

## **SINTESIS 3-BENZILIDEN-2-BUTILISOINDOLINON BERBAHAN DASAR BUTILAMINA MELALUI REAKSI *ONE-POT***

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### **INTISARI**

Sintesis 3-benziliden-2-butilisoindolinon dari bahan dasar butilamina melalui reaksi *one-pot* telah dilakukan. Tujuan penelitian ini adalah untuk mensintesis 3-benzilidenftalida melalui kopling Sonogashira, mensintesis 3-benziliden-2-butilisoindolinon melalui reaksi dua tahap yaitu reaksi adisi nukleofilik dan  $\beta$ -eliminasi. Selain itu, penelitian ini juga bertujuan mensintesis 3-benziliden-2-butilisoindolinon melalui reaksi *one-pot* yang menggabungkan reaksi adisi nukleofilik dan  $\beta$ -eliminasi.

Tahap pertama adalah mensintesis 3-benzilidenftalida dengan mereaksikan fenilasetilena dengan asam 2-iodobenzoat dalam pelarut DMSO dengan adanya katalis CuI dan basa NaHCO<sub>3</sub> pada temperatur ruang selama 24 jam. Selanjutnya, ftalida direaksikan dengan butilamina pada suhu 50 °C selama 6 jam melalui reaksi adisi nukleofilik. Senyawa 3-benzil-2-butyl-hidroksiisoindolinon yang didapatkan ditambahkan katalis HCl 6 M kemudian dipanaskan pada suhu 50 °C selama 3 jam melalui reaksi  $\beta$ -eliminasi. Selain itu, sintesis 3-benziliden-2-butilisoindolinon juga dilakukan melalui reaksi *one-pot* yang menggabungkan reaksi adisi nukleofilik dan  $\beta$ -eliminasi. Produk sintesis dikarakterisasi dengan spektrometer <sup>1</sup>H-NMR, <sup>13</sup>C-NMR dan FTIR serta diuji titik lebur.

Reaksi Sonogashira antara asam 2-iodobenzoat dan fenilasetilena menghasilkan 3-benzilidenftalida dengan persen hasil 64%. Reaksi adisi nukleofilik antara 3-benzilidenftalida dan butilamina menghasilkan 3-benzil-2-butyl-3-hidroksiisoindolinon dengan persen hasil 82%. Reaksi  $\beta$ -eliminasi antara 3-benzil-2-butyl-3-hidroksiisoindolinon terkatalisis HCl menghasilkan 3-benziliden-2-butilisoindolinon dengan persen hasil sebesar 67%. Reaksi *one-pot* antara 3-benzilidenftalida dan butilamina menghasilkan 3-benziliden-2-butilisoindolinon dengan persen hasil 87%. Berdasarkan perbandingan persen hasil antara reaksi dua tahap dan reaksi *one-pot*, maka reaksi *one-pot* lebih efektif, efisien dan ramah lingkungan.

Kata kunci: reaksi *one-pot*, benzilidenisoindolinon, adisi nukleofilik,  $\beta$ -eliminasi, Sonogashira

## **SYNTHESIS OF 3-BENZYLIDEN-2-BUTYLISOINDOLINONE FROM BUTYLAMINE VIA ONE-POT REACTION**

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### **ABSTRACT**

Synthesis of 3-benzyliden-2-butylisoindolinone via one-pot reaction has been conducted. The research was aimed to synthesize 3-benzylidenphthalide via Sonogashira coupling using phenylacetylene and 2-iodobenzoic acid, to synthesize 3-benzyliden-2-butylisoindolinone from 3-benzylidenphthalide and butylamine via two-step reactions consisting of a nucleophilic addition reaction and  $\beta$ -elimination. In addition, this study was also aimed to synthesize 3-benzyliden-2-butylisoindolinone via one-pot reaction, which combines nucleophilic addition reaction and  $\beta$ -elimination.

The first step was to synthesize 3-benzylidenphthalide via the Sonogashira reaction by reacting phenylacetylene and 2-iodobenzoic acid for 24 hours in the presence of CuI catalyst and NaHCO<sub>3</sub> as base at room temperature. Furthermore, the phthalide was reacted with butylamine at 50 °C for 6 hours via nucleophilic addition reactions. The 3-benzyl-2-butyl-hydroxyisoindolinone obtained was added with HCl 6 M as catalyst, then heated at 50 °C for 2 hours via  $\beta$ -elimination reaction. In addition, synthesis of 3-benzyliden-2-butylisoindolinone was also carried out via a one-pot reaction which combines nucleophilic addition reaction and  $\beta$ -elimination. The products were characterized by <sup>1</sup>H-NMR, <sup>13</sup>C-NMR, FTIR spectrometers and melting point test.

The Sonogashira reaction between 2-iodobenzoic acid and phenylacetylene produced 3-benzylidenphthalide in 64% yield. The nucleophilic addition reaction between 3-benzylidenphthalide and butylamine generated 3-benzyl-2-butyl-3-hydroxyisoindolinone in 82% yield. The  $\beta$ -elimination reaction of 3-benzyl-2-butyl-3-hydroxyisoindolinone, in the presence of HCl catalyst, gave 3-benzyliden-2-butylisoindolinone in 67% yield. A one-pot reaction between 3-benzylidenphthalide and butylamine produced 3-benzyliden-2-butylisoindolinone in 87% yield. By comparing the yield of reaction, one-pot reaction is more effective, efficient and environmentally friendly.

**Keywords:** one-pot reaction, benzylidenisoindolinone, nucleophilic addition,  $\beta$ -elimination, Sonogashira