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PREPARATION OF D-MANNOPYRANO-(cis-1',2'-b)-DIHYDROBENZOTHIAZINE

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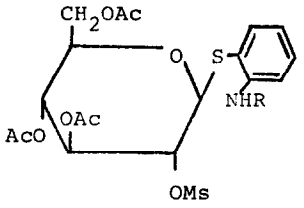
Recently much interest has been shown in the syntheses of nucleosides[1] having anhydro bond between the glycosyl moiety and pyrimidine or purine base. Although many aryl glycosides[2] and aryl thioglycosides[3] have been prepared for chromogenic substrates for the quantitative determination of glycosidase activity, synthetic study on aromatic glycosides corresponding to anhydro nucleosides has not been reported. Previously Tejima and his co-workers[4] have pointed out an anomalous high reactivity of secondary mesyl esters at C-2 in thiosugars to intramolecular nucleophilic substitution. From these standpoints, the authors designed further extention of synthetic study on aryl glycosides and aryl thioglycosides by the use of nucleophilic substitution of the secondary mesyl at C-2 by NH_2 group of aglycon. The present communication dealt with the formation of title compound from the new aromatic thioglucoside.

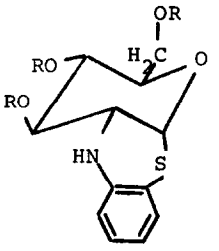
The aromatic thioglucoside has been synthesized by a slight modification of the method of Purves[5]. Reflux of two molar equivalents of potassium salt of o-aminobenzenethiol with one mole of 3,4,6-tri-O-acetyl-2-O-mesyl-α-D-glucopyranosyl bromide[6] in chloroform-methanol for 15 minutes afforded o-aminophenyl 1-thio-3,4,6-tri-O-acetyl-2-O-mesyl-β-D-glucopyranoside (1), m.p. 155-156, $[\alpha]_D^{23}$ +28° (c 1 in $CHCl_3$) in 82% yield. Acylation of 1 with acetic anhydride or benzoyl chloride in pyridine gave crystalline o-acetamidophenyl 1-thio-3,4,6-tri-O-acetyl-2-O-mesyl-β-D-glucopyranoside (2), m.p. 132-133, $[\alpha]_D^{23}$ +28° (c 1 in $CHCl_3$) in 50% yield and corresponding o-benzoyl-derivative (3), m.p. 138-139, $[\alpha]_D^{23}$ +94° (c 0.36 in $CHCl_3$) in 91% yield, respectively Sulfonation of 1 with mesyl chloride in pyridine gave dimesylate

namely, o-methanesulfonamidophenyl 1-thio-3,4,6-tri-O-acetyl-2-O-mesyl-β-D-glucopyranoside (4), m.p. 165-167, $[\alpha]_D^{23}$ -7.4° (c 0.37 in $CHCl_3$) in 87% yield.

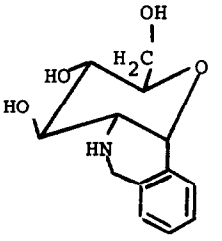


1. R=H 2. R=Ac

3. R=Bz 4. R=Ms



5. R=Ac 6. R=H



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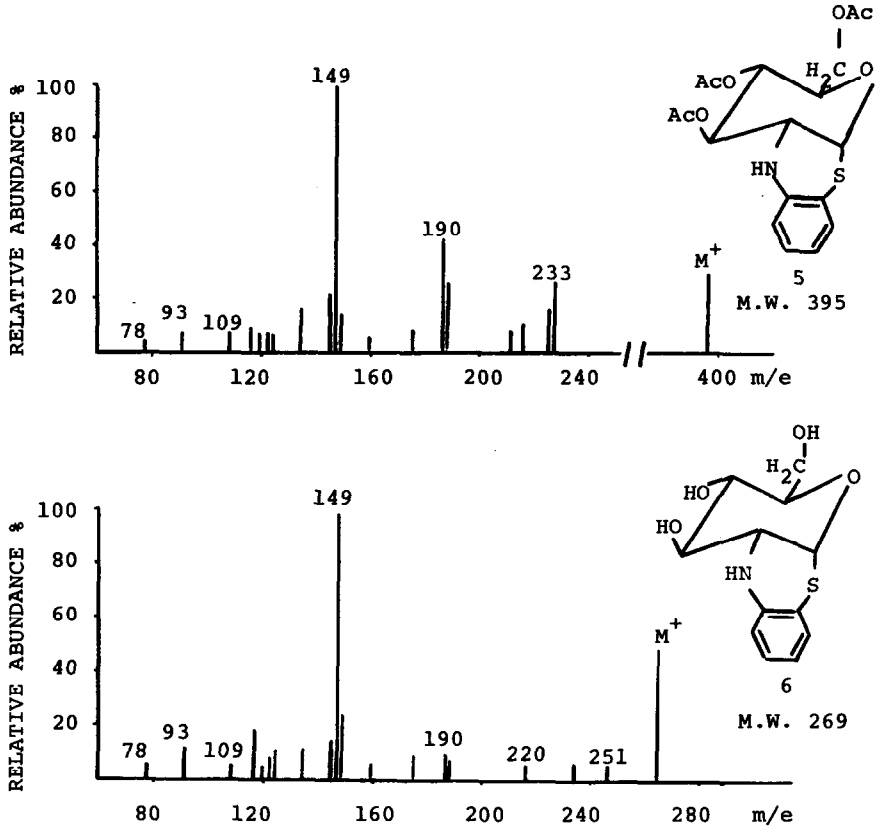
Reflux of 1 with an excess potassium acetate and sodium acetate in aqueous ethanol for 2 hours afforded crystals (5), m.p. 152-154, $[\alpha]_D^{23}$ +3° (c 1 in $CHCl_3$) in 38% yield. This product was also obtainable from 1 in 75% yield with a procedure, deacetylation of 1 followed by heating under reflux with sodium bicarbonate in aqueous ethanol and reacetylation with acetic anhydride in pyridine. The i.r. of 5 shows NH(3380 cm^{-1}) and no absorption near 1170-1180 cm^{-1} corresponding to mesyl. The u.v. of 5 shows moderate absorption near 307 mμ which appears to be characteristic of the $-NHC_6H_4S-$ group. Deacetylation of 5 with chilled sodium methoxide in methanol gave D-mannopyrano-(cis-1',2'-b)-dihydrobenzothiazine (6), m.p. 205-207, $[\alpha]_D^{23}$ -5° (c 0.2 in DMF). This compound is a new type of pyranobenzothiazine which has not yet been reported in literature. The mass spectra of 5 and 6 supported the postulated structures. The major fragmentation patterns of them are recorded below. It is quite interesting that the peak at m/e 149 corresponding with the benzothiazine moiety is observed.

Except anhydro nucleosides, only one example has been referred on the tricyclic compound with pyranose ring. In 1967, Wacker and Fritz[7] have reported the formation of D-glucopyrano-(cis-2',1'-c)-1,2,3,4-tetrahydro-isoquinoline (7).

Synthesis of other dihydrobenzothiazine or oxazine and studies on physiological activities of the sugar derivatives will be reported in the near future.

THE MASS SPECTRA OF D-MANNOPYRANODIHYDROBENZOTHIAZINE



All melting points are uncorrected. All new compounds gave satisfactory elemental analyses and n.m.r. spectra consistent with the assigned structure.

ACKNOWLEGEMENT

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