

## SINTESIS TURUNAN 2-ARILKUINAZOLIN-4(3H)-ON DENGAN VARIASI BENZALDEHIDA: STUDI EFEK STERIK DAN ELEKTRONIK TERHADAP RENDEMEN PRODUK

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### INTISARI

Penelitian ini memiliki tujuan untuk menginvestigasi pengaruh substituen pada benzaldehida terhadap sintesis turunan 2-arilkuinazolin-4(3H)-on berbahan dasar anhidrida isatoat, amonium asetat, dan turunan benzaldehida melalui reaksi multikomponen. Pengaruh substituen benzaldehida dilihat dari dua aspek, yaitu efek induksi dan efek sterik. Untuk mempelajari efek induksi, penelitian ini menggunakan turunan benzaldehida dengan substituen pada posisi *para* dengan karakteristik berbeda, yaitu gugus penarik elektron (-Cl dan -Br) serta gugus pendorong elektron (-OCH<sub>3</sub>, -CH<sub>3</sub>, -OH, dan -N(CH<sub>3</sub>)<sub>2</sub>). Prekursor berupa 2-, 3-, dan 4-metilbenzaldehida digunakan untuk mempelajari pengaruh efek sterik terhadap sintesis turunan 2-arilkuinazolin-4(3H)-on. Produk yang didapat kemudian dimurnikan dengan kromatografi kolom dan dikarakterisasi dengan spektrometer FTIR dan GC-MS.

Hasil penelitian menunjukkan bahwa varias benzaldehida dengan substituen pendorong elektron memberi hasil turunan 2-arilkuinazolin-4(3H)-on yang lebih tinggi (40–68%) dibandingkan dengan substituen penarik elektron (6–25%). Substituen gugus hidroksi pada posisi *para* memberikan hasil terendah yaitu sebesar 3%. Sementara itu, studi pengaruh posisi substituen pada benzaldehida menunjukkan bahwa 2-, 3-, dan 4-metilbenzaldehida menghasilkan turunan 2-arilkuinazolin-4(3H)-on dengan rendemen berturut-turut adalah 84, 54, dan 68%.

Kata Kunci: 2-arilkuinazolin-4(3H)-on, benzaldehida, reaksi multikomponen

## SYNTHESIS OF 2-ARYLQUINAZOLIN-4(3H)-ONE DERIVATIVES WITH BENZALDEHYDE VARIATIONS: A STUDY OF STERIC AND ELECTRONIC EFFECTS ON PRODUCT YIELD

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### ABSTRACT

The objectives of this study were to evaluate the inductive and steric effects of benzaldehyde substituents on the synthesis of 2-arylquinazolin-4(3H)-one derivatives using isatoic anhydride, ammonium acetate, and benzaldehyde derivatives via multicomponent reaction. To study the influence of inductive effect, this study utilized benzaldehyde derivatives with substituents in the *para* position with different characteristics, including electron-withdrawing groups (-Cl and -Br) and electron-donating groups (-OCH<sub>3</sub>, -CH<sub>3</sub>, -OH, and -N(CH<sub>3</sub>)<sub>2</sub>). The precursors of 2-, 3-, and 4-methylbenzaldehydes were utilized to study the influence of steric effects towards the synthesis of 2-arylquinazolin-4(3H)-one derivatives. The resulting products were then purified by column chromatography and characterized using FTIR and GC-MS spectrometers.

The results showed that benzaldehyde variations with electron-donating substituents provided higher yields of 2-arylquinazolin-4(3H)-one derivatives (40–68%) compared to those with electron-withdrawing substituents (6–25%). The hydroxy substituent at the *para* position gave the lowest yield at 3%. Meanwhile, studies on the position of the methyl substituent on benzaldehyde showed that 2-, 3-, and 4-methylbenzaldehyde produced 2-arylquinazolin-4(3H)-one derivatives with yields of 84%, 54%, and 68%, respectively.

Keywords: 2-arylquinazolin-4(3H)-one, benzaldehyde, multicomponent reaction