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SYNTHESIS AND EVALUATION OF ASPIRIN ASSISTED BY MICROWAVE OVEN

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ABSTRACT

Microwave synthetic methods were devised for three lab reactions. The synthesis of Aspirin. These reactions are all done in either general chemistry or organic chemistry. Under conventional heating methods, the aspirin synthesis requires heating at 55 °C for 30 minutes. The proposed microwave methods provide shorter reaction times (7 min. at 175 watts) while maintaining similar, if not better, yields. The aspirin and phenytoin syntheses were shortened to 7 minutes, and the Claisen condensation was shortened to 4.5 minutes. The microwave method produced a 85.88% yield for aspirin, while conventional yield was 72.08%.

KEY WORDS

Aspirin, Microwave oven, Phenytoin, Organic Chemistry

INTRODUCTION

In organic chemistry, many syntheses take hours under normal heating conditions. Microwave chemistry allows such reactions to proceed at a fraction of the time, and boasts better yields. A microwave emits oscillating magnetic fields, causing polar molecules to rotate along with the magnetic field. This movement of molecules causes more interactions between molecules.

Microwave reactions have been shown to be much faster, making these reactions useful. One such use is applying microwave chemistry in the undergraduate organic lab. Using a microwave in the organic chemistry lab can help students learn about optimization, while reducing wasted time in the lab. Students can run multiple reactions in the time it usually takes to run one reaction.

Aspirin can be used as a painkiller, but it is also given to people who are at a higher risk of heart attack. Aspirin lowers the risk of forming blood clots in arteries, decreasing the risk of heart attack. As well as being a blood thinner, aspirin is an analgesic that is used to reduce swelling. The synthesis of aspirin is an organic reaction known as an acetylation. The reaction proceeds when the alcohol group of salicylic acid attacks one of the carbonyl groups of acetic anhydrides. Now day's technique is considered as an important approach toward green chemistry, because this technique is more environmentally friendly. This technology is still under-used in the laboratory and has the potential to have large impact on the fields of screening, combinatorial chemistry, medicinal chemistry and drug development. Conventional method of organic synthesis usually needs longer heating time, tedious apparatus setup, which result in higher cost of process and the excessive use of solvents/ reagents lead to environmental pollution. This growth of green chemistry holds significant potential for a reduction of the by product, a reduction in waste production and a lowering of the energy costs. Due to its ability to couple directly with the reaction molecule and by-passing thermal conductivity leading to a rapid rise in the temperature, microwave irradiation has been used to improve many organic syntheses.