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THE SYNTHESIS OF ANOMERIC METHYL 4-O-L-MYCAROSYL-β-D-MYCAMINOSIDES

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The anomeric forms of methyl 4-O-L-mycarosyl-β-D-mycaminoside (VII) were synthesized by the condensation of 3,4-O-carbonyl-L-mycarosyl chloride and methyl N-carboethoxy-des-N-methyl-2-O-p-phenylazobenzoyl-β-D-mycaminoside (III) and following removal of the acyl group and N-methylation.

Recently, we have carried out the glycosidation of L-mycarose, a neutral branched-chain sugar found in macrolide antibiotics, with the primary hydroxyl group of D-glucosamine1). Now, we wish to report an example of the glycosidation of L-mycarose with the secondary hydroxyl group: the synthesis of the anomeric forms of methyl 4-O-L-mycarosyl-β-D-mycaminoside (VII). The α-anomer (VIIa) is the disaccharide constituting some kind of the 16-membered macroride antibiotics2).

β-D-Mycaminose hydrochloride monohydrate3) was treated with acetyl bromide4) to give a bromide (I) in the form of hydrobromide, which was methanolyzed in the presence of, at first, silver oxide and then sodium methoxide to give methyl β-D-mycaminoside (II)5). II was treated with chloroethylformate in the presence of sodium carbonate6), hydrolyzed with sodium ethoxide, and then selectively azoylated with azoyl chloride in pyridine to give methyl N-carboethoxy-des-N-methyl-2-O-p-phenylazobenzoyl-β-D-mycaminoside (III); the C-2 substitution was checked by PMR at 100 MHz in C_6D_6.

III was condensed with 3,4-O-carbonyl-L-mycarosyl chloride1) in nitromethane in the presence of mercuric cyanide to afford methyl 4-O-(3,4-O-carbonyl-α-L-mycarosyl)-N-carboethoxy-des-N-methyl-2-O-p-phenylazobenzoyl-β-D-mycaminoside (IVa) as the main product (11%), as well as the β-anomer (IVb: 7%). IVa was successively ethanolyzed, hydrolyzed with hot barium hydroxide, and then N-methylated reductively (formaline/palladium/ethanol) to give methyl 4-O-α-L-mycarosyl-β-D-mycaminoside (VIIa).

The minor product, IVb was treated as just above to furnish the β-anomer of the titled glycoside (VIIb).

Thus, the ratio of the formation of the both anomers were 3 : 2; the predominant formation of α-glycoside was again observed1).

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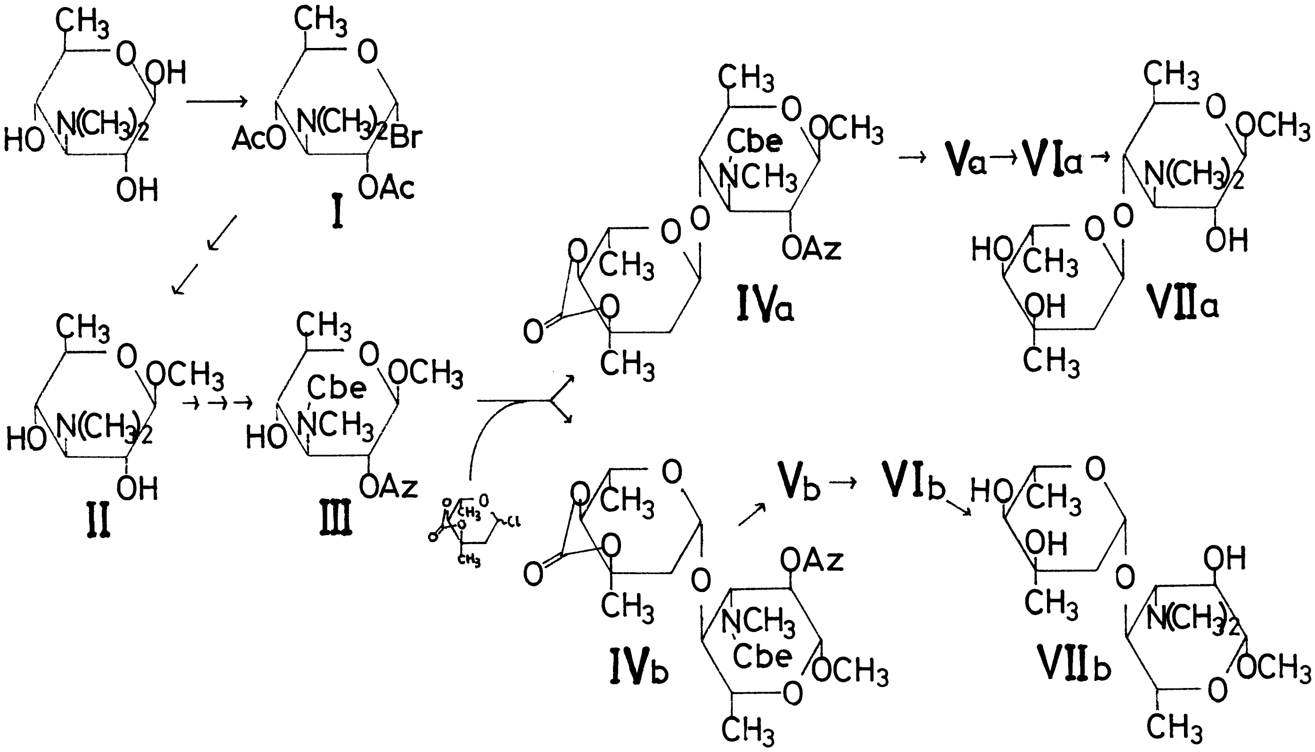

PHYSICAL DATA

Compounds	mp (°C)	$[\alpha]_D^{25}$ (%, solvent)
I	72 76	+100° (0.7, chloroform)
II	120 123	-35° (1.4, water)
III	134 136	-57° (1.3, chloroform)
IVa	97 99	+1.6°(1.0, chloroform)
IVb	176 178	+105° (1.0, chloroform)
Va	94 96	-84° (1.0, chloroform)
Vb	137 139°	+17° (1.0, chloroform)
VIa	glass	-78° (0.7, methanol)
VIb	195 197°	+8° (0.7, methanol)
VIIa	glass	-93° (1.1, ethanol)
VIIb	glass	+14° (0.9, ethanol)

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