Title - Novel Tandem Reaction to Synthesize Substituted Benzaldehydes
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Abstract: One of the foundations upholding chemical engineering, pharmacology, and medicine is organic chemistry. A plethora of various organic synthesis methods mark the beginnings of drug discovery and compounds required for the essentials of daily functioning. Despite organic synthesis' necessity in society's progression, great difficulty and the absorption of unnecessary funds and time are commonly a part of organic synthesis. Therefore, eliminating the wasted money and effort while maintaining high-yielding production of desired products is a prime goal within the field of organic chemistry. One way to rid these unnecessaries is to target the time-consuming and costly purification and isolation process of individual intermediates. To do so involves designing tandem reactions since they do not require intermediate purification and may have their final product synthesized in one pot. Our research targeted a method for a one pot synthesis of benzaldehyde derivates. Each derivative was modified by the addition of a various functionality group at the ortho position. Our strategy took advantage of directed metalation to target the desired benzaldehyde ortho analogs. This involved initiating the process with formamide and phenyl lithium to create an alpha-amino alkoxide in situ. We believe that an addition of butyllithium followed by the addition of a desired electrophile would form an ortho-substituted benzaldehyde. Thus, we synthesized the compounds under inert atmospheres, such as argon, and under low temperatures. Products were purified by radial preparative layer chromatography. We identified the compounds by infra-red (IR) and nuclear magnetic resonance imaging (NMR) spectroscopy. We successfully show that the desired compounds were formed by utilizing the methods of tandem reactions.