Regio- and Stereoselective Formation of 1,3-Diols

N. Kocem
University of Bonn, Kekule Institute for Organic Chemistry and Biochemistry
Gerhard-Domagk-Straße 1, 53121 Bonn, Germany
nick.kocem@uni-bonn.de

Polyketides represent an extensive class of secondary metabolites characterized by significant structural and functional diversity. These compounds demonstrate a broad spectrum of bioactivities, including antibacterial, antifungal, anticancer, antiviral, immunosuppressive, anti-cholesterol, and anti-inflammatory properties.[1] Polyols containing a 1,3-arrangement of hydroxyl groups comprise a substantial subset of polyketides. To address their synthesis, *Gansäuer et al*. developed a modular strategy for constructing polyol chains with 1,3-hydroxyl spacing.[2] The synthetic approach begins with readily accessible allyl alcohols, which are converted into glycidols through an initial asymmetric reaction, the *Sharpless* epoxidation.[3] This is followed by an oxidation step, such as a *Swern* oxidation[4] and a second asymmetric reaction: the catalyst-controlled allylation described by *Antilla*.[5] In our research group, we developed a fluoride-catalyzed hydrosilylation reaction

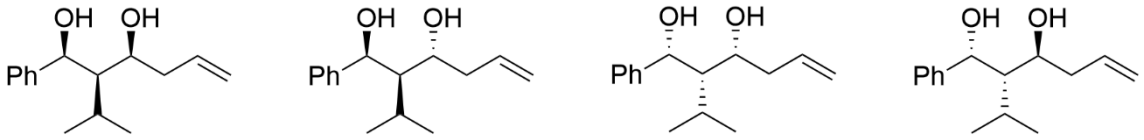

Figure 1. Four stereoisomers of 1,3-diols obtained using the polyol synthesis strategy.

to open the epoxide in a regio- and stereoselective manner. The reaction utilizes phenylsilane as the reducing agent, activated by catalytic amounts of fluoride, introduced by addition of *tert*-butylammonium fluoride (TBAF). Figure 1 highlights the successful application for the construction of such 1,3-diols with impressive diasteromeric and enantiomeric purity. Other substituents at the 1- and 2-positions remain a subject of ongoing investigation.

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4 K. Omura, D. Swern, *Tetrahedron*, **1978**, *34*, 1651.

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