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Nucleosides, Nucleotides and Nucleic Acids

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713597286>

A Novel Route for the Synthesis of Fluorodeoxy Sugars and Nucleosides

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To cite this Article Mikhailopulo, Igor A. , Sivets, Grigorii G. and Khripach, Natalia B.(1999) 'A Novel Route for the Synthesis of Fluorodeoxy Sugars and Nucleosides', *Nucleosides, Nucleotides and Nucleic Acids*, 18: 4, 689 — 690

To link to this Article: DOI: 10.1080/15257779908041542

URL: <http://dx.doi.org/10.1080/15257779908041542>

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A NOVEL ROUTE FOR THE SYNTHESIS OF FLUORODEOXY SUGARS AND NUCLEOSIDES

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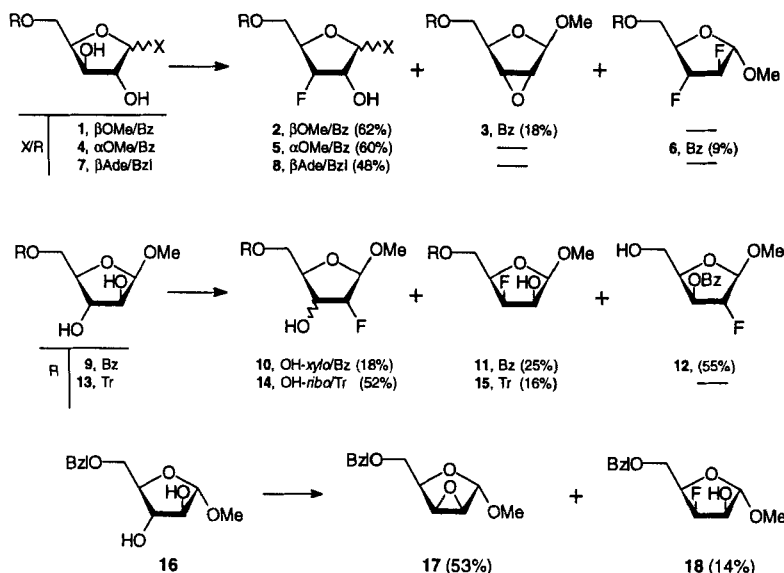
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ABSTRACT: Ring-fluorination of α - and β -D-pentofuranosides containing free secondary hydroxyl groups by (diethylamino)sulfur trifluoride (DAST) was studied.

Recently, we have described a new alternative for the preparation of 2,3-*cis* fluorodeoxy pentofuranosides using the reaction of (diethylamino)sulfur trifluoride (DAST) with methyl 5-O-benzyl- β -D-arabinofuranoside and its *xylo*-isomer¹. This study was continued and expanded, and especially focused on the influence of the configuration at the anomeric center and the nature of the 5-O-blocking group on the course of the transformation.

Treatment of methyl 5-O-benzoyl- β -D-xylofuranoside (**1**) with DAST in a molar ratio of 1:6 in anhydrous dichloromethane at room temperature for 19 h, followed by silica gel column chromatography, afforded the β -riboside **2** and the *ribo*-epoxide **3** in 62 and 18%, respectively. Under similar reaction conditions with the α -anomer **4** as starting material, the reaction was complete within 4 h at room temperature and the α -riboside **5** and the difluoride **6** were isolated by silica gel column chromatography¹ in 60 and 9% yield, respectively. Treatment of the β -xyloside **7** with DAST¹ gave, after chromatographic purification, the riboside **8** as the principal product (48%). These results point to the fact that the C(3)-O-SF₂NEt₂ derivatives are initially formed in the case of the xylosides. The distinctive feature of the reaction of DAST with the β -

arabinoside **9** (r.t., 5 h) consists in the formation of a 5,3-benzoxonium ion on one of the consecutive transformations which finally give rise to the inversion of the configuration at C(3) affording the xylosides **10** (18%) and **12** (55%); the lyxoside **11** was also isolated from the reaction mixture in a yield of 25%. In the presence of a non-participating 5-O-trityl group, compounds **14** and **15** were isolated in 52 and 16% yield, respectively, from the reaction products of **13** with DAST (r.t., 18 h). It may be thus reasonable to conclude that in the case of the β -arabinosides **9** and **13** the principal route of the reaction is the formation of the intermediate C(2)-O-SF₂NEt₂. Unlike **13**, the α -arabinoside **16** was converted (CH₂Cl₂/Py 1:1, r.t., 5 h) to the *lyxo*-epoxide **17** (53%) and the lyxoside **18** (14%) implying an intermediary formation of the C(3)-O-SF₂NEt₂ derivative.



In conclusion, we have demonstrated that the preparation of some fluorinated carbohydrates may be achieved in a good overall yield starting from the commercially available sugars. This approach provides a useful alternative to the previously described methods.

Acknowledgment: Financial support from the Alexander von Humboldt-Foundation (Bonn/Bad-Godesberg, Germany) is gratefully acknowledged.

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