SINTESIS ANALOG KURKUMIN MONOKETON BERBAHAN DASAR 4-METOKSIBENZALDEHIDA DAN AKTIVITASNYA SEBAGAI INHIBITOR ENZIM α-GLUKOSIDASE DARI BERAS LAPUK

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INTISARI

Telah disintesis senyawa analog kurkumin CA1 dengan nama kimia [(2E,6E)-2,6-bis(4-metoksibenzilidena) sikloheksanon], CA2 [(2E,5E)-2,5-bis (4-metoksibenzilidena) siklopentanon], dan CA3 [(1E,4E)-1,5-bis(4-metoksifenil) penta-1,4-dien-3-on] serta uji aktivitasnya sebagai inhibitor enzim α-glukosidase hasil isolasi dari beras lapuk. Ketiga senyawa analog kurkumin disintesis dari bahan dasar 4-metoksibenzaldehida dengan keton berupa sikloheksanon, siklopentanon, dan aseton. Analog kurkumin CA1, CA2, dan CA3 disintesis dengan mereaksikan senyawa 4-metoksibenzaldehida dengan sikloheksanon, siklopentanon, dan aseton menggunakan katalis basa berupa KOH. Analog kurkumin terbentuk setelah pengadukan selama 50 menit pada suhu 50 ºC. Reaksi yang terjadi merupakan reaksi kondensasi aldol silang Claisen-Schmidt. Ekstrak enzim α-glukosidase dihasilkan melalui isolasi dari beras lapuk dengan pH optimum ekstraksi 4,5. Fraksi yang digunakan adalah yang mempunyai aktivitas tertinggi, yaitu fraksi II. Pengujian parameter kinetik K_m dan V_{maks} menghasilkan nilai sebesar 1,53 mM dan 0,03 U/mL.

Hasil penelitian menunjukkan analog kurkumin berhasil disintesis dengan rendemen CA1 30,36%, CA2 70,80%, dan CA3 64,62%. Senyawa analog kurkumin CA2 mempunyai aktivitas inhibisi α-glukosidase tertinggi dibandingkan analog kurkumin CA1 dan CA3. Aktivitas inhibisi tertinggi analog kurkumin CA2 dihasilkan pada konsentrasi 2,50 mM dengan persen inhibisi sebesar 82,80%. Hasil ini menunjukkan potensi inhibisi yang lebih baik dibandingkan senyawa quersetin. Tipe inhibisi yang ditunjukkan analog kurkumin CA2 adalah kompetitif dengan nilai K_m 1,66 mM dan V_{maks} 0,03 U/mL.

Kata Kunci: 4-metoksibenzaldehida, analog kurkumin, α-glukosidase

SHYNTHESIS OF MONOKETO CURCUMIN ANALOGUES MADE FROM 4-METHOXYBENZALDEHYDE AND THEIR ACTIVITY AS INHIBITORS OF α-GLUCOSIDASE ENZYME FROM MILDEWED RICE

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ABTSRACT

Curcumin analogues CA1 [(2E,6E)-2,6-bis (4-methoxybenzylidena) cyclohexanone], CA2 [(2E,5E)-2,5-bis (4-methoxybenzylidena) cyclopentanone], and CA3 [(1E,4E)-1,5-bis (4-methoxyphenyl) penta-1,4-dien-3-one] have been sythesized and tested their activities as α-glucosidase inhibitor from mildewed rice. The curcumin analogues were synthesized from 4-methoxybenzaldehyde with cyclohexanone, cyclopentanone, and acetone respectively. Curcumin analogues CA1, CA2, and CA3 were synthesized from 4-methoxybenzaldehyde with cyclohexanone, cyclopentanone, and acetone using KOH base catalyst. However stirring for 50 minutes at 50 ºC produced curcumin analogues. The reaction is Claisen-Schmidt cross aldol condensation. The α-glucosidase enzyme extract was produced by mildewed rice with optimum extraction at pH 4.5. The fraction with highest activity was fraction II. The results of kinetic parameter test showed K_m and V_{maks} value at 1.53 mM and 0.03 U/mL.

The results showed that curcumin analogues were succesfully synthesized with yield of CA1 30.36%, CA2 70.80%, and CA3 64.62%. Curcumin analog CA2 has highest inhibition activity than CA1 and CA3. The highest activity of CA2 showed at concentration 2.50 mM with inhibition percent 82.80%. This result showed inhibiton potention better than quersetin. The type of CA2 inhibition was competitive with K_m and V_{max} value 1.66 mM and 0.03 U/mL.

Key words: 4-methoxybenzaldehyde, curcumin analog, α-glucosidase