

SINTESIS ANALOG KURKUMIN MONO-KETON BERBAHAN DASAR BENZALDEHIDA DAN UJI AKTIVITASNYA SEBAGAI INHIBITOR ENZIM α -AMILASE SERTA EFEK SINERGITAS DENGAN ASAM FERULAT

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INTISARI

Sintesis analog kurkumin mono-ke-ton berba-han dasar benzaldehida dan uji aktivitasnya sebagai inhibitor α -amilase serta efek sinergitas dengan asam ferulat telah dilakukan. Penelitian ini diawali dengan sintesis senyawa analog kurkumin melalui kondensasi Claisen-Schmidt dengan mereaksikan benzaldehid dengan aseton menghasilkan (1E,4E)-1,5-difenilpenta-1,4-dien-3-on (analog kurkumin **AS**) dan dengan sikloheksanon menghasilkan (2E,6E)-2,6-dibenzilidin sikloheksanon (analog kurkumin **SH**) menggunakan katalis kalium hidroksida 5% pada kondisi refluks selama 1 jam. Struktur senyawa hasil sintesis dielusidasikan dengan FTIR, *Direct Inlet*-MS, dan ¹H-NMR. Senyawa analog kurkumin hasil sintesis diuji aktivitas penghambatannya terhadap enzim α -amilase dengan penentuan persentase inhibisi dan menggunakan akar-bosa sebagai kontrol positif serta uji sinergitas dengan asam ferulat. Penentuan absorbansi menggunakan *microplate reader* pada panjang gelombang 550 nm.

Hasil sintesis diperoleh senyawa analog kurkumin **AS** dan **SH** berupa padatan berwarna kuning dengan rendemen 79,48% dan 89,60%. Hasil uji inhibisi analog kurkumin **AS** dan analog kurkumin **SH** terhadap enzim α -amilase menunjukkan aktivitas inhibisi tertinggi pada konsentrasi 1 mM sebesar 47,23% dan 68,50%. Uji sinergitas analog kurkumin **AS** dengan asam ferulat menunjukkan inhibisi tertinggi sebesar 86,21% pada perbandingan konsentrasi (**AS:AF**) 1:2 dan analog kurkumin **SH** dengan asam ferulat menunjukkan inhibisi tertinggi sebesar 82,32% pada perbandingan konsentrasi (**SH:AF**) 4:1 .

Kata-kata kunci : α -amilase , analog kurkumin, asam ferulat dan sinergi

SYNTHESIS OF MONO-KETONE CURCUMIN ANALOGUES FROM BENZALDEHYDE AND THEIR ACTIVITY ASSAY AS INHIBITOR OF α -AMYLASE ENZYME AND SYNERGISM EFFECT WITH FERULIC ACID

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ABSTRACT

Synthesis of mono-ketone curcumin analogues from benzaldehyde and activity assay as inhibitor of α -amylase enzyme and synergism effect with ferulic acid have been successfully conducted. This research is firstly initiated by synthesizing of mono-ketone curcumin analogues from benzaldehyde and various ketones (acetone and cyclohexanone) through Claisen-Schmidt aldol condensation to form (1E,4E)-1,5-diphenylpenta-1,4-dien-3-one (curcumin analogue **AS**) and (2E,6E)-2,6-dibenzylidenecyclohexanone (curcumin analogue **SH**) using alkaline catalyst such as potassium hydroxide 5% under reflux condition for an hour. The structures of the products were elucidated by FTIR Spectrophotometer, Direct Inlet-MS and $^1\text{H-NMR}$. Mono-ketone curcumin analogues were then evaluated for their activity assay towards inhibition of alpha amylase enzyme through determination of inhibition presentation and acarbose was used as positive control. The synergy assay with ferulic acid was also done with combination of certain mono-ketone curcumin analogues. The determination of length of absorbance using micro plate reader was observed on 550 nm.

The results showed that curcumin analogue **AS** and **SH** was obtained as yellow solid with a yield of 79.48% and 89.60% respectively. The results of inhibition assay towards alpha amylase enzyme showed the highest activity of 1 mM concentration those were 47.23% and 68.50%, respectively. The synergy assay of mono-ketone curcumin analogue **AS** showed the highest inhibition of 86.21% with the concentration comparison (**AS:FA**) 1:2, while for mono-ketone curcumin analogue **SH** showed the highest inhibition of 82.32% with the concentration comparison (**SH:FA**) 4:1

Keywords : : α -amilase, curcumin analogues, ferulic acid and synergy