SKRIPSI SARJANA FARMASI

FORMULASI DAN UJI AKTIVITAS ANTIKANKER NANOFITOSOM KATEKIN GAMBIR TERHADAP KEMATIAN SEL KANKER SERVIKS *(HELA CELL LINE)* SECARA IN VITRO

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ABSTRAK

Formulasi dan Uji Aktivitas Antikanker Nanofitosom Katekin Gambir terhadap Kematian Sel Kanker Serviks *(HeLa Cell Line)* secara In Vitro

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Kanker serviks merupakan jenis kanker yang disebabkan oleh infeksi *Human Papilloma Virus* (HPV) pada permukaan leher rahim. Berbagai terapi telah dikembangkan, tetapi belum memberikan hasil yang optimal. Katekin termasuk dalam golongan senyawa antioksidan aktif turunan flavonoid yang berpotensi sebagai antikanker. Namun, katekin bersifat sangat polar sehingga sulit berpenetrasi ke dalam membran sel yang kaya akan lipid dan menyebabkan rendahnya bioavaibilitas. Untuk mengatasi hal tersebut, katekin diformulasikan ke dalam nanofitosom dengan pembentukan kompleks antara fitokonstituen dan lesitin yang sifatnya mirip dengan membran sel. Nanofitosom dibuat dalam 5 formulasi dengan perbandingan molar katekin dan lesitin pada 5 variasi konsentrasi kolesterol menggunakan metode hidrasi lapis tipis. Berdasarkan uji stabilitas fisik, formulasi 4 menunjukkan hasil paling stabil dalam hal ukuran partikel. Formulasi 4 menghasilkan nilai zeta potensial -68 mV, indeks polidispersitas 0,412, efisiensi penjerapan 93,5% serta morfologi berbentuk sferis atau bulat. Selanjutnya, dilakukan uji aktivitas nanofitosom katekin terhadap sel HeLa secara in vitro yang bertujuan untuk mengetahui pengaruh nanofitosom katekin terhadap pertumbuhan dan regulasi sel kanker serviks dengan metode MTT assay serta pengamatan morfologi sel HeLa yang mengalami apoptosis di bawah mikroskop fluoresensi. Evaluasi uji aktivitas antikanker dari nanofitosom katekin diperoleh nilai IC_{50} sebesar 36,307 µg/ml dan terdapat peningkatan persentase sel yang mengalami apoptosis. Pada konsentrasi IC_{25} didapatkan 28,53% sel mati, konsentrasi IC_{50} didapatkan 50,33% sel mati, dan konsentrasi IC_{75} didapatkan 69,8% sel yang mati. Hasil pengujian menunjukkan ada perbedaan rata-rata persentase sel yang mengalami apoptosis pada semua kelompok penelitian secara bermakna dengan nilai p <0,05. Berdasarkan hal tersebut, dapat disimpulkan bahwa nanofitosom katekin berpotensi untuk dikembangkan sebagai antikanker pada kanker serviks.

Kata kunci : Apoptosis, Katekin, MTT assay, Nanofitosom, Sel Hela

ABSTRACT

Formulation and Anticancer Activity Test of Gambir Catechin Nanophytosome against In Vitro Cervical Cancer Cell Death (HeLa Cell Line)

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Cervical cancer is a type of cancer caused by infection with the Human Papilloma Virus (HPV) on the surface of the cervix. Various therapies have been developed, but have not provided optimal results. Catechins are included in the class of active antioxidant compounds derived from flavonoids that have the potential as anticancer. However, catechins are highly polar so they are difficult to penetrate into lipid-rich cell membranes and cause low bioavailability. To overcome this problem, catechins were formulated into nanophytosomes with the formation of complexes between phytoconstituents and lecithin which are similar to cell membranes. Nanofitosomes were made in 5 formulations with molar ratios of catechins and lecithin at 5 variations of cholesterol concentration using the thin layer hydration method. Based on the physical stability test, formulation 4 showed the most stable results in terms of particle size. Formulation 4 resulted in a zeta potential value of -68 Mv, a polydispersity index 0f 0,412, an absorption efficiency of 93,5% and a spherical morphology. Furthermore, the activity of catechin nanophytosomes was tested on HeLa cells in vitro to determine the effect of catechin nanophytosomes on the growth and regulation of cervical cancer cells using the MTT assay method and to observe the morphology of HeLa cells undergoing apoptosis under a fluorescence microscope. Evaluation of the anticancer activity of catechin nanophytosomes obtained an IC50 value of 36.307 g/ml and there was an increase in the percentage of cells undergoing apoptosis. At the concentration of IC25, 28.53% of dead cells were found, the concentration of IC50 was 50.33% of dead cells, and the concentration of IC75 was 69.8% of dead cells. The test results showed that there was a significant difference in the average percentage of cells undergoing apoptosis in all study groups with $p < 0.05$. Based on this, it can be concluded that the catechin nanophytosome has the potential to be developed as an anticancer in cervical cancer.

Key words : Apoptosis, Catechins, MTT assay, Nanophytosome, HeLa cells