INTISARI

Penuaan merupakan faktor utama pemicu penyakit degeneratif. Perkembangan ilmu dan teknologi mendorong penggunaan sel punca sebagai agen terapi yang berfokus pada regenerasi sel dalam menunda penuaan. Ekstrak air sel punca tanaman wortel diketahui mengandung glikoprotein, sedangkan ekstrak etanolnya mengandung flavonoid. Glikoprotein dan flavonoid diketahui memiliki sifat antioksidan. Penelitian yang berfokus pada efek sitoprotektif yang berfokus pada perbaikan siklus sel masih jarang. Penelitian ini bertujuan untuk menguji potensi esktrak etanol dan air kalus kecambah wortel sebagai agen regenerasi sel.

Kalus kecambah wortel diekstraksi menggunakan etanol 70% dan akuabides. Uji sitoprotektif ekstrak selanjutnya dilakukan pada sel fibroblas (*HDFa cell line*) yang diberi H_2O_2 menggunakan metode MTT *assays.* Hasil yang didapat berupa kadar H_2O_2 yang mampu menurunkan viabilitas sel hingga 50% dan kadar ekstrak yang mampu memberikan viabilitas sel paling mendekati viabilitas kontrol sel. Hasil kadar H_2O_2 dan ekstrak selanjutnya dianalisis statistik menggunakan uji ANOVA Tukey LSD *post hoc* serta Kruskal-Wallis Mann-Whitney *post hoc*. Uji sitoprotektif ekstrak melalui perbaikan siklus sel akibat H_2O_2 dilakukan dengan *flow cytometry* menggunakan kadar H_2O_2 dan ektrak terpilih.

Berdasarkan hasil penelitian, kadar H_2O_2 yang mampu menurunkan viabilitas sel mendekati 50% adalah 350 μM. Pemberian 350 μM H_2O_2 pada sel *HDFa* mampu menurunkan viabilitas sel hingga 67,53 $\pm$ 13,15%. Uji sitoprotektif menunjukkan bahwa *pre-treatment* ekstrak etanol dengan kadar 0,15 mg/mL pada sel *HDFa* yang diberi H_2O_2 memberikan viabilitas sel sebesar 10,69 $\pm$ 0,74%, sedangkan *pre-treatment* dengan 0,50 mg/mL ekstrak air memberikan viabilitas sel sebesar 10,05 $\pm$ 4,10%. Dibandingkan dengan kontrol H_2O_2, maka didapatkan penurunan akumulasi sel di fase G_0/G_1 sebesar 0,58% dan 0,38% berturut-turut untuk *pre-treatment* dengan 0,15 mg/mL ekstrak etanol dan 0,50 mg/mL ekstrak air. Ekstrak etanol dan air kalus kecambah wortel memiliki kecenderungan berefek sitoprotektif melalui perbaikan siklus sel fibroblas *HDFa*.

Kata kunci : Kalus, sitoprotektif, siklus sel, *flow cytometry*.

ABSTRACT

Aging is the main factor of degenerative diseases. Development of science and technology that encourage the use of stem cell as the therapeutic agent that focus on cell regeneration in delaying the aging process. Carrot stem cell extracts is known to contain glycoproteins while the ethanolic extract contain flavonoids. Glycoprotein and flavonoids is known for their antioxidant activity. However, the researches that focus on cell cycle cytoprotective effect are still limited. This study aims to test the potential of ethanolic extract and water extract of carrot sprouts callus as cell regeneration agent.

In this study the carrot sprouts callus was extracted using 70% ethanol and akuabides. Afterwards the cytoprotective effect of extract to fibroblast (*HDFa*) cells that was treated H_2O_2 were tested using MTT assays method. The result is the level of H_2O_2 that can decrease cell viability up to 50% and the level of extracts that can produce the nearest cell viability to cell control viability. The results were analyzed using ANOVA Tukey LSD post hoc and Kruskal-Wallis Mann-Whitney post hoc. Then, cytoprotective test through cell cycle restoring is carried out using flow cytometry using selected content of H_2O_2 and extract.

Based on the results of the study, the H_2O_2 level that can decrease cell viability until 50% is 350 μM. Giving 350 μM of H_2O_2 to *HDFa* cell can decrease cell viability until 67,53 $\pm$ 13,15%. The cytoprotective test showed that pre-treatment of 0.15 mg/mL ethanolic extract on *HDFa* cell that was treated H_2O_2 result in cell viability of 10.69 $\pm$ 0.74%, while for pre-treament of 0.50 mg/mL water extract result in cell viability of 10,05 $\pm$ 4,10%. Compared to H_2O_2 control, there are 0.58% decrease of cell accumulation in G0/G1 cell phase in fibroblast cell with 0.15 mg/mL ethanolic extract pre-treatment and 0.38% decrease of cell accumulation in G0 / G1 cell phase for pre-treatment of 0.50 mg/mL water extract. Ethanolic and water extracts of carrot sprouts callus have a tendency to result in cytoprotective effect through cell cycle restoring of fibroblast *HDFa* cell.

Keyword: Callus, cytoprotective, cell cycle, flow cytometry