ABSTRAK

Triple negative breast cancer (TNBC) termasuk subtipe kanker payudara yang ditemukan pada 15-20% pasien kanker payudara. Terapi lini utama TNBC hanya dapat menggunakan agen kemoterapi, seperti doksorubisin yang diketahui memicu migrasi sel kanker. Lengkuas mengandung senyawa *acetoxychavicol acetate* (ACA) dan galangin yang memiliki aktivitas antikanker sebagai penghambat migrasi sel kanker. Tujuan penelitian ini untuk menelusuri aktivitas antimetastasis lengkuas sebagai agen ko-kemoterapi doksorubisin pada sel kanker payudara metastasis 4T1.

Ekstrak lengkuas (EL) diperoleh melalui maserasi menggunakan pelarut etanol 96 % dan dikarakterisasi dengan metode *gas chromatography-mass spectrometry* (GC-MS). Selanjutnya sitotoksitas EL serta kombinasi EL dan doksorubisin ditentukan berdasarkan viabilitas sel melalui MTT *Assay*. Efek migrasi sel 4T1 akibat perlakuan EL dan dikombinasikan dengan doksorubisin diukur dengan *scratch wound healing assay*. Ekspresi MMP-9 yang terlibat dalam proses metastasis diamati dengan *gelatin zymography assay*.

Berdasarkan proses maserasi diperoleh EL dengan rendemen sebesar 16% yang mengandung p-kumaril alkohol, β-kariofilen, dan eugenol secara berurutan sebesar 11,37%, 1,89 % dan 2,89%. Sitotoksisitas EL bersifat lemah dengan IC_{50} = 65 µg/mL. Lebih lanjut, EL tunggal dan kombinasi dengan doksorubisin mampu menghambat migrasi sel dan menurunkan ekspresi MMP-9 secara signifikan dibanding kontrol sel dan perlakuan doksorubisin tunggal. Oleh sebab itu, EL mampu meningkatkan sitotoksik doksorubisin dan kombinasinya mampu menghambat metastasis ditinjau melalui penghambatan migrasi serta penurunan ekspresi MMP-9. Oleh sebab itu, EL berpotensi untuk dikembangkan sebagai agen ko-kemoterapi sel kanker payudara metastasis.

Kata kunci: Lengkuas, Migrasi, MMP-9, 4T1

ABSTRACT

Triple negative breast cancer (TNBC) is one of breast cancer subtypes that found in 15-20% of breast cancer patients. Doxorubicin became the first line therapy of TNBC which known to induce metastatic. Galangal contain various active compounds which have anticancer activities, for instance inhibitory effect of cells migration. The aim of this study was to explore the antimetastatic activity of galangal as a co-chemotherapy agent doxorubicin in metastatic 4T1 breast cancer cells.

Galangal extract (GE) was obtained through maceration using 96% ethanol and was characterized by the gas chromatography-mass spectrometry (GC-MS) method. Furthermore, cytotoxicity of GE and its combination with doxorubicin were determined based on cell viability through MTT assay. The effect of 4T1 cells migration due to EL treatment and combined with doxorubicin was measured by the scratch wound healing assay. Expression of MMP-9 involved in the metastatic process was measured by gelatin zymography assay.

Based on maceration process, GE was obtained with a yield of 16% containing p-coumaril alcohol, β-karyophilene, and eugenol in amount of 11.37%, 1.89% and 2.89% respectively. Cytotoxicity of GE was moderate with IC_{50} = 65 µg / mL. Furthermore, EL single and combination with doxorubicin were able to inhibit cell migration and significantly reduce MMP-9 expression compared to cell control and doxorubicin treatment. Thus, GE and its combination with doxorubicin could inhibit metastasis through inhibition of migration and suppressed MMP-9 expression. Therefore, GE potentially to be developed as a co-chemotherapy agent for metastatic breast cancer cells.

Keywords: Galangal, Migration, MMP-9, 4T1