INTISARI

SINTESIS ANALOG KURKUMIN MONOKETON BERBAHAN DASAR SINAMALDEHIDA DAN UJI AKTIVITASNYA SEBAGAI INHIBITOR ENZIM α-GLUKOSIDASE

Telah dilakukan sintesis analog kurkumin monoketon sebagai senyawa target yang berbahan dasar sinamaldehida dan uji aktivitasnya sebagai inhibitor enzim α-glukosidase. Tahap sintesis melibatkan reaksi kondensasi aldol silang Claisen-Schmidt dengan variasi keton sehingga dihasilkan senyawa analog kurkumin monoketon. Pengujian aktivitas antidiabetes senyawa analog kurkumin dilakukan melalui inhibisi enzim α-glukosidase yang diisolasi dari beras lapuk (*Oryza sativa*).

Tahapan awal penelitian ini yaitu analog kurkumin disintesis dengan mereaksikan sinamaldehid dan monoketon berupa aseton (analog kurkumin A [(1*E*,3*E*,6*E*,8*E*)-1,9-difenil-1,3,6,8-nanotetraen-5-on]), siklopentanon (analog kurkumin B [(2*E*,5*E*)-2,5-bis((*E*)-3-fenilalilidin) siklopentanon]), dan sikloheksanon (analog kurkumin C [(2*E*,6*E*)-2,6-bis((*E*)-3-fenilalilidin) sikloheksanon]) dalam pelarut etanol. Sintesis tersebut dilakukan dalam kondisi basa KOH dengan pengadukan pada suhu 52 °C selama 50 menit. Seluruh senyawa hasil sintesis dianalisis strukturnya menggunakan FTIR, *direct inlet*-MS, ^{1}H- dan ^{13}C-NMR. Tahap selanjutnya analog kurkumin hasil sintesis diuji aktivitasnya sebagai inhibitor enzim α-glukosidase.

Hasil penelitian menunjukkan bahwa analog kurkumin monoketon hasil sintesis diperoleh rendemen berurutan sebesar 85,57; 72,15; dan 82,97%. Hasil berupa padatan berwana kuning dengan titik leleh berurutan sebesar 116,60–122,40; 196,20–200,10; dan 142,30–148,10 °C. Hasil uji inhibisi terhadap enzim α-glukosidase mengindikasi bahwa analog kurkumin B memiliki aktivitas tertinggi dan cukup berpotensi untuk menginhibisi enzim α-glukosidase dengan persentase inhibisi sebesar 70,71%.

Kata kunci: analog kurkumin monoketon, sinamaldehida, enzim α-glukosidase, antidiabetik

ABSTRACT

SYNTHESIS OF CURCUMIN ANALOGUES MONOKETONE FROM CINNAMALDEHYDE AND THEIR INHIBITION ASSAY AGAINST α-GLUCOSIDASE ENZYME

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The synthesis of curcumin analogues monoketone as target compounds from cinnamaldehyde and inhibition assay against α-glucosidase enzyme had been performed. The stepwise of synthesis was performed by aldol condensation Claisen-Schmidt reaction and used ketones variation to give curcumin analogues monoketone. The antidiabetic activity of curcumin analogues was carried out by inhibition test against α-glucosidase enzyme of mildwed rice (*Oryza sativa*).

The first step of synthesis was started by reacting cinnamaldehyde and monoketones such as acetone (curcumin analog A [(1*E*,3*E*,6*E*,8*E*)-1,9-diphenyl-1,3,6,8-nanotetraen-5-one]), cyclopentanone (curcumin analog B [(2*E*,5*E*)-2,5-bis((*E*)-3-phenylallylidene) cyclopentanone], and cyclohexanone (curcumin analog C [(2*E*,6*E*)-2,6-bis[(*E*)-3-phenylallylidene] cyclohexanone]) in etanol as solvent. The synthesis was carried out in base condition (KOH) by stirring at 52 °C for 50 minutes. The stuctures of all products were identified by using FTIR, *direct inlet*-MS, ^{1}H- and ^{13}C-NMR. Futhermore, the activity of curcumin analogues was tested against with α-glucosidase enzyme inhibition.

The results show that the curcumin analogues (A-C) were yielded in 85.57; 72.15; and 82.97%, respectively as yellow solid. The melting point of curcumin analogues (A-C) were at 116.60–122.40; 196.20–200.10; and 142.30–148.10 °C, respectively. The inhibition against α-glucosidase enzyme indicated that the curcumin analog B was potential to inhibit α-glucosidase enzyme with the highest activity by giving inhibtion percentage of about 70.71% at 2.5 mM.

Keywords: curcumin analogues monoketone, cinnamaldehyde, α-glucosidase, antidiabetic