ukuran partikel $54,43 \pm 10,14$ nm, indeks polidispersitas $0,514 \pm 0,10$, potensial zeta $+93,59 \pm 6,90$ mV. Hasil elektroforesis menunjukkan bahwa RIP MJ-C sebelum dan setelah diliofilisasi memiliki aktivitas memotong DNA superkoil menjadi bentuk *nick circular* dan *linear*. Dari hasil uji sitotoksik diperoleh data persentase kematian sel yang terbesar (43,20%) pada formula nanopartikel terkonjugasi anti EpCAM 9C4 konsentrasi 16,67 $\mu\text{g/mL}$. Dari hasil penelitian dapat disimpulkan bahwa RIP dapat dienkapsulasi dalam sistem nanopartikel, nanopartikel yang dikonjugasikan dengan anti EpCAM dapat meningkatkan efek sitotoksik.

Kata Kunci: RIP MJ-C, *Mirabilis jalapa* L, Nanopartikel, anti EpCAM

ABSTRACT

RIP MJ-C in *Mirabilis jalapa* .L plant is obtained through the purification process by using CM-Sepharose CL-6B stationary phase. To protect the RIP MJ-C from the effects of degradation, a nanoparticle system by using chitosan polymer short chain and low methylation pectin which conjugated with anti-EpCAM antibody 9C4 to improve selectivity and effectiveness against breast cancer cells T47D.

The extraction of *M. jalapa* L leaves are conducted with liquid mixing media technique, called pH 7.2 phosphate buffer. The extraction of *M. jalapa* L leaves are purified by using ion exchange chromatography method, the result is RIP MJ-C. Before and after RIP MJ-C is being electrophoresis lyophilized to examine its activities. The optimum formula nanoparticles determined by using factorial design 22 method with Design Expert® software version 7.1.5. Formula nanoparticles RIP MJ-C using chitosan polymer short chain and low methylation pectin which conjugated with anti-EpCAM is tested its cytotoxicity effects by MTT assay method.

The extraction result of 1718,5 g *M. jalapa* L leaves produce 1,656 g of RIP MJ-C. Based on the optimization, optimum formula is gained from a combination of short chain chitosan 0,06% and 0,02%. Nanoparticles characteristic which was produced with particle size of $54,43 \pm 10,14$ nm, polydispersity index of $0,514 \pm 0,10$, and + zeta potential of $93,59 \pm 6,90$ mV. Electrophoresis results showed that before and after RIP MJ-C was being lyophilized has an activity to cut supercoil DNA to become circular nick and linear shapes. The result of cytotoxic test shows the data in percentage indicates the highest percentage of the death cell (43,20%) in the nanoparticles formula conjugated with 16,67 mg / mL concentration of anti-EpCAM 9C4. From the results of this study, it can be concluded that the RIP can be encapsulated in a nanoparticle system, the nanoparticles were conjugated with anti-EpCAM can enhance cytotoxic effects.

Keywords : RIP MJ-C, *Mirabilis jalapa* L, Nanoparticle, Anti EpCAM