

**SINTESIS TURUNAN ETIL- α -ASETIL SINAMAT DAN UJI
AKTIVITASNYA SEBAGAI SENYAWA TABIR SURYA**

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ABSTRAK

Sintesis turunan etil- α -asetil sinamat dan uji aktivitasnya sebagai senyawa tabir surya telah dilakukan. Penelitian ini bertujuan untuk mensintesis senyawa etil- α -asetil-sinamat, etil- α -asetil-2,4-diklorosinamat, etil- α -asetil-3,4-dimetoksi sinamat dan menguji aktivitasnya sebagai senyawa aktif tabir surya. Etil- α -asetil-sinamat disintesis dengan mereaksikan benzaldehida dan etil asetoasetat melalui reaksi kondensasi Knoevenagel. Etil- α -asetil-2,4-diklorosinamat dan etil- α -asetil-3,4-dimetoksisinamat disintesis masing-masing menggunakan 2,4-diklorobenzaldehida dan 3,4-dimetoksibenzaldehida dengan etil asetoasetat. Reaksi terjadi pada kondisi basa dengan katalis piridin pada suhu 100 °C selama 24 jam menggunakan refluks. Senyawa hasil sintesis dikarakterisasi dengan spektrofotometer FT-IR, GC-MS, ¹H- dan ¹³C-NMR. Uji aktivitas tabir surya dilakukan secara *in vitro* menggunakan spektrofotometer UV-Vis.

Hasil sintesis menunjukkan etil- α -asetil sinamat, etil- α -asetil-2,4-diklorosinamat, dan etil- α -asetil-3,4-dimetoksisinamat yang diperoleh berupa cairan berwarna coklat dengan persen hasil berturut-turut sebesar 47, 65, dan 40%. Serapan UV etil- α -asetil sinamat, etil- α -asetil-2,4-diklorosinamat, dan etil- α -asetil-3,4-dimetoksisinamat menunjukkan profil elektronik pada daerah UV-B dengan absorbansi maksimum masing-masing pada 282, 284, 310 nm dan ketiga senyawa memiliki jenis proteksi maksimal dengan nilai SPF masing-masing sebesar 12,81; 15,29; dan 8,36 pada konsentrasi yang berbeda dari tiap senyawa yaitu 5, 10, dan 25 $\mu\text{g mL}^{-1}$ sedangkan campuran dari ketiga senyawa memiliki jenis proteksi ultra pada konsentrasi 5 $\mu\text{g mL}^{-1}$ dengan nilai SPF sebesar 50,80.

Kata Kunci: Etil- α -asetil sinamat, kondensasi Knoevenagel, SPF, Serapan UV, Tabir Surya.

SYNTHESIS OF ETHYL- α -ACETYL CINNAMATE DERIVATES AND THEIR ACTIVITY TEST AS SUNSCREEN

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ABSTRACT

Synthesis of ethyl- α -acetyl-cinnamate derivatives and their activity test as sunscreen have been done. The objectives of the research were to synthesize ethyl- α -acetyl-cinnamate, ethyl- α -acetyl-2,4-dichlorocinnamate, and ethyl- α -acetyl-3,4-dimethoxycinnamate and to study their potential as UV filters. Ethyl- α -acetyl-cinnamate synthesis was synthesized by reacting benzaldehyde with ethyl acetoacetate through Knoevenagel condensation. Meanwhile, ethyl- α -acetyl-2,4-dichlorocinnamate and ethyl- α -acetyl-3,4-dimethoxycinnamate were synthesized from 2,4-dichlorobenzaldehyde and 3,4-dimethoxybenzaldehyde, respectively, with ethyl acetoacetate. The reactions occurred in basic condition with pyridin as catalyst and were conducted by reflux for 24 hours at 100 °C. Synthesized products then were characterized by FT-IR, GC-MS, ¹H- and ¹³C-NMR spectrometers. The activity test as sunscreen was determined by using UV-Vis spectrophotometry method.

The results obtained, ethyl- α -acetyl-cinnamate, ethyl- α -acetyl-2,4-dichlorocinnamate, and ethyl- α -acetyl-3,4-dimethoxycinnamate, were forms of brown oil with 47; 65; and 40% of yields, respectively. UV absorbance of each product showed electronic profiles in the UV-B region with maximum absorbance at 282, 284, and 310 nm, respectively and these compounds have maximum protection with SPF number of 12.81, 15.29, and 8.36 at concentration of 5, 10 and 25 $\mu\text{g mL}^{-1}$, respectively. Mixture of these compounds resulted in an ultra protection type at a concentration of 5 $\mu\text{g mL}^{-1}$ with SPF number of 50.80.

Keywords: ethyl- α -acetyl-cinnamate, Knoevenagel condensation, SPF number, sunscreen, UV absorbance.