A Mild Method for the Preparation of Unsaturated Alcohols from 1,3-Glycols *via* Dimethylformamide Acetals

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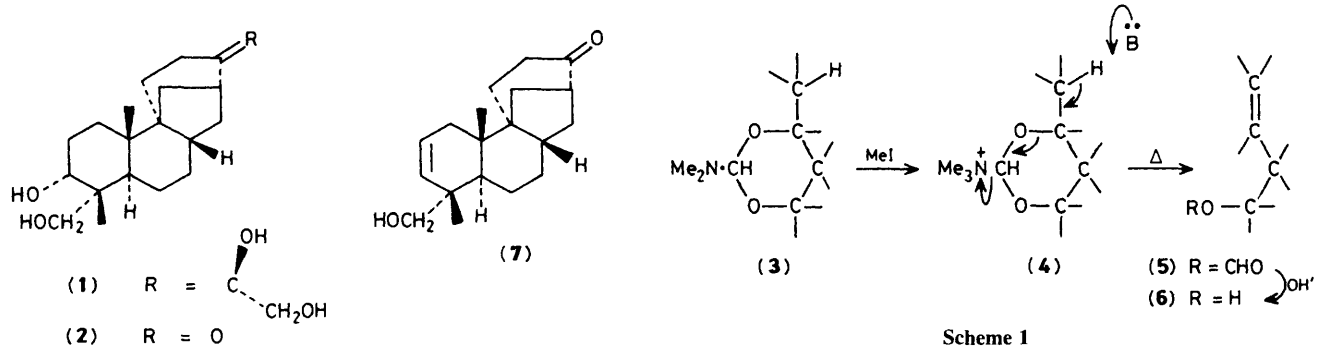
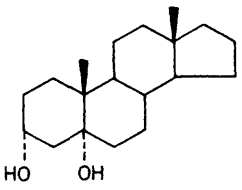
Provided it possesses a hydrogen atom suitably placed for elimination, a 1,3-glycol may be converted into an unsaturated alcohol *via* quaternization of its dimethylformamide acetal.

In connection with biosynthetic work on the diterpenoid, aphidicolin (**1**) we required a mild method for the elimination of the ring *A* hydroxy group which would not lead to rearrangement or cyclic ether formation. *N*,*N*-Dimethylformamide dimethyl acetal has proved to be a useful reagent for the activation of alcohols and vicinal glycols through the formation of their dimethylformamide acetal derivatives.[1—4] Decomposition of the cyclic dimethylformamide acetals from 1,2-glycols may afford either epoxides or alkenes depending upon the conditions. In this communication we report a simple transformation permitting the conversion of 1,3-glycols into unsaturated alcohols.

The dimethylformamide acetal (**3**) of a suitably oriented 1,3-glycol may be prepared by simply heating the glycol with the commercially available dimethylformamide dimethyl acetal. Evaporation of the excess reagent and reaction with methyl iodide in toluene affords the quaternary salt (**4**), which on further heating in toluene (reflux 1—3 h) undergoes



Scheme 1



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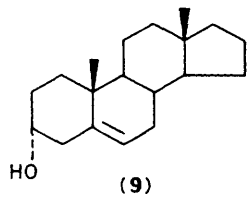

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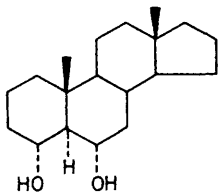

(10)

elimination to afford the unsaturated formate (**5**). Subsequent hydrolysis with base affords the alcohol (**6**) (see Scheme 1).

Using this sequence the 1,3-glycols (**2**)[5] and (**8**)[6] have been transformed to the unsaturated alcohols (**7**) and (**9**) respectively in 50—60% yield. Stereochemical studies, which will be reported in our full paper, indicate that the reaction requires a diaxial relationship between the C–O bond of the cyclic acetal that is to be broken and the proton to be eliminated. Thus the diequatorial 1,3-glycol (**10**) affords only a mixture of the 4- and 6-monoformates from which the parent diol was regenerated on hydrolysis.

This reaction may provide a mild one-pot procedure for the conversion of 1,3-glycols into unsaturated alcohols in which the geometry of the cyclic acetal may define the regiospecificity of the elimination reaction. Bearing in mind the common occurrence of 1,3-glycols in polyketide natural products and their synthesis through the reduction of 1,3-dicarbonyl compounds or by the Prins reaction, this mild elimination may be potentially useful.

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