

ABSTRACT

The Effect of Steric Hindrance on the Synthesis of *o*-Acetoxycinnamic Acid and *o*-Butyryloxy-cinnamic Acid Using Micro Wave Irradiation

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In recent years, derivatization of 2-hydroxycinnamic acid or *o*-coumaric acid has become an important area of drug development. On the other hand, the steric hindrance is one of the most determining factor in organic synthesis. This research developed two ester derivatives of *o*-coumaric acid, i.e. *o*-acetoxycinnamic acid and *o*-butyryloxy-cinnamic acid, through reaction with acetyl and butyryl chloride. The purpose of this study was to determine the effect of steric hindrance on the microwave assisted acyl nucleophilic substitution to form esters from *o*-coumaric acid using acyl halides. The reaction was carried out at a power of 120-Watts and using 14 mmol of acyl halides. *o*-acetoxycinnamic acid was completely formed at 1x30 seconds with a yield of 97,52 %, $\pm 0,79$ greater than the percent yield of *o*-butyryloxy-cinnamic acid, where the synthesis of *o*-butyryloxy-cinnamic acid took 2x30 seconds to achieve complete reaction with a yield of 94,36 % $\pm 0,44$. Statistical analysis shows a significance value of 0.008 which is less than 0.05. This means that there are significant differences in the use of acyl chloride in the form of acetyl chloride and butyryl chloride with the use of acetyl chloride as reagent will result in a higher percent yield. That is, steric hindrance will have an influence in the esterification reaction between *o*-coumaric acid and acyl halides. The greater the steric hindrance the longer the reaction will take and yield of the results obtained will be less.

The characteristics of the target compounds were carried out using FT-IR spectrophotometry and $^1\text{H-NMR}$ spectrometry. These characterizations have shown that *o*-acetyloxy-cinnamic acid and *o*-butyryloxy-cinnamic acid have been successfully synthesized.

Keywords: *o*-acetoxycinnamic acid, *o*-butyryloxy-cinnamic acid, acyl halida, microwave irradiation, steric hindrance.