SINTESIS DAN UJI AKTIVITAS ANTIKANKER SENYAWA N-ASETIL PIRAZOLINA DARI VERATRALDEHIDA DAN 4-KLOROASETOFENON

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INTISARI

Telah dilakukan sintesis N-asetil pirazolina berbahan dasar veratraldehida dan 4-kloroasetofenon dengan uji *in-vitro* sebagai antikanker. Penelitian ini bertujuan untuk mempelajari reaksi pembentukan N-asetil pirazolina dari suatu senyawa kalkon hasil reaksi antara veratraldehida dan 4-kloroasetofenon, serta uji sitotoksisitas dengan nilai IC_{50} N-asetil pirazolina terhadap sel kanker HeLa, WiDr, MCF-7 dan T47D dengan kontrol positif obat Doxorubicin

Senyawa kalkon yang dihasilkan dari reaksi veratraldehida dan 4-kloroasetofenon dalam katalis NaOH 30% (b/v). Selanjutnya kalkon digunakan untuk sintesis senyawa N-asetil pirazolina dengan 2 metode. Metode pertama melalui reaksi siklokondensasi diikuti asetilasi, metode kedua melalui pembentukan asetil hidrazin dan reaksi siklokondensasi. Kondisi optimum diperoleh pada metode kedua dengan variasi mol pada kalkon dan waktu reaksi. Produk dianalisis dengan TLC, spektrometer FT-IR, GC-MS, ^{1}H- dan ^{13}C-NMR. Uji antikanker terhadap beberapa sel kanker dengan metode MTT.

Sintesis senyawa kalkon diperoleh padatan kuning kehijauan yang optimum pada waktu 4 jam dengan rendemen 93,19% dan kemurnian 97,72%. Hasil terbaik sintesis N-asetil pirazolina terjadi pada tahap kedua yakni melalui pembentukan asetil hidrazin dan reaksi siklokondensasi. Reaksi total adalah 9 jam yang diperoleh padatan putih tulang dengan rendemen sebesar 87,28% dan kemurnian 91,90%. Hasil pengujian sitotoksisitas terhadap sel kanker menunjukkan bahwa IC_{50} senyawa N-asetil pirazolina terhadap sel kanker HeLa, WiDr, MCF-7, T47D berturut-turut sebesar 39,19; 100,00; 40,47; 26,51 μg/mL. Senyawa N-asetil pirazolina menunjukkan toksisitas sedang terhadap sel kanker.

Kata kunci: antikanker, Doxorubicin, kalkon, N-asetil pirazolina, veratraldehida

SYNTHESIS AND ANTICANCER TEST OF N-ACETYL PYRAZOLINE FROM VERATRALDEHYDE AND 4-CHLOROACETOPHENONE

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ABSTRACT

Synthesis N-acetyl pyrazoline from veratraldehyde and 4- chloroacetophenone with its *in vitro* test as an anticancer agent have been conducted. The aim of this research was to study the formation of N-acetyl pyrazoline from chalcone, which was yielded from reaction between veratraldehyde and 4-chloroacetophenone also to test the cytotoxicity by determination of IC_{50} value of N-acetyl pyrazoline against HeLa, WiDr, MCF-7 and T47D cancer cells.

The chalcone synthesis was carried out by stirring a mixture of veratraldehyde and 4- chloroacetophenone in the presence of NaOH 30% (w/v) in various reaction time. The synthesis of N-acetyl pyrazoline was performed by two methods. The first one is cyclocondensation and acetylation, the second one is formation of acetyl hydrazine followed by cyclocondensation, consecutively. The optimization of those two methods was done by various concentration of chalcone and reaction time. The structure elucidation was carried out by TLC method, FT-IR, GC-MS, ^{1}H- and ^{13}C-NMR spectrometers. Anticancer test was performed towards some cancer cells with MTT method.

The chalcone was produced in 4 h of reaction as greenish-yellow solid with 93.19% yield and 97.72% purity. The best result of N-acetyl pyraziline synthesis was carried out by the second method, i.e cyclocondensation followed by acetylation. This total reaction time of 9 h gave N- acetyl pyrazoline as ivory solid with 87.28% yield and 91.90% purity. The IC_{50} value of N-acetyl pyrazoline against, HeLa, WidDr, MCF-7 and T47D cancer cells were 39.19; 100.00; 40.47; 26.51 μg/mL, respectively. We conclude that N-acetyl pyrazoline show a moderate toxicity towards some cancer cells.

Kata kunci: anticancer, chalcone, Doxorubicin, N-Acetyl pyrazoline, veratraldehyde