SINTESIS SENYAWA TURUNAN HIDROKSI KALKON DAN ESTER KALKON SEBAGAI BAHAN AKTIF TABIR SURYA SERAPAN LEBAR UVA UVB, ANTIOKSIDAN SERTA INHIBITOR TIROSINASE

ARIS STIAWAN
1/383270/PA/16930

INTISARI

Sintesis dan uji aktivitas senyawa turunan hidroksi kalkon, bromo benzaldehida dan ester kalkon sebagai antioksidan, inhibitor tirosinase serta bahan aktif tabir surya serapan lebar telah dilakukan. Sintesis senyawa turunan kalkon dilakukan dengan mereaksikan asetofenon dan turunan benzaldehida dalam suasana basa selama 48 jam. Senyawa ester disintesis dengan mereaksikan senyawa turunan hidroksikalkon dan sinamoil klorida dengan trietilamin menggunakan metode refluks selama 200 menit. Hasil sintesis diidentifikasi dengan spektrometer FTIR, GC-MS, ^{1}H-NMR, dan ^{13}C-NMR. Uji aktivitas tabir surya dilakukan dengan spektrofotometer UV-Vis pada panjang gelombang 200-400 nm. Uji aktivitas antioksidan menggunakan metode DPPH. Uji aktivitas inhibisi dilakukan terhadap enzim tirosinase menggunakan L-DOPA.

Hasil sintesis senyawa 3,5-dibromo-4-hidroksibenzaldehida, 5-bromo-4-hidroksi-3-metoksibenzaldehida, 4-hidroksikalkon, 4-hidroksi-3-metoksikalkon, 4-sinamoksikalkon dan 4-sinamoksi-3-metoksikalkon dengan rendemen berturut-turut sebesar 60-99%. Panjang gelombang senyawa turunan kalkon berada pada 200-280 nm dan 320-400 nm. Panjang gelombang serapan UV senyawa turunan ester kalkon berada pada 240-380 nm. Uji aktivitas antioksidan senyawa hasil sintesis dihasilkan nilai IC_{50} 9,2-577,8 μgmL^{-1}. Uji aktivitas tabir surya senyawa 4-hidroksikalkon, 4-hidroksi-3-metoksikalkon, 4-sinamoksikalkon dan 4-sinamoksi-3-metoksikalkon nilai SPF sebesar 3,5-210,5 dan nilai PA sebesar 16,9-39,2. Uji aktivitas inhibitor tirosinase pada senyawa 4-hidroksikalkon memberikan nilai IC_{50} 1,6 μgmL^{-1} dan 4-hidroksi-3-metoksikalkon sebesar 1,2 μgmL^{-1}.

Kata kunci,: antioksidan, inhibitor tirosinase, *in vitro*, kalkon, tabir surya

SYNTHESIS OF HYDROXY CHALCONE AND ESTER CHALCONE DERIVATIVES AS ACTIVE BROAD SPECTRUM SUNSCREEN UVA UVB COMPOUND, ANTIOXIDANT SERTA TYROSINASE INHIBITOR

ARIS STIAWAN
15/383270/PA/16930

ABSTRACT

The synthesis and the activity test of hydroxychalcone derivative compounds, bromo benzaldehyde and chalcone esters as antioxidants, tyrosinase inhibitors and active ingredients of wide absorption sunscreen had been done. Synthesis of chalcone derivative compounds was carried out by reacting acetophenone and benzaldehyde derivatives in alkaline conditions for 48 hours. Synthesis of ester compounds was carried out by reacting the hydroxychalcone and cinnamoyl chloride derivatives with triethylamine using reflux method for 200 minutes. The synthesized products were indentified by FTIR Spectrometer, GC-MS, ^{1}H-NMR, and ^{13}C-NMR Spectrometer. The sunscreen activity was tested by UV-Vis Spectrophotometer at wavelength interval of 200-400 nm. Antioxidant activity was tested by DPPH method. The inhibitory activity was tested for the tyrosinase enzyme by L-DOPA as a substrate.

The synthesis of 3,5-dibromo-4-hydroxybenzaldehyde, 5-bromo-4-hydroxy-3-methoxybenzaldehyde, 4-hydroxychalcone, 4-hydroxy-3-methoxychalcone, 4-cinnamoxychalcone and 4-cinnamoxy-3-methoxychalcone gave yield of 60-99%. UV absorption of chalcone derivatives appeared as 200-280 nm and 320-400 nm. UV absorption of chalcone ester derivatives appeared as 240-380 nm. Antioxidant activity test of the synthesized compound gave IC_{50} values ranging from 9.2 to 57.8 μgmL^{-1}. The sunscreen activity of 4-hydroxychalcone, 4-hydroxy-3-methoxychalcone, 4-cinnamoxychalcone and 4-cinnamoxy-3-metoxychalcone were of SPF 3.5-210.5 and PA values were 16.9-39.2. The tyrosinase inhibitor activity test of 4-hydroxychalcone afforded a value of IC_{50} 1,6 μgmL^{-1} and that of 4-hydroxy-3-methoxychalcone was IC_{50} of 1,2 μgmL^{-1}.

Key words: antioxidants, chalcone, *in vitro*, sunscreen, tyrosinase inhibitors,