

ABSTRAK

Persentase kasus kanker payudara pada tahun 2020 mencapai 11,7% dari total kasus kanker dan menyebabkan 6,9% kematian akibat kanker di seluruh dunia. Pada kanker, MMP-9 diekspresikan secara berlebihan dan ekspresi tertinggi terlihat pada kanker payudara *triple-negative* dibandingkan dengan kanker payudara lainnya. Hal ini membuat MMP-9 menjadi target terapeutik yang potensial pada kanker payudara *triple-negative* yang kurang mengekspresikan ER, PR, dan HER-2. Penelitian ini merupakan penelitian eksperimental murni dengan rancangan *post-test only randomized control group design*. Aktivitas partisi *n*-heksana daun asoka dalam menghambat aktivitas MMP-9 secara *in vitro* diuji menggunakan *FRET-based assay*. Hasil penelitian menunjukkan bahwa persentase penghambatan aktivitas enzim MMP-9 oleh partisi *n*-heksana daun asoka adalah 97% pada konsentrasi 1000 µg/mL. Penentuan keamanan terhadap sel Vero dan aktivitas antiproliferasi terhadap sel 4T1 dilakukan dengan *MTT assay* dan didapatkan nilai CC_{50} sebesar 972,2 µg/mL dan EC_{50} sebesar 225,5 µg/mL yang menghasilkan indeks keamanan sebesar 4,311. Berdasarkan identifikasi profil GC-MS, senyawa pada puncak kelima diprediksi sebagai ixorapeptida II dan diantara sepuluh puncak terdapat ixorapeptida termodifikasi. Hal ini menunjukkan bahwa partisi *n*-heksana daun asoka berpotensi sebagai kandidat antikanker payudara *triple-negative*.

Kata kunci: kanker payudara, partisi *n*-heksana daun asoka, *in vitro*

ABSTRACT

The percentage of breast cancer cases in 2020 reached up to 11,7% of total cancer cases and caused 6,9% of cancer deaths worldwide. In cancer, MMP-9 is overexpressed and the highest expression is indicated more in triple-negative breast cancer than in other breast cancers. This makes MMP-9 to be a potential therapeutic target in triple-negative breast cancer that lacks ER, PR, and HER-2 expression. This research is a true experimental study with a post-test only randomized control group design. The activity of n-hexane partition of Asoka leaves in inhibiting MMP-9 activity in vitro was tested using the FRET-based assay. The results showed that the percentage of inhibition of MMP-9 enzyme activity by n-hexane partition of asoka leaves was 97% at 1000 µg/mL concentration. The determination of its safety against Vero cells and its antiproliferative activity against 4T1 cells was carried out using the MTT assay with the CC50 is 972,2 µg/mL and EC50 is 225,5 µg/mL which yielded a safety index of 4,311. Based on GC-MS profile identification, the substance on the 5th peak is predicted as ixorapeptide II and among the ten peaks there are some modified ixorapeptides. This suggests that the n-hexane partition of asoka leaves is potential for a triple-negative breast anticancer candidate.

Keywords: breast cancer, n-hexane partition of asoka leaves, in vitro



