ABSTRAK

Enzim MMP-9 diekspresikan secara tinggi pada kanker payudara dengan permasalahan, inhibitor yang telah dirancang untuk enzim tersebut bersifat tidak selektif sehingga menyebabkan efek samping yang merugikan. Pada penelitian ini telah disintesis senyawa arilamida-2 sebagai penghambat MMP-9 yang dirancang lebih selektif dengan menghambat *hemopexin domain MMP-9* (PEX-9). Senyawa arilamida-2 berhasil disintesis dengan mereaksikan benzokain dan 3-bromopropionil klorida dengan katalisator piridin melalui mekanisme reaksi substitusi nukleofilik asil. Senyawa hasil sintesis dilakukan uji organoleptis, kelarutan, titik lebur, dan warna dengan DAB-HCl. Produk yang terbentuk berupa serbuk berwarna putih, larut dalam etil asetat, kloroform, dan DMSO. Titik lebur senyawa hasil sintesis adalah 116-124^{o}C yang bereaksi negatif terhadap DAB-HCl mengindikasikan gugus amina primer dari benzokain sudah tersubstitusi. Senyawa hasil sintesis dipastikan strukturnya dengan menggunakan ^{1}H-NMR, ^{13}C-NMR, FTIR, dan GC-MS. Spektrum ^{1}H-NMR menunjukan proton etilen pada geseran kimia 2-4 ppm dan karbon etilen pada 20-40 ppm untuk ^{13}C-NMR. Gugus karbonil amida dideteksi dengan FTIR muncul pada 1535 cm^{-1} sementara bobot molekul senyawa hasil sintesis dideteksi dengan MS sebesar m/z 299. Hasil uji aktivitas *in vitro* terhadap enzim MMP-9 menunjukan persentase penghambatan enzim MMP-9 sebesar 36% yang berasosiasi dengan aktivitas rendah-sedang senyawa arilamida-2 sebagai inhibitor MMP-9.

Kata kunci : Arilamida-2, kanker payudara, MMP-9, PEX-9, uji aktivitas *in vitro*

ABSTRACT

MMP-9 is highly expressed in breast cancer with the major issue, the inhibitor which has been designed for the corresponding enzyme having non-selective properties, therefore this causes some adverse drug reactions. In this study, it has been synthesized arylamide-2 as MMP-9 inhibitor which is designed to be more selective by inhibiting hemopexin domain of MMP-9 (PEX-9). Arylamide-2 was successfully synthesized by reacting benzocaine and 3-bromopropionyl chloride using pyridine as the catalyst through the mechanism of acyl nucleophilic substitution reactions. Synthesized compound was carried out by an organoleptic, solubility, melting point, and color with DAB-HCl test. The product was formed as a white powder which is soluble in ethyl acetate, chloroform, and DMSO. The melting point of the synthetic product was measured at 116-124^{o}C, while negatively reacting with DAB-HCl indicating that primary amine has been substituted. The synthesized compound structure was confirmed using ^{1}H-NMR by showing ethylene proton at 2-4 ppm whereas the ethylene-carbon appears at 20-40 ppm as confirmed by ^{13}C-NMR. The amide carbonyl group was indicated at 1535 cm^{-1} as confirmed by FTIR while the molecular weight was detected using GC-MS by showing m/z 299. The result showed that arylamide-2 was able to inhibit MMP-9 with percentage inhibition of 36% at 200 µg/ml concentration associating with its potency as weak to moderate inhibitor of MMP-9 in searching of anti-breast cancer candidate.

Keyword: Arylamide-2, breast cancer, MMP-9, PEX-9, in vitro activity bioassay