Optimasi Reaksi Biginelli Menggunakan Katalis Jus Belimbing Sayur dengan Substrat 2-(2-Propun-1-Iloksi)Benzaldehid, Asetilaseton, dan Urea/Tiourea = Optimization of the Biginelli Reaction Using 2-(2-Propun-1- yloxy)benzaldehyde, Acetylacetone, and Urea/Thiourea Substrates with Starfruit Juice as Catalyst

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Abstrak

Senyawa turunan dihidropirimidin (DHPM) merupakan senyawa organik yang memiliki banyak manfaat diantaranya sebagai antikoagulan, antihipertensi, antiinflamasi, antimikroba, antibakteri, antifungi, dan antioksidan. Pengembangan sintesis turunan DHPM dapat disintesis melalui reaksi Biginelli. Modifikasi pereaksi dan metode reaksi ini terus dilakukan untuk memperoleh hasil yang paling baik dan ramah lingkungan. Pada penelitian ini, telah dilakukan sintesis senyawa turunan DHPM yaitu 5-acetyl-6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-3,4-dihydropyrimidin-2(1H)-one, dan 1-(6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-2-thioxo-1,2,3,4-tetrahydropyrimidin-5-yl)ethanone melalui reaksi Biginelli dengan metode refluks dengan jus belimbing sayur sebagai katalis asam. Reaktan aldehid yang digunakan adalah 2-(2-propun-1-iloksi)benzaldehid sedangkan reaktan 1,3-dikarbonil yang digunakan adalah asetilaseton. Perbedaan sintesis senyawa turunan DHPM terletak pada komponen urea yang digunakan yaitu urea dan tiourea. Rendemen yang dihasilkan untuk senyawa 5-acetyl-6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-3,4-dihydropyrimidin-2(1H)-on sebesar 93%. Kemurnian senyawa target diuji dengan Kromatografi Lapis Tipis (KLT) dan dilakukan kromatografi kolom untuk medapatkan senyawa target yang murni. Senyawa hasil sintesis kemudian dikarakterisasi dengan uji LC-MS/MS, FTIR, dan NMR yang menandakan bahwa produk 5-acetyl-6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-3,4-dihydropyrimidin-2(1H)-on berhasil disintesis, namun tidak berhasil didapatkan produk 1-(6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-2-thioxo-1,2,3,4-tetrahydropyrimidin-5-yl)ethenone dari sintesis Biginelli menggunakan jus belimbing sayur.
.....Dihydropyrimidine (DHPM) and its derivatives are organic compounds that have many benefits including anticoagulant, antihypertensive, anti-inflammatory, antimicrobial, antibacterial, antifungal, and antioxidant properties. The synthesis of DHPM derivatives can be achieved through the Biginelli reaction. Modifications in the reactants and reaction methods are continuously explored to achieve optimal and environmentally friendly results. In this study, the synthesis of dihydropyrimidine derivatives, specifically dihydropyrimidinones, 5-acetyl 6-methyl-4-(2-(prop-2-yn-1-yloxy)phenyl)-3,4-dihydropyrimidin-2(1H)-one and dihydropyrimidinethiones, 1-(6- methyl-4-(2- (prop-2-yn-1-yloxy)phenyl)-2-thioxo-1,2,3,4-tetrahydropyrimidin-5-yl)ethanone was conducted using the Biginelli reaction with starfruit juice as an acid catalyst. The difference in the synthesis of DHPM derivatives lies in the urea component used, namely urea and thiourea. Substrates such as 2-(2-prop-1- enyloxy)benzaldehyde, acetylacetone, and urea/thiourea were used to form the dihydropyrimidine derivative compounds. The synthesized product of dihydropyrimidinone compound was obtained in 93% yield, whereas the dihydropyrimidinethione product was not successfully obtained.