ABSTRAK

Ekspresi MMP-9 yang tinggi berkorelasi dengan tingkat keparahan kanker payudara pada jenis *triple-negative* dan HER2 positif. Beberapa senyawa sudah dilaporkan sebagai MMP *inhibitors* sebagai anti-kanker. Namun, MMP *inhibitors* tersebut gagal pada uji klinis karena menunjukkan efek samping yang merugikan. Penelitian ini telah mensintesis turunan arilamida-1 sebagai penghambat MMP-9 yang dirancang lebih selektif dengan menghambat *hemopexin domain* MMP-9 (PEX-9). Sintesis dilakukan dengan mereaksikan sulfanilamida dan 3-bromopropionil klorida menggunakan katalisator piridin melalui reaksi substitusi nukleofilik asil (S_NA). Senyawa hasil sintesis dilakukan uji organoleptis, titik lebur, kelarutan, dan DAB-HCl. Produk yang terbentuk berupa serbuk berwarna putih yang larut dalam DMSO. Titik lebur senyawa hasil sintesis 222-235^oC dan menunjukkan hasil negatif pada uji DAB-HCl memastikan bahwa gugus amina primer sudah tersubstitusi. Struktur hasil sintesis dielusidasi dengan FTIR, ^{1}H-NMR dan ^{13}C-NMR, serta GC-MS. Hasil elusidasi struktur dengan FTIR menunjukkan gugus fungsi C=O amida pada 1589 cm^{-1}. Proton etilen terletak pada geseran kimia 2-4 ppm berdasarkan ^{1}H-NMR dan 10-60 ppm pada ^{13}C-NMR, serta hasil GC-MS yang memastikan bobot molekul senyawa hasil sintesis dengan m/z 307. Uji *in vitro* dengan *fluorogenic assay* terhadap MMP-9 menunjukkan persentase penghambatan sebesar 13% pada konsentrasi 200 µg/mL yang berasosiasi pada aktivitas yang rendah pada arilamida-1 sebagai penghambat MMP-9.

Kata Kunci: turunan arilamida-1, kanker payudara, MMP-9, PEX-9, uji *in vitro*

ABSTRACT

MMP-9 expression was highly correlated with triple-negative and HER2 breast cancer. Some compounds have been reported as MMP inhibitors, however, most of them fail in clinical trials due to the adverse side effects. This is because the drugs are designed to target catalytic domains that are structurally similar to all MMPs, so that they are not specific. This study synthesized arylamide-1 derivative which is designed to be selective to hemopexin MMP-9 (PEX-9). This was carried out by reacting sulfanilamide and 3-bromopropionyl chloride using pyridine as the catalyst through acyl nucleophilic substitution. Synthesized compound were carried out by an organoleptic test, melting point, solubility, and DAB-HCl. The product was determined its physical appearance as a white powder which is soluble in DMSO. The melting point is 222-253ºC and negatively reacting with DAB-HCl confirming the substituted primary amine group at sulfanilamide. Structure elucidation using FTIR indicates the presence of carbonyl group at 1589 cm^{-1}. The ethylene proton is assigned using ^{1}H-NMR which is showed at 2-4 ppm whereas its carbon appears at 10-60 ppm based on ^{13}C-NMR. The molecular weight of the product is confirmed using GC-MS showing m/z 307. The in vitro fluorogenic assay is applied to determine the inhibition of MMP-9 by arylamide-1. The results show 13% of inhibition of MMP-9 at 200 µg/mL associating with a low activity of arylamide-1 as an MMP-9 inhibitor.

Keyword: arylamide-1 derivative, breast cancer, MMP-9, PEX-9, in vitro test