SINTESIS N-ASETILPIRAZOLINA BERBAHAN DASAR VERATRALDEHIDA DAN 2-HIDROKSIASETOFENON SERTA SELEKTIVITASNYA TERHADAP BEBERAPA SEL KANKER

Amanah Wati
12/334649/PA/14882

INTISARI

Telah dilakukan sintesis dan uji sitotoksisitas senyawa N-asetilpirazolina dari veratraldehida dan 2-hidroksiasetofenon. Tahap awal adalah mensintesis kalkon melalui reaksi antara veratraldehida dan 2-hidroksiasetofenon dalam pelarut metanol menggunakan katalis NaOH 40% (b/v) dengan metode refluks selama 4 jam. Kedua, mensintesis senyawa N-asetilpirazolina dengan merefluks kalkon dan hidrazin monohidrat dalam asam asetat glasial berlebih selama 24 jam. Elusidasi struktur produk dilakukan menggunakan spektrometer FTIR, GC-MS, TLC-*Scanner*, ^{1}H-,^{13}C- dan HMQC-NMR. Uji sitotoksisitas kalkon dan N-asetilpirazolina terhadap sel kanker MCF-7, HeLa, T47D, dan WiDr serta sel normal Vero dilakukan dengan metode MTT.

Produk sintesis kalkon [(E)-3-(3,4-dimetoksifenil)-1-(2-hidroksifenil)prop-2-en-1-on] memiliki titik leleh 103,2-106,0 ^{o}C dengan rendemen 45,07% sedangkan senyawa N-asetilpirazolina [1-(5-(3,4-dimetoksifenil)-3-(2-hidroksifenil)-4,5-dihidro-1H-pirazol-1-il)etanon] dihasilkan berupa padatan putih dengan titik leleh 137,4-139,8 ^{o}C dan rendemen 93,14%.

Senyawa N-asetilpirazolina memberikan toksisitas sedang terhadap sel kanker MCF-7, toksisitas lemah terhadap sel kanker HeLa maupun WiDr dan tidak bersifat toksik terhadap sel T47D sehingga aktivitas N-asetilpirazolina dalam menghambat sel kanker MCF-7 dikatakan lebih selektif dibandingkan dengan sel kanker uji lainnya. Senyawa kalkon juga menunjukkan selektivitas lebih baik terhadap sel kanker MCF-7 dan bersifat lebih toksik dibandingkan senyawa N-asetilpirazolina. Aktivitas rendah dari senyawa N-asetilpirazolina diduga terjadi karena adanya gugus hidroksi pada posisi *orto*.

Kata kunci : N-asetilpirazolina, kalkon, sitotoksisitas, dan veratraldehida

SYNTHESIS OF N-ACETYLPYRAZOLINE FROM VERATRALDEHYDE AND 2-HYDROXYACETOPHENONE AND ITS SELECTIVITY AGAINST SOME CANCER CELLS

Amanah Wati
12/334649/PA/14882

ABSTRACT

Synthesis and cytotoxicity test of N-acetylpyrazoline have been carried out. First, chalcone was synthesized from veratraldehyde and 2-hydroxyacetophenone in methanol using NaOH 40% (w/v) under reflux for 4 hours. Second, synthesis of N-acetylpyrazoline was conducted by refluxing the chalcone and hydrazine monohydrate in the presence of excessive glacial acetic acid for 24 hours. The structure elucidation of products was confirmed by FTIR, GC-MS, ^{1}H-, ^{13}C- and HMQC-NMR spectrometers. Cytotoxicity tests of chalcone and N-acetylpyrazoline against MCF-7, HeLa, T47D and WiDr cancer cells also Vero cell line were conducted by MTT assay.

The product of chalcone [(E)-3-(3,4-dimethoxyphenyl)-1-(2-hydroxyphenyl) prop-2-en-1-one] had m.p of 103.2-106.0 ^{o}C in 45.07% yield, while N-acetylpyrazoline [1-(5-(3,4-dimethoxyphenyl)-3-(2-hydroxyphenyl)-4,5-dihydro-1H-pyrazol-1-yl)ethanone] was yielded in 93.14% as white solid with m.p of 137.4-139.8 ^{o}C.

The N-acetylpyrazoline had moderate toxicity against MCF-7 cells, weak toxicity against HeLa and WiDr cells and no toxicity towards T47D cells. Therefore, the N-acetylpyrazoline activity against MCF-7 cancer cells was more selective than WiDr, HeLa and T47D cells. The chalcone also showed better selectivity to MCF-7 cells and more toxic than N-acetylpyrazoline. The low toxicities of N-acetylpyrazoline was probably due to the presence of hydroxyl group at orto position.

Keywords: N-acetylpyrazoline, chalcone, cytotoxicity, veratraldehyde