SINTESIS ANALOG KURKUMIN DARI TURUNAN BENZALDEHIDA DAN MONOKETON SERTA UJI AKTIVITAS DAN EFEK SINERGISITASNYA DENGAN ASAM FERULAT SEBAGAI INHIBITOR α-AMILASE

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INTISARI

Sintesis senyawa analog kurkumin berbahan dasar veratraldehida dan *p*-anisaldehida, dan uji inhibisi enzim α-amilase serta sinergisitasnya dengan asam ferulat telah dilakukan. Penelitian ini bertujuan untuk mensintesis senyawa analog kurkumin, mengetahui aktivitas dan efek sinergisitas dengan asam ferulat sebagai inhibitor enzim α-amilase dengan pengujian secara *in vitro*. Tahap sintesis melibatkan kondensasi Claisen-Schmidt dari aldehida aromatik (veratraldehida dan *p*-anisaldehida) dengan monoketon (sikloheksanon dan siklopentanon) menggunakan katalis kalium hidroksida 8% dalam pelarut etanol, menghasilkan senyawa analog kurkumin (**1-4**) berwarna kuning dengan rendemen berturut-turut sebesar 26,39; 31,13; 18,42; dan 31,87%. Elusidasi struktur terhadap semua produk dilakukan dengan spektrometer FTIR, *Direct Inlet*-MS, ^{1}H- dan ^{13}C-NMR.

Uji aktivitas inhibisi senyawa analog kurkumin terhadap enzim α-amilase dan sinergisitasnya dengan asam ferulat menggunakan iodin sebagai reagen dan diukur absorbansinya pada panjang gelombang 568 nm dengan spektrofotometer UV-vis menunjukkan % inhibisi masing-masing senyawa analog kurkumin (**1-4**) pada konsentrasi 1 mM sebesar 58,17; 33,03; 22,95; dan 91,50%. Analog kurkumin menunjukkan efek sinergisitas dengan asam ferulat pada perbandingan konsentrasi senyawa analog kurkumin dan asam ferulat (1:8) untuk analog kurkumin **1** dan **2** dengan aktivitas inhibisi enzim α-amilase sebesar 98,65 dan 99,23%, dan pada perbandingan konsentrasi (1:4) untuk analog kurkumin **3** dan **4** sebesar 98,37 dan 99,14%.

Kata kunci: analog kurkumin, veratraldehida, *p*-anisaldehida, enzim α-amilase, asam ferulat

SYNTHESIS OF CURCUMIN ANALOGS FROM BENZALDEHYDE DERIVATIVE AND MONOKETONE AND THEIR ACTIVITY AND SYNERGISM EFFECT WITH FERULIC ACID AS α-AMYLASE INHIBITOR

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ABSTRACT

Synthesis of curcumin analogs from veratraldehyde and *p*-anisaldehyde and their inhibition test towards α-amylase enzyme and their synergism effect with ferulic acid (FA) have been performed. The synthesis involves Claisen-Schimdt condensation from aromatic aldehyde (veratraldehyde and *p*-anisaldehyde) with monoketones (cyclohexanone and cyclopentanone) using potassium hydroxide as catalyst in ethanol, to produce curcumin analogs (**1-4**) as yellow solid in 26.39; 31.13; 18.42; and 31.87% yield, respectively. Structure elucidation of all products was carried out by means of FTIR, Direct Inlet-MS, ^{1}H- and ^{13}C-NMR spectrometers.

The inhibitory activity test of the curcumin analogs compound against α-amylase enzyme and their synergism with ferulic acid used iodine as a reagent. The inhibition percentage was calculated using the quantized absorbance obtained from UV-vis spectrophotometer at wavelength of 568 nm. The assay of curcumin analogs (**1-4**) towards α-amylase showed inhibition percentage of 58.17; 33.03; 22.95; and 91.50% at concentration 1 mM. The result showed that the curcumin analogs displayed synergism effect with ferulic acid towards α-amylase. The curcumin analogs **1** and **2** demonstrated potential inhibition with % inhibition of 98.65 and 99.23%, respectively, at concentration curcumin : FA of 1:8. In addition, the curcumin analogs **3** and **4** showed the inhibition percentage of 98.37 and 99.14%, respectively, at the concentration ratio of curcumin and FA of 1:4.

Keywords: curcumin analogs, veratraldehyde, *p*-anisaldehyde, α-amylase enzyme, ferulic acid