ABSTRAK

Pada kanker payudara, diketahui bahwa enzim *matrix metalloproteinase* (MMP) dan khususnya MMP-9 diekspresikan dalam jumlah yang tinggi sehingga banyak penelitian tentang penemuan *MMP inhibitor* (MMPI). Kebanyakan MMPI diketahui gagal pada uji klinis karena menimbulkan efek samping yang merugikan seperti inflamasi dan sindroma muskuloskeletal. Penelitian ini bertujuan untuk mensintesis senyawa arilamida-3 yang dirancang aktif menghambat MMP-9 pada *hemopexin domain* (PEX-9) dengan mereaksikan 3,4,5-trimetoksianilin dan 3-bromopropionil klorida dengan katalisator piridin pada suhu kamar. Produk hasil sintesis berupa serbuk berwarna putih dan larut dalam kloroform dengan titik lebur 115,7-120,1°C. Uji DAB-HCl menunjukkan hasil negatif yang berarti gugus amina primer telah tersubstitusi. Uji KLT menunjukkan senyawa hasil sintesis berbeda dengan bahan baku dan murni secara KLT. Hasil elusidasi struktur menunjukkan proton etilen terletak pada geseran kimia 2-4 ppm berdasarkan ^{1}H-NMR dan 15-55 ppm pada ^{13}C-NMR, C=O dan -NH- amida pada 1658,78 dan 3448,72 cm^{-1} berdasarkan FTIR, serta m/z 317 berdasarkan GC-MS. Senyawa hasil sintesis diuji aktivitasnya dalam menghambat enzim MMP-9 *in vitro* dengan *fluorogenic assay*. Hasil uji *in vitro* menunjukkan persen penghambatan senyawa arilamida-3 sebesar 5% pada konsentrasi 200 µg/mL mengindikasikan bahwa senyawa tersebut mempunyai aktivitas rendah dalam menghambat MMP-9.

Kata kunci: *hemopexin*, *in vitro*, kanker payudara, *matrix metalloproteinase-9* (MMP-9), senyawa arilamida-3

ABSTRACT

In breast cancer, it is known that Matrix Metalloproteinase-9 enzyme (MMP-9) and especially MMP-9 are highly expressed by the cancer cells so that many studies have been done to discover MMP inhibitor. Most of these inhibitors fail in clinical trials due to the adverse side effects such an inflammation and musculoskeletal syndrome. This study aims to synthesize arylamide derivative-3 which is selectively targeting hemopexin domain (PEX-9) by reacting 3,4,5-trimethoxyaniline and 3-bromopropionyl chloride with pyridine as catalysator at room temperature. The product was determined its physical appearance as a white powder which is soluble in chloroform with 115,7-120,1°C melting point. DAB-HCl test showed negative result which is confirming substitution of primary amine group at 3,4,5-trimethoxyaniline. Arylamide-3 is pure by KLT and has different Rf with 3,4,5-trimethoxyaniline. Structure elucidation showed ethylene proton appears at 2-4 ppm using ^{1}H-NMR and its carbon appears at 15-55 ppm using ^{13}C-NMR, carbonyl group and secondary amine appears at 1658,78 and 3448,72 cm^{-1} using FTIR, and m/z 317 using GC-MS. Arylamide derivative-3 was then tested for its activity in inhibiting MMP-9 in vitro with fluorogenic assay. The results showed a percent inhibition of arylamide-3 of 5% at 200 µg/mL associated with its low activity to inhibit MMP-9.

Keyword: arylamide-3 compound, breast cancer, *hemopexin*, *in vitro*, *matrix metalloproteinase-9* (MMP-9)