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ONE-STAGE α-GLUCOSYLATION USING TETRA-O-BENZYL-α-D-GLUCOSE AND MIXTURE OF TRIMETHYLSILYL BROMIDE, COBALT(II) BROMIDE, TETRABUTYLAMMONIUM BROMIDE, AND MOLECULAR SIEVE

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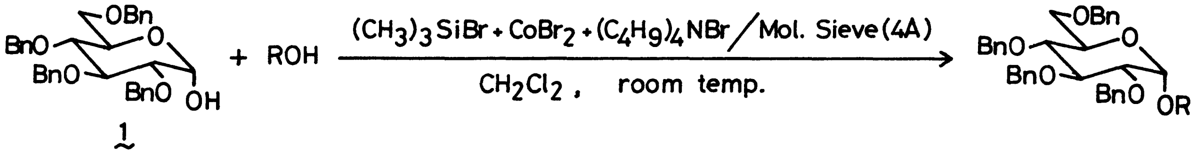
The one-stage α-glucosylation using 2,3,4,6-tetra-O-benzyl-α-D-glucopyranose and a mixture of trimethylsilyl bromide, cobalt(II) bromide, and tetrabutylammonium bromide in the presence of molecular sieve is presented.

A variety of α-glucosylation reactions starting from 2,3,4,6-tetra-O-benzyl-α-D-glucopyranose (**1**) have been reported.[1)] However, none of them can be performed in one-stage fashion; they always require the activation stage[1a)] or the preparation of an intermediate.[1b,c)] We now wish to communicate the one-stage[2)] α-glucosylation procedure using **1** and a composed reagent system of trimethylsilyl bromide, cobalt(II) bromide, and tetrabutylammonium bromide in dichloromethane containing molecular sieve (4A)

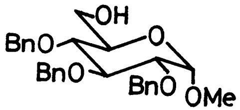
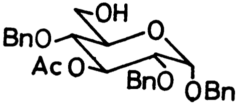
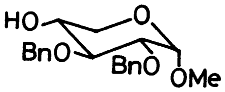


A typical procedure is as follows: To a mixture of **1** (90 mg, 0.17 mmol), cyclohexylmethanol (16 μl, 0.13 mmol), cobalt(II) bromide (37 mg, 0.17 mmol), tetrabutylammonium bromide (54 mg, 0.17 mmol), and molecular sieve (4A, 135 mg) in dichloromethane (0.45 ml), trimethylsilyl bromide (18 μl, 0.17 mmol) was added and the resulting mixture was stirred overnight at room temperature in the dark. After filtration, the reaction mixture was concentrated and chromatographed on silica gel as usual.

Table 1 shows the results of α-glucosylation of some alcohols including monosaccharide derivatives using this handy procedure.

The equimolar mixture of trimethylsilyl bromide and cobalt(II) bromide converted **1** rapidly into 2,3,4,6-tetra-O-benzyl-α-D-glucopyranosyl bromide (**2**). The ternary reagent system appearently brominates **1**, in the presence of alcohol, into **2** which undergoes the halide-catalyzed α-glucosylation.[3)]

Table 1 Results of Glucosylation[1]

Alcohol (ROH)	Reaction Time h	Yield of glucosides[2] %
Cyclohexylmethanol	16	100 (76)[3]
Cyclohexanol	16	90 (80)[3]
5α-Cholestan-3β-ol	16	87 (72)[4]
6-(2,4-Dinitroanilino)hexanol	16	94 (73)[4]
	16	69 (85)[5]
	42	73 (86)[6,7]
	42	36 (82)[7,8]

[1] Mol ratio of **1**, $CoBr_2$, $(CH_3)_3SiBr$, and $(C_4H_9)_4NBr$ to alcohol (ROH) was 1.3 and weight ratio of the molecular sieve to **1** was 1.5. [2] The value in parenthesis is the weight % of the α-anomer. [3] Glucosides were identified with those reported in ref. 2c. [4] Glucosides were identified with those reported in ref. 2d.
[5] Glucosides were identified with those reported in ref. 2a. The α-anomer, mp 105-106 °C, $[\alpha]_D^{20}$ +59° (c 1.0, $CHCl_3$) [lit.1b) mp 101.5 °C, $[\alpha]_D^{20}$ +59.3° (c 1.78, $CHCl_3$)].
[6] The α-anomer, mp 119-121 °C, $[\alpha]_D^{20}$ +88° (c 1.0, $CHCl_3$), the β-anomer mp 99-101 °C, $[\alpha]_D^{20}$ +22° (c 0.6, $CHCl_3$). [7] Glucosides gave correct analysis. [8] The α-anomer, $[\alpha]_D^{20}$ +58° (c 1.0, $CHCl_3$), the β-anomer, $[\alpha]_D^{20}$ +38° (c 1.5, $CHCl_3$).

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