

SINTESIS TURUNAN N-HIDROGEN PIRAZOLINA BERBAHAN DASAR 2-HIDROKSIASETOFENON DAN DIMETILAMINOBENZALDEHIDA SERTA UJI TOKSISITASNYA TERHADAP BEBERAPA SEL KANKER

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INTISARI

Telah dilakukan sintesis turunan *N*-hidrogen pirazolina berbahan dasar dimetilaminobenzaldehida (DMAB) dengan 2-hidroksiasetofenon beserta uji *in-vitro* sebagai senyawa antikanker. Penelitian ini bertujuan untuk mempelajari reaksi pembentukan turunan pirazolina dari suatu senyawa kalkon hasil reaksi antara DMAB dengan 2-hidroksiasetofenon, menentukan nilai IC₅₀ senyawa turunan *N*-hidrogen pirazolina hasil sintesis terhadap sel kanker WiDr, HeLa, MCF-7, T47D, dan sel normal Vero.

Sintesis ini diawali dengan mereaksikan 2-hidroksiasetofenon dan DMAB dalam etanol dengan katalis basa NaOH 40% (b/v), campuran direaksikan dengan metode refluks selama 1 jam. Tahap selanjutnya adalah reaksi siklisasi antara senyawa kalkon dan hidrazin monohidrat dengan metode sonokimia selama 6 jam. Produk yang terbentuk kemudian diuji kebenaran strukturnya dengan spektrometer FT-IR, GC-MS, ¹H-NMR dan ¹³C-NMR. Uji antikanker dilakukan terhadap beberapa sel kanker dan sel normal dengan metode MTT.

Kalkon yang dihasilkan dari reaksi kondensasi *Claisen-Schmidt* berupa padatan berwarna ungu dengan titik leleh 156 - 157 °C dan rendemen sebesar 71,03%. Reaksi siklisasi kalkon dengan hidrazin monohidrat dihasilkan produk senyawa turunan *N*-hidrogen pirazolina berupa padatan kuning dengan titik leleh 103 - 105 °C dan rendemen sebesar 89,32%. Nilai IC₅₀ senyawa turunan *N*-hidrogen pirazolina terhadap sel WiDr, HeLa, T47D, MCF-7, dan Vero (sel normal) berturut-turut 28,05; 20,57; 15,81; 88,93 dan 51,43 µg/mL. Berdasarkan hasil tersebut senyawa turunan *N*-hidrogen pirazolina berpotensi sebagai senyawa antikanker terhadap kanker kolon, serviks dan kanker payudara dengan efek samping toksik terhadap sel normal pada tingkat sedang.

Kata kunci: DMAB, 2-hidroksiasetofenon, kalkon, pirazolina, antikanker.

SYNTHESIS OF N-HYDROGEN PYRAZOLINE DERIVATIVE FROM 2-HYDROXYACETOPHENONE AND DIMETHYLAMINOBENZALDEHYDE AND ITS TOXICITY TEST TOWARD SOME CANCER CELLS

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ABSTRACT

Synthesis of N-hydrogen pyrazoline derivative and its cytotoxicity toward cancer cells have been carried out. The aim of the research were to synthesis chalcone from 2-hydroxyacetophenone, dimethylaminobenzaldehyde (DMAB), to synthesis pyrazoline derivative from chalcone and hydrazin monohydrate, and to determine the IC_{50} values of N-hydrogen pyrazoline against WiDr, HeLa, MCF-7, T47D cancer cell, and Vero normal cell.

The first step was Claisen-Schmidt reaction towards 2-hydroxyacetophenone and DMAB in ethanol solvent using base catalyst NaOH 40% (w/v). The mixture was refluxed for 1 hour. The Second step was cyclization reaction of chalcone and hydrazine monohydrate under ultrasonic irradiation for 6 hours. Synthesized product was elucidated using FT-IR, GC-MS, 1H -NMR and ^{13}C -NMR. Anticancer test was performed towards some cancer cells and also normal cell with MTT method.

Claisen-Schmidt condensation reaction between 2-hydroxyacetophenone and DMAB produced chalcone in 71.03% yield. The synthesized chalcone was appeared to be a purple solid with m.p 156 to 157 °C. Furthermore, the cyclization reaction yielded the pyrazoline in 89.32%. Products appeared to be a yellow solid with m.p 103 to 105 °C. The IC_{50} values of N-hydrogen pyrazoline against WiDr, HeLa, MCF-7 and T47D and normal Vero Cell were 28.05; 20.57; 15.81; 88.93 and 51.43 $\mu g/mL$, respectively. It was concluded that N-hydrogen pyrazoline selective against colon, cervical, and breast cancer with side effects that was toxic on normal cells at moderate levels.

Keyword : DMAB, 2-hydroxyacetophenone, chalcone, pyrazoline, anticancer.