

SINTESES TURUNAN 4-AMINOKUINOLIN BERBAHAN DASAR 4,7-DIKLOROKUINOLIN DAN DIAMINOALKANA MELALUI REAKSI SUBSTITUSI NUKLEOFILIK AROMATIK

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INTISARI

Sintesis turunan senyawa 4-aminokuinolin berbahan dasar 4,7-diklorokuinolin dan diaminoalkana melalui reaksi substitusi nukleofilik aromatik telah dilakukan. Sintesis tersebut dilakukan dengan mereaksikan 4,7-diklorokuinolin dengan empat jenis senyawa diaminoalkana meliputi 1,2-diaminoetana, 1,3-diaminopropana, 1,4-diaminobutana dan 1,8-diaminooktana. Reaksi substitusi nukleofilik aromatik dilakukan pada suhu 80°C selama 1 jam dan dilanjutkan 135°C selama 14 jam untuk menghasilkan senyawa turunan 4-aminokuinolin. Setiap produk reaksi dikarakterisasi menggunakan spektrometer FTIR, ¹H-NMR dan ¹³C-NMR. Untuk mempelajari pengaruh jenis diaminoalkana terhadap persen hasil dilakukan studi komputasi dengan metode semi empirik menggunakan parameter PM3.

Reaksi dari 4,7-diklorokuinolin dengan 1,2-diaminoetana menghasilkan senyawa *N*-(7-klorokuinolin-4-il)etana-1,2-diamin berupa padatan berwarna kuning kecokelatan dengan persen hasil 36%. Reaksi dengan 1,3-diaminopropana menghasilkan senyawa *N*-(7-klorokuinolin-4-il)propana-1,3-diamin berupa padatan berwarna kuning dengan persen hasil 79%. Reaksi dengan 1,4-diaminobutana menghasilkan senyawa *N*-(7-klorokuinolin-4-il)butana-1,4-diamin berupa padatan berwarna coklat muda dengan persen hasil 66%. Reaksi dengan 1,8-diaminooktana menghasilkan senyawa *N*-(7-klorokuinolin-4-il)oktana-1,8-diamin berupa *gel* berwarna kuning kecokelatan dengan persen hasil 83%. Perbandingan persen hasil dengan muatan parsial senyawa diaminoalkana menunjukkan bahwa sintesis turunan 4-aminokuinolin melalui reaksi substitusi nukleofilik aromatik bergantung pada nukleofilisitas dan efek sterik dari senyawa diaminoalkana.

Kata kunci: 4,7-diklorokuinolin, diaminoalkana, 4-aminokuinolin, substitusi nukleofilik aromatik

***SYNTHESIS OF 4-AMINOQUINOLINES FROM
4,7-DICHLOROQUINOLINE AND DIAMINOALKANES
VIA NUCLEOPHILIC AROMATIC SUBSTITUTION REACTION***

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ABSTRACT

Synthesis of 4-aminoquinolines from 4,7-dichloroquinoline and diaminoalkanes via nucleophilic aromatic substitution reaction has been conducted. The synthesis was carried out by reacting 4,7-dichloroquinoline with four types of diaminoalkane compounds including 1,2-diaminoethane, 1,3-diaminopropane, 1,4-diaminobutane and 1,8-diaminooctane. The aromatic nucleophilic substitution reaction was carried out at 80°C for 1 hour and continued at 135°C for 14 hours to produce 4-aminoquinolines. All products were characterized using FTIR, ¹H-NMR and ¹³C-NMR spectrometers. To learn the effect of diaminoalkanes on percent yield, a computational study was conducted with a semi-empirical method using PM3 parameter.

The reaction of 4,7-dichloroquinoline with 1,2-diaminoethane produced *N*-(7-chloroquinoline-4-yl)ethane-1,2-diamine compounds as a brownish yellow solid in 36% yield. The reaction with 1,3-diaminopropane produced *N*-(7-chloroquinoline-4-yl)propane-1,3-diamine as a yellow solid in 79% yield. The reaction with 1,4-diaminobutane produced *N*-(7-chloroquinoline-4-yl)butane-1,4-diamine as a light brown solid in 66% yield. The reaction with 1,8-diaminooctane produced *N*-(7-chloroquinoline-4-yl)octane-1,8-diamine as a brownish yellow gel in 83% yield. Comparison of the yield percentage with the partial charge of the diaminoalkanes shows that the synthesis of 4-aminoquinolines via aromatic nucleophilic substitution reaction depends on the nucleophilicity and steric effects of the diaminoalkanes.

Keywords: 4,7-dichloroquinoline, diaminoalkane, 4-aminoquinoline, aromatic nucleophilic substitution