# SINTESIS N-ASETIL PIRAZOLINA BERBAHAN DASAR 4-HIDROKSIASETOFENON DAN VANILIN SERTA UJI TOKSISITASNYA TERHADAP BEBERAPA SEL KANKER

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## INTISARI

Telah dilakukan sintesis N-asetil pirazolina berbahan dasar vanilin dengan 4-hidroksiasetofenon beserta uji *in-vitro* sebagai senyawa antikanker. Penelitian ini bertujuan untuk mempelajari reaksi pembentukan pirazolina dari suatu senyawa kalkon hasil reaksi antara vanilin dengan 4-hidroksiasetofenon, melakukan uji sitotoksisitas dengan menentukan nilai $IC_{50}$ senyawa N-asetil-pirazolina hasil sintesis terhadap sel kanker HeLa, MCF-7, T47D dan sel normal Vero.

Sintesis ini diawali dengan mereaksikan 4-hidroksiasetofenon dan vanilin dalam metanol dengan katalis basa KOH 40% (b/v) dan montmorillonit KSF lalu campuran diaduk selama 48 jam. Tahap selanjutnya adalah reaksi siklisasi antara senyawa kalkon, hidrazin monohidrat dan asam asetat glasial dengan metode refluks selama 24 jam. Produk yang terbentuk kemudian diuji kebenaran strukturnya dengan metode KLT, dan spektrometer FT-IR, GC-MS, $^{1}H$- dan $^{13}C$-NMR. Uji antikanker dilakukan terhadap beberapa sel kanker dan sel normal dengan metode MTT.

Kalkon yang dihasilkan berupa padatan berwarna kuning dengan titik leleh 228,7-229,6 °C dan rendemen 34,57%. Kalkon direaksikan dengan hidrazin monohidrat dan asam asetat glasial dalam pelarut metanol menghasilkan N-asetil pirazolina berupa padatan berwarna putih abu-abu dengan titik leleh 179,6-180,6 °C dan rendemen 86,43%. Nilai $IC_{50}$ N-asetil pirazolina terhadap sel Vero, HeLa, MCF-7 dan T47D berturut-turut sebesar 101,25; 78,73; 86,40; dan 1.318,25 µg/mL. Dapat disimpulkan bahwa senyawa N-asetil pirazolina memiliki potensi sebagai senyawa antikanker terhadap sel kanker serviks HeLa dan sel kanker payudara MCF-7.

Kata kunci: vanilin, 4-hidroksiasetofenon, N-asetil-pirazolina, kalkon, antikanker.

# SYNTHESIS OF N-ACETYL PYRAZOLINE FROM 4-HYDROXYACETOPHENONE AND VANILLIN AND ITS TOXICITY TEST TOWARD SOME CANCER CELLS

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## ABSTRACT

N-acetyl pyrazoline synthesis based from vanillin and 4-hydroxyacetophenone and its *in vitro* test as an anticancer agent have been conducted. The purposes of this research were to study the formation of N-acetyl pyrazoline from chalcone, which was yielded from reaction between vanillin and 4-hydroxyasetophenone, and also to test the cytotoxicity by determining the $IC_{50}$ values of N-acetyl pyrazoline against HeLa, MCF-7, T47D cancer cells and Vero normal cell.

The first synthesis was carried out by stirring a mixture of vanillin and 4-hydroxyacetophenone in methanol in the presence of KOH 40% (w/v) and montmorillonite KSF for 48 h. The second step was cyclization reaction of chalcone, hydrazine monohydrate and glacial acetic acid under reflux for 24 hours. The structure elucidation was done by TLC method, FT-IR, GC-MS, $^{1}$H- and $^{13}$C-NMR spectrometers. Anticancer test was performed towards some cancer cells and also normal cell with MTT method.

The product of chalcone was yielded as yellow solid with m.p 228.7 to 229.6 °C in 34.57%. Chalcone was reacted with hydrazine monohydrate and glacial acetic acid in methanol to give greyish white solid with m.p 179.6 to 180.6 °C in 86.43%. The $IC_{50}$ values of N-acetyl pyrazoline against Vero cells, HeLa, MCF-7 and T47D were 101.25; 78.73; 86.40; and 1318.25 µg/mL, respectively. It was concluded that N-acetyl pyrazoline has potential as an anticancer agent towards HeLa cervix cancer and MCF-7 breast cancer.

Keyword: vanillin, 4-hydroxyacetophenone, N-acetyl pyrazoline, chalcone, anticancer.