SINTESIS SENYAWA ANALOG KURKUMIN DARI BAHAN DASAR VERATRALDEHIDA DAN BROMOVERATRALDEHIDA, DAN UJI INHIBISINYA TERHADAP ENZIM α-GLUKOSIDASE

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INTISARI

Telah dilakukan sintesis senyawa analog kurkumin (**1**-**6**) dari bahan dasar veratraldehida dan 6-bromoveratraldehida, dan uji anti diabetes senyawa hasil sintesis melalui uji inhibisi enzim α-glukosidase. Tahap sintesis melibatkan brominasi veratraldehida dan kondensasi aldol *Claisen Schmidt* veratraldehida atau bromoveratraldehida dengan variasi monoketon (sikloheksanon, siklopentanon atau aseton) menghasilkan senyawa analog kurkumin.

Tahapan pertama yaitu sintesis senyawa bromoveratraldehida dengan mereaksikan veratraldehida dan HBr dengan katalis asam $KBrO_3$ menghasilkan 6-bromoveratraldehida rendemen sebesar 80,00%. Tahapan kedua yaitu sintesis senyawa analog kurkumin (**1**-**3**) dengan merefluk campuran veratraldehida dan monoketon (sikloheksanon, siklopentanon, atau aseton) dengan katalis KOH menghasilkan rendemen berturut-turut sebesar 54,30; 69,20; dan 60,00%. Prosedur yang sama untuk sintesis analog kurkumin (**4**-**6**) dilakukan dengan mereaksikan 6-bromoveratraldehida dan monoketon (sikloheksanon, siklopentanon, atau aseton) menghasilkan rendemen masing-masing sebesar 36,84; 64,89; dan 34,63%. Elusidasi struktur terhadap semua produk yang diperoleh dilakukan dengan spektrometer FTIR, GC-MS, ^{1}H- dan ^{13}C-NMR.

Uji inhibisi enzim α-glukosidase pada analog kurkumin (**1**-**6**) dilakukan menggunakan isolat enzim α-glukosidase dari beras lapuk. Hasil uji inhibisi enzim menunjukkan bahwa kurkumin **1** cukup berpotensi untuk menginhibisi enzim α-glukosidase dengan % inhibisi sebesar 88,53 pada konsentrasi 7,5 mM. Adanya gugus bromo pada senyawa analog kurkumin tidak menunjukkan pengaruh terhadap inhibisi enzim α-glukosidase.

Kata kunci : Bromoveratraldehida, kurkumin analog, enzim α-glukosidase.

SYNTHESIS CURCUMIN ANALOGUES FROM VERATRALDEHYDE AND BROMOVERATRALDEHYDE, AND THEIR INHIBITION TOWARD α-GLUCOSIDASE ENZYME

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ABSTRACT

Synthesis of curcumin analogues (**1-6**) from veratraldehyde and bromoveratraldehyde, and their inhibition toward α-glucosidase enzyme have been carried out. The stepwise synthesis was performed via veratraldehyde bromination and followed by Claisen-Schmidt aldol condensation to give curcumin analogues.

First reaction of bromoveratraldehyde synthesis was started by reacting veratraldehyde with HBr in the presence of $KBrO_3$ catalyst to give 6-bromoveratraldehyde in 80.00% yield. Next, the curcumin analogues (**1-3**) were synthesized by refluxing veratraldehyde and monoketone (cyclohexanone, cyclopentanone and acetone) with KOH as base catalyst. The products have been successfully synthesized in 54.34; 69.23; and 60.00% yield. In addition, the same procedure using bromoveratraldehyde and monoketone (cyclohexanone, cyclopentanone and acetone) yielded the curcumin analogues (**4-6**) in 36.84; 64.89; and 34.63%, respectively. The structure elucidation of all products were obtained from FTIR, GC-MS, ^{1}H- and ^{13}C-NMR spectrometers.

Inhibition of α-glucosidase enzyme of curcumin analogues (**1-6**) was performed α-glucosidase enzyme isolated from molded rice. The result showed that curcumin **1** has potentially inhibit was α-glucosidase enzyme with %inhibition 88.53 at concentration 7.5 mM. There is no effect of bromo subtituent on inhibition α-glucosidase enzyme.

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Keywords: bromoveratraldehyde, curcumin, α-glucosidase enzyme