SINTESIS DAN UJI INHIBISI ENZIM α-GLUKOSIDASE PADA ANALOG KURKUMIN DARI VANILIN DAN BROMOVANILIN

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INTISARI

Telah disintesis analog kurkumin (**1-4**) serta uji inhibisi enzim α-glukosidase nya. Analog kurkumin disintesis melalui reaksi kondensasi aldol silang Claisen-Schmidt dari bahan dasar vanillin dan bromovanilin hasil dari brominasi vanillin menggunakan katalis asam. Uji aktivitas antidiabetik analog kurkumin (**1-4**) dilakukan terhadap enzim α-glukosidase yang diperoleh dari beras lapuk (*Oryza sativa*).

Brominasi terhadap vanillin dilakukan dengan menggunakan $KBrO_3$ dan HBr dalam kondisi asam. Analog kurkumin **(1,2)** disintesis masing-masing dengan mereaksikan vanillin dengan sikloheksanon dan siklopentanon, sedangkan analog kurkumin **(3,4)** disintesis masing-masing dengan mereaksikan bromovanilin dengan sikloheksanon dan siklopentanon. Sintesis tersebut dilakukan dalam kondisi asam HCl dengan pengadukan pada suhu kamar selama 2 jam dan didiamkan selama 2 hari. Hasil yang diperoleh dianalisis strukturnya dengan spektrometer FTIR, GC-MS, ^{1}H- dan ^{13}C-NMR. Analog kurkumin hasil sintesis kemudian diuji aktifitasnya sebagai inhibitor enzim α-glukosidase.

Hasil penelitian menunjukkan bahwa reaksi brominasi vanillin menghasilkan 5-bromovanilin yang berupa padatan putih dengan rendemen 79,00%. Hasil sintesis analog kurkumin (**1-4**) berupa padatan berwarna hijau kekuningan dengan rendemen masing-masing 53,00; 52,27; 42,74 dan 41,56%. Hasil uji inhibisi terhadap enzim α-glukosidase menunjukkan bahwa kurkumin **2** cukup potensial untuk menginhibisi enzim α-glukosidase dengan persen inhibisi 94,26% pada konsentrasi senyawa 5 mM.

Kata Kunci: Vanilin, Bromovanilin, Kurkumin, Analog kurkumin, Enzimα-glukosidase

SYNTHESIS AND INHIBITION TEST α-GLUCOSIDASE ENZYME OF CURCUMIN ANALOGUES FROM VANILLIN AND BROMOVANILLIN

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ABSTRACT

The syntheses and α-glucosidase enzyme inhibition test of curcumin analogues (**1-4)** had been performed. The curcumin analogues were synthesized based on Claisen-Schmidt condensation from vanillin and bromovanillin,the product of vanillin bromination by using acid catalyst. The antidiabetic activity of curcumin analogues(**1-4)** was carried out by the use of α-glucosidase enzyme from moldy rice (*Oryza sativa*).

The bromination of vanillin was performed using $KBrO_3$ and HBr in acidic condition. The curcumin analogues (**1,2**) were synthesized by reacting the vanillin with cyclohexanone and cyclopentanone, while curcumin analogues (**3,4**) were synthesized by reacting bromovanillin with cyclohexanone and cyclopentanone. The synthesis was carried out in acidic condition (HCl) by stirring at room temperature for 2 hours and allowed to settle for 2 days. The structure of all products were confirmed by FTIR, GC-MS, ^{1}H- and ^{13}C-NMR spectrometersand the activity of curcumin analogues were examined with α-glucosidase enzyme inhibitor.

The results showed that the bromination of vanillin produced 5-bromovanillin as white solid with 79.00% yield and the curcumin analogues (**1-4**) were yielded in 53.00, 52.27, 42.72 and 41.56%, respectively as yellowish green solid. The inhibition test of α-glucosidase enzyme showed that the curcumin **2** was potential to inhibit the α-glucosidase enzyme with inhibition percentage about 94.26% at 5 mM.

Key words: Vanillin, Bromovanillin, Curcumin, Curcumin analogues, α-glucosidase enzymes