ABSTRAK

Kanker merupakan penyakit penyebab kematian kedua terbesar di dunia, dengan prevalensi tertinggi pada wanita berupa kanker payudara. Kematian pada penderita kanker tidak disebabkan kanker primernya, melainkan kanker yang sudah menyebar ke daerah lain yang disebut metastasis. Penyebab terjadinya metastasis adalah karena degradasi *extracellular matrix* (ECM) oleh enzim *Matrix Metalloproteinase* (MMP). Pada kanker payudara HER-2 positif dan *triple negative* diekspresikan MMP-9 dalam jumlah yang besar. Oleh karena MMP-9 dapat dihambat secara selektif pada domain hemopexin, maka disintesis senyawa arilamida-4 yang mengambil farmakofor dari senyawa pada penelitian sebelumnya yang terbukti dapat menghambat pada domain hemopexin. Sintesis arilamida-4 dilakukan melalui reaksi substitusi nukleofilik asil (S_NA). Sintesis dilakukan dengan mereaksikan sulfadiazin dan 3-bromopropionil klorida dengan katalisator piridin pada suhu kamar. Senyawa hasil sintesis berupa serbuk kuning (rendemen 66%), negatif terhadap DAB-HCl, larut dalam DMSO, dan memiliki titik lebur 191-195^oC. Senyawa hasil sintesis sudah dipastikan strukturnya dengan NMR, FTIR, dan MS. Uji aktivitas *in vitro* terhadap MMP-9 menunjukkan bahwa nilai IC_{50} sebesar 193 µM, sehingga dapat disimpulkan bahwa arilamida-4 aktif dalam menghambat enzim MMP-9.

Kata kunci: Arilamida, *Hemopexin*, Kanker payudara, *Matrix Metalloproteinase 9*, Substitusi Nukleofilik Asil.

ABSTRACT

Cancer is the leading largest cause of death in the world, in which breast cancer being the highest prevalence in female among others. The mortality in cancer is caused by the cells has been spreading over areas which is called as metastasis, rather than the primary one. The metastasis is due to the degradation of extracellular matrix (ECM) by the Matrix Metalloproteinase (MMP) enzyme. In HER-2 positive and triple negative breast cancers, MMP-9 is overexpressed, therefore is an interesting target in breast cancer drug discovery. In this study, it was synthesized compound (Arylamide-4) having pharmacophores similar to the active compound being found to inhibit MMP-9 selectively in hemopexin domain. Arylamide-4 was synthesized by reacting sulfadiazine and 3-bromopropionyl chloride using pyridine as the catalyst at room temperature through acyl nucleophilic substitution reactions (S_NA). The physical appearance of the synthesize compound is yellow powder (yield = 66%), which negatively reacts with DAB HCl, soluble in DMSO, having melting range 191-195^oC. The synthetic product was characterized using NMR, FTIR, and MS, and then *in vitro* testing against MMP-9. The conclusion is arilamide-4 compound is able to inhibit MMP-9 with a potent activity as calculated IC_{50} is equal to 193 µM.

Keywords: Arylamide-4, Hemopexin, Breast Cancer, Matrix Metalloproteinase *9*, Nucleophilic Acyl Substitution