

Synthesis of N-(2-hydroxy-3-methoxybenzylidene) - 2, 3, 4, 6-tetra-O-acetyl - β -D galactopyranosylamine as a new chiral Schiff base for asymmetric [2+2] cycloadditions

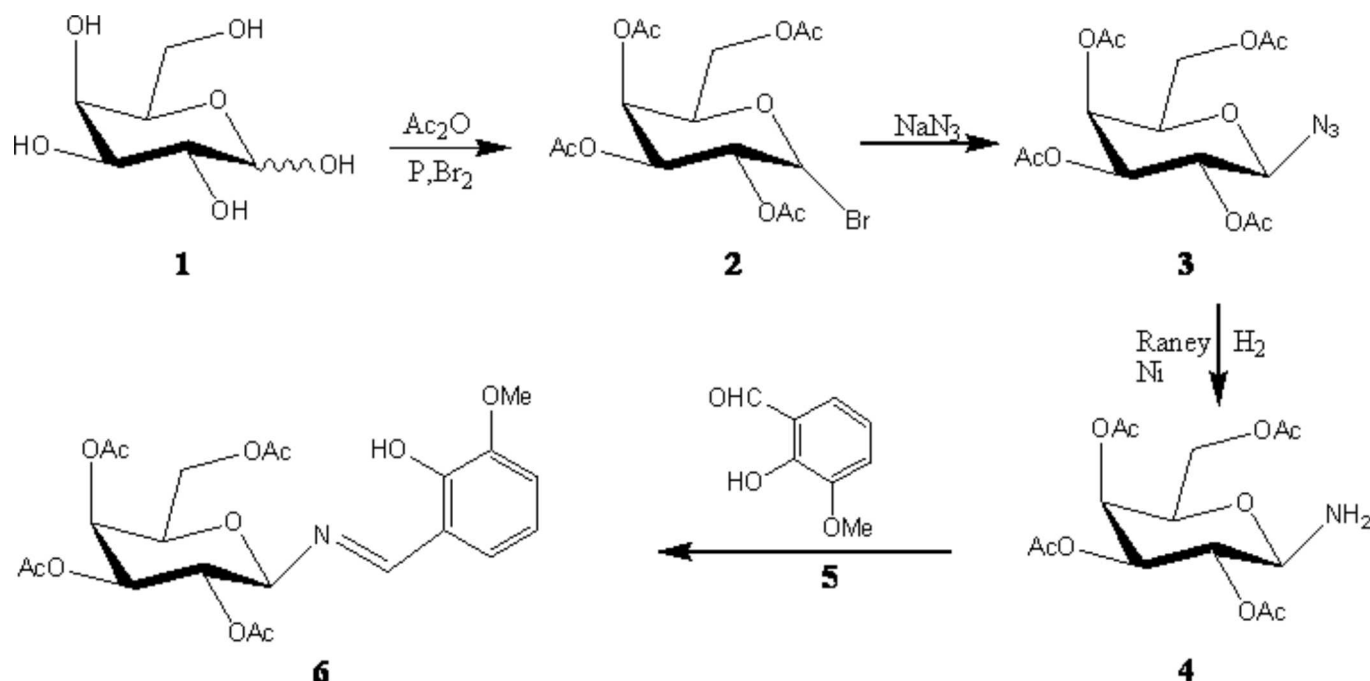
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The importance of carbohydrates for asymmetric synthesis is well recognized [1-4]. The reason that carbohydrates contain too many chiral centers and functional groups has limited their research about stereodifferentiating selection processes in asymmetric synthesis for a long time. During the past decades few carbohydrates have received increasing attention as stereodifferentiating auxiliaries in stereoselective syntheses [5]. Carbohydrates have been applied for stereo- and regioselective chemical reactions for last two decades. They could be used for biological recognition on membrane, and they play a prominent role in numerous biological processes such as tumor-cell growth [6], bacterial and viral infection or inhibition of glycosidases [2,7-9]. Glycosylamines are valuable intermediates in the preparation of nucleosides and drugs [10-12]. It has been proposed that when the Schiff base is derived from an optically active amine and an achiral aldehyde, the degree of distereoselectivity in the [2+2] cycloaddition varies [13-14]. The asymmetric Staudinger reaction utilizing 2,3,4,6-tetra-O-acetyl- β -D-galactopyranosylamine and 2,3,4,6-tetra-O-pivaloyl- β -D-galactopyranosylamine as the chiral auxiliary in the synthesis of 2-azetidinones has been reported by us and others [15-18]. We now report compound **6** as a new chiral auxiliary Schiff base for β -lactam syntheses.



D-(+)-Glucose **1** was converted to 2, 3, 4, 6-tetra-O-acetyl- β -D-galactopyranosylbromide **2** by a reported method [18]. Treatment of **2** with NaN_3 in 9:1 acetone-water afforded galactosylazide **3** in 95% yield. Reduction of **3** by hydrogenation in the presence of Raney Ni gave 2, 3, 4, 6-tetra-O-acetyl- β -D-galactopyranosylamine as a white solid which was recrystallized from ethanol. o-Vanillin **5** (0.87 g, 5.71 mmol) was added to a solution of 2,3,4,6-tetra-O-acetyl- β -D-galactosylamine **4** (2.00 g, 5.76 mmol) in ethanol (35 ml). The mixture was refluxed for 5 h. The resulting yellow solid N-(2-hydroxy-3-methoxybenzylidene) - 2,3,4,6-tetra-O-acetyl - β -D galactopyranosylamine **6** was collected in 90% yield by filtration.

$$[\alpha]_D^{22} = +24.5 \text{ (c = 0.02, CHCl}_3\text{)}$$

Melting point: 180-182 °C.

IR (KBr, cm^{-1}): 3357.8-3620.1 (OH); 1743.5 (C=O); 1633.6 (C=N) cm^{-1} .

$^1\text{H-NMR}$ (250MHz, $\text{DMSO-}d_6$): δ = 12.44 (OH, br, 1H); 8.53 (NCH, s, 1H); 7.30-6.82 (Ar-H, m, 4H); 3.84 (OCH₃, s, 3H); 1.91-2.10 (4CH₃CO, s, 12H),

$^{13}\text{C-NMR}$ (62.9 MHz, $\text{DMSO-}d_6$): δ = 170.82-165.03 (C=O); 124.90-115.21 (Ar); 21.10-20.97(OCH₃).

MS (m/z, %): 481 (2.00); 331 (2.10); 169 (21.60); 109 (18.10); 43 (100.00).

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