Abstract

This research study presents a comprehensive investigation into the synthesis of carbocyclic glycosyl donors, carbocyclic nucleosides, *thio*-glycosyl donors, and *thio*-nucleosides – considered as key compounds with significant implications for the chemistry of nucleosides and glycosides. A series of organic reactions were performed for each scheme, curated to manufacture the desired target molecules. These reactions include acetonide protection, TBDPS protection, Wittig reaction, Swern oxidation, Grignard reaction, RCM, oxidative rearrangement, sodium borohydride reduction, cyclopropanation, Mitsunobu reaction, amination, Mesylation, cyclization, and Vorbrüggen condensation. All targeted products resulted in satisfactory yields in which product identity and purification were validated through TLC and ^{1}H-NMR. However, there were challenges encountered during the oxidative rearrangement reaction that led to the degradation of the desired product. Nevertheless, this research is still preceded to inspire further advancements in nucleoside and glycoside chemistry.

Keywords: *Nucleoside chemistry, carbocyclic glycosyl donors, carbocyclic nucleosides, thio-glycosyl donors, thio-nucleosides*