

SINTESIS, KARAKTERISASI DAN UJI AKTIVITAS ANTIBAKTERI TURUNAN SENYAWA 3,5-DIARIL-2-PIRAZOLINA-1-KARBALDEHIDA BERBAHAN DASAR VERATRALDEHIDA

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INTISARI

Telah dilakukan sintesis, karakterisasi dan uji aktivitas antibakteri turunan senyawa 3,5-diaril-2-pirazolina-1-karbaldehida berbahan dasar veratraldehida. Penelitian ini dilakukan dengan tujuan untuk mempelajari sintesis turunan senyawa 3,5-diaril-2-pirazolina-1-karbaldehida dan uji aktivitas antibakterinya terhadap beberapa bakteri Gram positif dan Gram negatif.

Penelitian ini diawali dengan melakukan sintesis senyawa 1-(2,4-dihidroksifenil)-3-(3,4-dimetoksifenil)-2-propen-1-on (kalkon) melalui reaksi kondensasi *Claisen Schmidt* antara veratraldehida, 2,4-dihidroksiasetofenon dan KOH 40% (b/b) pada temperatur ruang selama 48 jam. Selanjutnya senyawa kalkon hasil sintesis direaksikan dengan hidrazin monohidrat dalam asam format menggunakan metode refluks selama 24 jam untuk menghasilkan senyawa 3-(2,4-dihidroksifenil)-5-(3,4-dimetoksifenil)-2-pirazolina-1-karbaldehida (pirazolina). Elusidasi struktur senyawa hasil sintesis dilakukan menggunakan spektrometer FTIR, GC-MS, ^1H - dan ^{13}C -NMR. Senyawa pirazolina diuji aktivitas antibakterinya menggunakan metode difusi sumuran pada agar terhadap beberapa bakteri Gram positif yaitu *Bacillus subtilis*, *Bacillus cereus* dan *Staphylococcus aureus* serta bakteri Gram negatif yaitu *Escherichia coli* dan *Shigella flexneri*.

Reaksi kondensasi *Claisen Schmidt* menghasilkan senyawa kalkon berupa padatan berwarna kuning dengan rendemen sebesar 19,27%. Senyawa pirazolina berupa padatan berwarna kuning kehijauan telah berhasil disintesis menghasilkan rendemen sebesar 81,87%. Uji antibakteri menunjukkan bahwa senyawa pirazolina menunjukkan aktivitas sebagai antibakteri pada bakteri Gram positif dan Gram negatif yang diujikan dengan nilai DDH (mm)/konsentrasi senyawa uji (ppm) terbaik pada bakteri Gram positif *Bacillus subtilis* (5,25/1000) dan bakteri Gram negatif *Shigella flexneri* (4,75/1000).

Kata kunci: kalkon, 2-pirazolina-1-karbaldehida, antibakteri, veratraldehida

SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY TEST OF 3,5-DIARYL-2-PYRAZOLINE-1-CARBALDEHYDE DERIVATIVE FROM VERATRALDEHYDE

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ABSTRACT

Synthesis, characterization and antibacterial activity test of 3,5-diaryl-2-pyrazoline-1-carbaldehyde derivative have been conducted. The aims of this research are to study the synthesis of 3,5-diaryl-2-pyrazoline-1-carbaldehyde derivative and its antibacterial activity test against several Gram positive and Gram negative bacteria.

This research begins with a synthesis of 1-(2,4-dihydroxyphenyl)-3-(3,4-dimethoxyphenyl)-2-propene-1-one (chalcone) by *Claisen Schmidt* condensation reaction of veratraldehyde, 2,4-dihydroxyacetophenone and KOH 40% (b/b) at room temperature for 48 hours. Furthermore, chalcone synthesized is reacted with hydrazine monohydrate in the presence of formic acid under reflux for 24 hours to produce 3-(2,4-dihydroxyphenyl)-5-(3,4-dimethoxyphenyl)-2-pyrazoline-1-carbaldehyde (pyrazoline). The structure elucidation of the synthesized compounds was confirmed by FTIR, GC-MS, ^1H - dan ^{13}C -NMR spectrometers. The pyrazoline was tested for antibacterial activity by agar well-diffusion against Gram positive bacteria such as *Bacillus subtilis*, *Bacillus cereus* and *Staphylococcus aureus* as well as Gram negative bacteria, namely *Escherichia coli* and *Shigella flexneri*.

Claisen Schmidt condensation reaction has produced a yellow solid of chalcone compound with 19.27% yield. The greenish yellow pyrazoline compound has been synthesized to give 81.87% yield. Antibacterial test showed that pyrazoline was active against selected Gram positive and Gram negative bacteria with the best zone of inhibition (mm)/concentration of the test compound (ppm) in Gram positive bacteria *Bacillus subtilis* (5.25/1000) and Gram negative bacteria *Shigella flexneri* (4.75/1000).

Keywords: chalcone, 2-pyrazoline-1-carbaldehyde, antibacterial, veratraldehyde