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A 2,3-CARBAMATE-BEARING ALLYL GALACTOSAMINE DONOR FOR THE SYNTHESIS OF REPEATING α-(1→4)-LINKED GALACTOSAMINE UNITS

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The 1,2-cis-linked 2-amino-2-deoxy sugar structure is found in various oligosaccharides of biological importance. The repeating GalpNAC-α-(1→4)-GalpNAC unit constitutes for example an essential motif incorporated in a range of oligosaccharides, e.g. the repeating unit of the O-antigen moiety of the lipopolysaccharide from Escherichia Coli O142 or Sphaerotilus natans.1) Vi antigen is instead a linear homopolymer of α-(1→4)-linked N-acetyl galactosaminuronic monomers, with a variable degree of O-acetylation at the C3 position. Vi antigen is a capsular polysaccharide found mainly in Salmonella typhi and Salmonella paratyphi C, two serotypes of Salmonella that are responsible for severe infection in humans.2)

Although in the past years there has been much progress in carbohydrate chemistry, 1,2-cis-selective glycosylation of gluco- or galactosamines is still a challenge. 2-Azido-glycosyl donors, developed many years ago, are still employed for the synthesis of 2-amino-2-deoxy α-glycosides, even if glycosylations suffer of low selectivity. Progress in resolving these issues has been made with the development of donors carrying a 2,3-trans-carbamate group, which has attracted much attention as a steredirecting protection in glycosylation reactions. The fused carbamate ring proved to be a non-participating group and favors the formation of α-glycosides. So far, different studies have demonstrated that 2,3-oxazolidinone protected thioglycosides are highly efficient substrates for the synthesis of α-linked glycosides.3)

Herein we report a new 2,3-oxazolidinone protected galactosamine donor, bearing an allyl group at the anomic position. The allyl group, in addition to its traditional role as a valuable anomic protecting group, can also be converted into a good leaving group for glycosylation. Thus, the allyl glycoside is first isomerized to the corresponding prop-1-etyl glycoside, which, after chemoselective activation of the anomic enol ether moiety with a suitable electrophile in the presence of the glycosyl acceptor, leads to the formation of the disaccharide product.4) This method has the advantage that prop-1-etyl glycoside can be directly derived from allyl glycoside with a variety of facile and highly effective isomerization methods and immediately subjected to glycosylation.

Herein we describe the synthesis of a galactosamine building block, which has the anomic position protected by an allyl group, and positions 2 and 3 involved in the formation of an oxazolidinone ring. The proper donor and acceptor to perform a α-(1→4) glycosylation have been obtained from this common building block. The new 2,3-oxazolidinone protected allyl galactosamine donor has been subjected to glycosylation reactions to study its reactivity and the stereoselectivity of the process.


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