Carbohydrate Research, 80 (1980) 354–355

Note

An efficient transformation of epoxides into olefins, using potassium iodide, zinc, and phosphorus(V) oxide in *N*, *N*-dimethylformamide

PER J. GAREGG, DIMITRIOS PAPADIMAS, AND BERTIL SAMUELSSON
Department of Organic Chemistry, Arrhenius Laboratory, University of Stockholm, S-106 91 Stockholm (Sweden)
(Received September 4th, 1979; accepted for publication, September 17th, 1979)

The deoxygenation of epoxides into olefins has received considerable attention in organic synthesis[1,2]. In carbohydrate chemistry, the conversion of epoxides into the corresponding olefinic sugars using potassium selenocyanate has been described[3].

During our work on the conversion of vicinal diols into olefins[4], the possibility of converting epoxides in the hexopyranose series into olefins was also considered. We now report that potassium iodide, zinc, and phosphorus(V) oxide in *N*,*N*-dimethylformamide at 90° efficiently transforms methyl 2,3-anhydro-4,6-*O*-benzylidene-α-D-hexopyranosides having the *allo* and *manno* configurations into methyl 4,6-*O*-benzylidene-2,3-dideoxy-α-D-*erythro*-hex-2-enopyranoside in yields of 86 and 83%, respectively. The advantages of this reaction system, apart from the high yields indicated, are the low cost and ready availability of the reagents.

EXPERIMENTAL

General methods were the same as those reported[5].

Methyl 4,6-O-benzylidene-2,3-dideoxy-α-D-erythro-hex-2-enopyranoside. — A mixture of methyl 2,3-anhydro-4,6-*O*-benzylidene-α-D-allo-(or manno-)pyranoside[6] (1.0 g, 3.79 mmol), phosphorus(V) oxide (5.38 g, 37.9 mmol), zinc (2.48 g, 37.9 mmol), and potassium iodide (3.77 g, 22.7 mmol) in *N*,*N*-dimethylformamide (50 ml) was stirred for 3 h at 90° (15 h for the *manno* compound). The mixture was cooled, and filtered through Celite which was then washed with toluene; the filtrate and washings were combined and extracted exhaustively with saturated, aqueous sodium hydrogencarbonate and then water. The organic phase was dried ($MgSO_4$), filtered, and concentrated, to yield the title compound (0.81 g, 86%, from the *allo* compound; and 0.78 g, 83%, from the *manno* compound), m.p. 117–119°, $[\alpha]_D$ +130° (*c* 1.0, chloroform); lit.[7] m.p. 117–119°, $[\alpha]_D$ +126° (chloroform).

ACKNOWLEDGMENTS

We thank Professor Bengt Lindberg for his interest, and the Swedish Natural Research Council for financial support.

REFERENCES

1 H. SUZUKI, T. FUCHITA, A. IWASA, AND T. MISHINA, *Synthesis*, (1978) 905–908, and references cited therein.
2 I. T. HARRISON AND S. HARRISON, *Compendium of Organic Synthetic Methods*, Vols. 1 and 2, Wiley–Interscience, New York, 1971 and 1974.
3 T. VAN ES, *Carbohydr. Res.*, 5 (1967) 282–285.
4 P. J. GAREGG AND B. SAMUELSSON, *Synthesis*, (1979) 469–470.
5 P. J. GAREGG AND B. SAMUELSSON, *Carbohydr. Res.*, 67 (1978) 267–270.
6 N. K. RICHTMYER, *Methods Carbohydr. Chem.*, 1 (1962) 107–113; L. F. WIGGINS, *ibid.*, 2 (1963) 188–191.
7 J. E. CHRISTENSEN AND L. GOODMAN, *J. Am. Chem. Soc.*, 83 (1961) 3827–3834.