SINTESIS SENYAWA TURUNAN PIRAZOLINA DENGAN PREKURSOR *p*-ANISALDEHIDA DAN 2-HIDROKSIASETOFENON SERTA UJI SITOTOKSISITASNYA TERHADAP BEBERAPA SEL KANKER

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INTISARI

Sintesis senyawa turunan pirazolina dan uji sitotoksisitasnya terhadap beberapa sel kanker telah dilakukan. Penelitian ini bertujuan untuk mensintesis 1-(2-hidroksifenil)-3-(4- metoksifenil)-2-propen-1-on (kalkon) dari *p*-anisaldehyde and 2-hidroksiasetofenon, mensintesis 1-(5-(4-metoksifenil)-3-(2-hidroksifenil)-4,5-dihidro-1H-pirazol-1il)etanon (pirazolina **1**) dari kalkon dan hidrazin hidrat dengan adanya asam asetat glasial, melakukan sintesis senyawa *N*-fenil-3-(2-hidroksifenil)-5-(4-metoksifenil)-2-pirazolina (pirazolina **2**) serta melakukan uji sitotoksisitas untuk menentukan nilai IC_{50} senyawa pirazolina **2** hasil sintesis terhadap sel kanker WiDr dan T47D.

Sintesis diawali dengan mereaksikan 2-hidroksiasetofenon dan *p*-anisaldehida dalam suasana basa KOH menghasilkan senyawa turunan kalkon melalui reaksi kondensasi Claisen-Schmidt. Hidrazin hidrat ditambahkan secara bertetes-tetes ke dalam larutan kalkon dengan metode refluks. Penambahan selanjutnya dengan asam asetat glasial menghasilkan pirazolina **1**. Pirazolina **2** diperoleh melalui penambahan fenilhidrazin ke dalam larutan kalkon menggunakan metode refluks maupun sonokimia selama 7 jam. Struktur produk dielusidasi dengan menggunakan spektrometer FT-IR, GC-MS, ^{1}H- and ^{13}C-NMR. Uji sitotoksisitas pirazolina **2** dilakukan terhadap T47D dan WiDr menggunakan metode MTT untuk menentukan nilai IC_{50}.

Senyawa kalkon yang diperoleh berupa padatan kuning terang dengan persen hasil 73,39%. Pirazolina **1** didapatkan dengan warna putih dengan persen hasil 1,29%, sedangkan Pirazolina **2** dihasilkan sebagai padatan putih dengan persen hasil 77,00% melalui metode sonokimia dan 52,90% melalui metode refluks. Pirazolina **2** diuji aktivitas biologinya sebagai senyawa antikanker. Nilai IC_{50} terhadap T47D dan WiDr secara berturut-turut yaitu 255,94 and 416,87 μg/mL. Berdasarkan hasil tersebut, pirazolina **2** tidak memberikan toksisitas yang signifikan terhadap sel kanker T47D dan WiDr.

Kata kunci : kalkon, pirazolina, sonokimia, sitotoksisitas.

SYNTHESIS OF PYRAZOLINE DERIVATIVES USING *p*-ANYSALDEHIDE AND 2-HYDROXYACETOPHENONE AND ITS CITOTOXICITY TOWARDS CANCER CELLS

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ABSTRACT

Synthesis and anticancer activity assay of pyrazoline derivatives have been done. The aim of this research were to synthesize 1-(2-hydroxyphenyl)-3-(4-methoxyphenyl)-2-propen-1-one (chalcone) from *p*-anisaldehyde and 2-hydroxyacetophenone, to synthesize 1-(5-(4-methoxyphenyl)-3-(2-hydroxyphenyl)-4,5-dihydro-1H-pyrazol-1-yl)etanone (pyrazoline **1**) from chalcone and hydrazine hydrate in glacial acetic acid, to synthesize *N*-phenyl-3-(2-hydroxyphenyl)-5-(4-methoxyphenyl-2-pyrazoline (pyrazoline **2**) and to determine the cytotoxicity of pyrazoline against several cancer cell lines.

The synthesis was started by reacting 2-hydroxyacetophenone and *p*-anisaldehyde in the presence of KOH to give chalcone via Claisen-Schmidt condentation. Hydrazine hydrate was added dropwise into solution of chalcone in methanol under reflux temperature. Further addition of glacial acetic acid into reaction mixture would produce pyrazoline **1**. In addition, Pyrazoline **2** was obtained by adding phenylhydrazine to chalcone in methanol. The mixture was irradiated in ultrasonic bath or reacted under reflux for 7 hours. The structures were elucidated by FT-IR, GC-MS, ^{1}H- and ^{13}C-NMR analysis. The pyrazoline **2** cytotoxicity was tested against T47D and WiDr cells by MTT method to determine the IC_{50} value.

The chalcone was obtained as bright yellow solid and in 73.39% yield. Pyrazoline **1** was produced as white solid in 1.29% yield, repectively, while pyrazoline **2** was yielded as broken white solid in 77.00% by sonochemistry and 52.90% by reflux method. Pyrazoline **2** was tested for their biological activity as anticancer. The IC_{50} value againts T47D, and WiDr cells were 255.94 and 416.87 μg/mL. Respectively, it was concluded that the pyrazoline **2** showed no-significant anticancer activity.

Keywords: chalcone, pyrazoline, sonochemistry, citotoxicity.