AUTOMATED SYNTHESIS OF MONOSACCHARIDE BUILDING BLOCKS AND APPLICATIONS IN OLIGOSACCHARIDE SYNTHESIS

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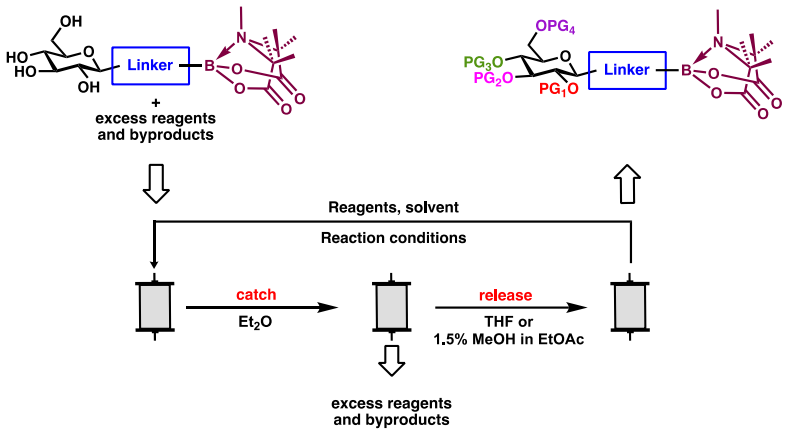
Despite significant progress in the synthesis of oligosaccharides, the synthesis of targets featuring complex glycosidic linkages of monosaccharide building blocks remains a challenge. These compounds are present in a wide range of biologically relevant compounds.
While much of the emphasis in the development of automated platforms for carbohydrate synthesis has been on the construction of oligosaccharides, manual syntheses of monosaccharide building blocks can represent up to 90% of the synthetic effort and thus constrain throughput [1]. This is often laborious and time-consuming. Furthermore, excess amounts of glycosyl donor building blocks are frequently used in glycosylations, presenting a pressing need to develop methods for streamlining the acquisition of monosaccharides.
This work aims to improve the purification of monosaccharides, which is often a bottleneck in the preparation of important carbohydrates. By using a purification tag, TIDA [2], the process of purifying monosaccharides is made simpler and more efficient. One of the key findings of this research is that the silica binary affinity properties of the TIDA tag can be extended to monosaccharides bearing a variety of protecting groups (>22 examples) [3]. This characteristic proved beneficial during the synthesis of the tagged molecules as it simplified purification and eliminated the need for arduous column chromatography. As a result, this process is potentially amenable to automation. This process significantly reduces the amount of silica and solvent used to isolate the products in each step and makes the synthesis more environment-friendly.



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