SINTESIS TURUNAN N-ASETILPIRAZOLINA DAN UJI ANTIBAKTERI DENGAN BAHAN DASAR 3-NITROBENZALDEHIDA, 4-HIDROKSIASETOFENON DAN HIDRAZIN HIDRAT

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INTISARI

Telah dilakukan sintesis turunan pirazolina melalui reaksi siklokondensasi antara suatu turunan kalkon hasil sintesis dan hidrazin hidrat. Tujuan penelitian ini untuk menciptakan agen antibakteri baru yang mampu menggantikan agen antibakteri lama yang telah resisten.

Penelitian ini diawali dengan sintesis *m*-nitrobenzaldehida melalui reaksi nitrasi terhadap benzaldehida menggunakan asam nitrat sebagai agen penitrasi. Padatan yang didapatkan direkristalisasi dengan metode yang lebih ramah lingkungan yaitu menggunakan pelarut MTBE sebagai pengganti benzena hangat. Reaksi kondensasi Claisen-Schmidt antara *m*-nitrobenzaldehida dan 4-hidroksiasetofenon pada suhu ruang selama 24 jam menghasilkan 1-(4-hidroksifenil)-3-(3-nitrofenil)prop-2-en-1-on (**kalkon 1**) dengan rendemen 63,6%. Reaksi siklokondensasi terhadap **kalkon 1** dan hidrazin hidrat dengan katalis asam asetat glasial pada kondisi refluk selama 6 jam menghasilkan 1-[3-(4-hidroksifenil)-5-(3-nitrofenil)-4,5-dihidro-1*H*-pirazol-1-il]etanon (**pirazolina 1**) dengan rendemen 45%.

Uji antibakteri dari **pirazolina 1** dilakukan terhadap lima bakteri yang berbeda, yaitu bakteri Gram positif: *Bacillus cereus*; *Bacillus subtilis*; *Staphylococcus aureus*; dan bakteri Gram negatif: *Escherichia coli*; *Shigella flexneri*. Metode yang digunakan untuk uji antibakteri adalah metode difusi agar, yaitu dilakukan dengan pembuatan sumuran. Hasil uji antibakteri menunjukkan bahwa **pirazolina 1** memiliki aktivitas antibakteri terbaik pada bakteri *Bacillus subtilis*.

Kata kunci: *m*-nitrobenzaldehida, kalkon, pirazolina, antibakteri.

SYNTHESIS AND ANTIBACTERY ASSAY OF NOVEL N-ACETYLPYRAZOLINE DERIVATIVE COMPOUND 3-NITROBENZALDEHYDE, 4-HYDROXYACETOPHENONE AND HYDRAZINE HYDRATE

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ABSTRACT

A pyrazoline derivative has been synthesized from a synthesized chalcone derivative and hydrazine hydrate by cyclocondensation reaction. This research was held suppose to create a new antibacterial agent that replaces of the past resistance antibacterial agents.

m-Nitrobenzaldehyde, as the first synthesis, synthesized by nitration reaction to benzaldehyde by nitric acid as a nitration agent. The nitration product was recrystallized by MTBE solvent for replacing the high toxicity of benzene. 1-(4-hydroxyphenyl)-3-(3-nitrophenyl)prop-2-en-1-one (**chalcone 1**) was synthesized from Claisen-Schmidt condensing *m*-nitrobenzaldehyde and 4-hydroxyacethophenone at room temperature in alkaline condition for 24 hours. This reaction afforded **chalcone 1** in 63.6% yields. On the other hand 1-[3-(4-hydroxyphenyl)-5-(3-nitrophenyl)-4,5-dihydro-1*H*-pyrazol-1-yl]ethanone (**pyrazoline 1**) was synthesized from **chalcone 1** by cyclocondensation reaction with hydrazine hydrate in glacial acetic acid on reflux condition for six hours afforded **pyrazoline 1** in 45% yields.

Antibacterial assay of **pyrazoline 1** has been studied to againt five organisms: *Bacillus cereus*, *Bacillus subtilis*, and *Staphylococcus aureus* as examples of Gram-positive bacteria, *Escherichia coli* and *Shigella flexneri* as examples of Gram-negative bacteria. Antibacterial assay was held using agar well diffusion method. The assay showed that **pyrazoline 1** gave the best activity to *Bacillus subtilis*.

Key words: *m*-nitrobenzaldehyde, chalcone, pyrazoline, antibacterial.