INTISARI

Fraksi basa RIP (*Ribosome Inactivating Protein*) dari daun *Mirabilis jalapa* L. yang disebut MJ-30 telah terbukti bersifat sitotoksik terhadap beberapa lini sel kanker. Nanopartikel memungkinkan modifikasi efektifitas dan selektifitas sistem penghantaran obat melalui konjugasi partikel pada molekul penarget spesifik. EpCAM merupakan protein marker dari *hepatic stem cell* memiliki potensi tinggi sebagai marker target dalam pengobatan kanker. Konjugasi antibodi anti-EpCAM diperkirakan dapat memfasilitasi penghantaran partikel obat secara spesifik menuju sel kanker.

RIP MJ-30 diformulasikan dalam bentuk nanopartikel menggunakan polimer alginat dengan *crosslinker* $CaCl_2$. Optimasi pH reaksi biokonjugasi dilakukan antara *Bovine Serum Albumin (*BSA) sebagai model protein dengan nanopartikel RIP MJ-30. Variasi pH yang digunakan adalah 4,5; 5,5; dan 6,5. Reaksi biokonjugasi nanopartikel RIP MJ-30 dengan antibodi anti-EpCAM kemudian dilakukan dalam kondisi pH optimum. Keberhasilan reaksi konjugasi dianalisis secara kualitatif melalui metode elektroforesis menggunakan *Native*-PAGE dan secara kuantitatif menggunakan *Bicinchoninic Acid* (BCA) *assay*.

Formula optimal pengemasan RIP MJ-30 dalam nanopartikel menggunakan alginat 0,3% adalah dengan konsentrasi $CaCl_2$ 0,2%. Analisis kualitatif dan kuantitatif dari hasil optimasi pH medium biokonjugasi antara model protein BSA dengan nanopartikel RIP MJ-30 menunjukkan reaksi biokonjugasi berjalan optimal pada pH medium 6,5. Nanopartikel RIP MJ-30 terkonjugasi anti-EpCAM memiliki diameter rata-rata 205,0nm, zeta potensial -6,9mV, dan *entrapment efficiency* 71,11±4,84%. Elektroforesis Native-PAGE menunjukkan jarak migrasi anti-EpCAM terkonjugasi nanopartikel yang lebih pendek dibandingkan anti-EpCAM bebas dan BCA *assay* menunjukkan efisiensi konjugasi sebesar 98.99±0,83%. Hasil penelitian menunjukkan bahwa katalis EDAC dalam pH 6,5 mampu mengkonjugasikan anti-EpCAM pada nanopartikel RIP MJ-30 dengan baik.

Kata kunci : anti-EpCAM, nanopartikel, RIP MJ-30, alginat, EDAC.

ABSTRACT

The base fraction of RIP (Ribosome Inactivating Protein) isolated from the leaves of *Mirabilis jalapa*, known as RIP MJ-30 has proven to have cytotoxic activity against several cancer cell lines. Nanoparticle has potential in modificating the efficiency and design of targeted drug therapy by conjugation of specific targeting proteins. EpCAM is a marker protein of hepatic stem cell with high potential of being used as target protein in the teraphy of cancer. Conjugation of anti-EpCAM antibody should be able to facilitate the drug delivery specifically towards cancer cell.

RIP MJ-30 was formulated in the form of polymeric nanoparticle using alginate with the help of $CaCl_2$ as crosslinker. Optimazion of pH condition for the bioconjugation reaction was done between Bovine Serum Albumin (BSA) as a model protein and RIP MJ-30 nanoparticle. Variation of pH being used were 4.5, 5.5, and 6.5. Reaction of bioconjugation between RIP MJ-30 nanoparticle and anti-EpCAM antibody was done within the optimum pH condition. The success of conjugation was analyzed qualitatively using Native-PAGE electrophoresis method and quantitatively using Bicinchoninic Acid (BCA) assay.

The optimum formulation of RIP MJ-30 nanopartices were made with 0,3% alginate and 0,2% CaCl2. Results of qualitative and quantitative analysis from pH optimazion between BSA and RIP MJ-30 nanoparticle indicated that 6.5 was the optimum pH condition for the conjugation reaction. RIP MJ-30 nanoparticle conjugated with anti-EpCAM antibody has mean diameter of 205,0nm, zeta potential of -6,9mV, and entrapment efficiency 71,11±4,84%. Native-PAGE electrophoresis shows that the anti-EpCAM conjugated with RIP MJ-30 has shorter migration distance compard to the free unconjugated anti-EpCAM antibody and BCA assay shows 98.99±0,83% conjugation efficiency. Results of the research indicated that katalis EDAC in pH condition of 6.5 succeded in conjugating anti-EpCAM antibody to RIP MJ-30 nanoparticle.

Key words: anti-EpCAM, nanoparticle, RIP MJ-30, alginate, EDAC