

Abstract

Clopidogrel is an antiplatelet medication used for treating one of the major contributors of mortality worldwide – cardiovascular diseases (CAVDs). The conventional synthesis of clopidogrel as a complex organic molecule can be time-consuming and costly as various reaction conditions need to be set and maintained. A simpler method following the Multicomponent Reaction (MCR), specifically Ugi-3 Component Reaction (Ugi-3CR), utilizing *tert*-butyl isocyanide is a proposed solution to reduce synthesis cost especially for large-scale production of the drug. The research also has the objective of optimizing this alternate method to achieve the highest possible yield. Several reaction conditions were established, and amongst them is utilizing water as the solvent as a solution for “green chemistry”. Purification of the isolates obtained is done using Column Chromatography (CC) utilizing petroleum ether : ethyl acetate (0-15%) as the eluent. As for characterization, Infrared Spectroscopy (IR), Nuclear Magnetic Resonance (NMR), Liquid Chromatography Mass Spectrometry (LCMS) and Thin Layer Chromatography (TLC) are utilized. The result of the study found that a clopidogrel intermediate with a high yield of 81% was obtained by Ugi-3CR at 60°C for 16 hours, using methanol (MeOH) as solvent and without formic acid catalyst. Though the formation of the final clopidogrel product was successfully detected, it was not able to be obtained due to excessive amounts of impurities. Conclusively, limitations of the study were present which included impropriety in the final esterification process which could be optimized in further studies.

Keywords: Clopidogrel, Multicomponent Reaction (MCR), Ugi-3CR, *tert*-butyl isocyanide