A NEW METHOD FOR THE SYNTHESIS OF FUNCTIONALIZED TETRAHYDROFURANS AND TETRAHYDROPYRANS DIRECTED TOWARD THE TOTAL SYNTHESIS OF POLYETHER ANTIBIOTICS

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In the course of studies on the total synthesis of polyeter antibiotics such as salinomycin and iso-lasalocid A, we developped two methods for building up the functionalized tetrahydrofurans and tetrahydropyrans which constitute structural unit of polyether antibiotics.

Method 1* involved the synthesis of chiral tetrahydrofuran and tetrahydropyran systems via oxidative cyclization by DDQ as shown in the reactions from 1 to 2 and from 3 to 4. In this reaction it was found that the E-olefin gave cyclization product, but Z-olefin was recovered unchanged.

Due to the low yield in the cyclization step by method 1, we turned our attention to the exploration of the acid-catalyzed cyclization (method 2) of allylic alcohols such as 5, 7, and 9 to the tetrahydrofurans 6, 8 and tetrahydropyran 10, and this reactions were proved to be very effective and convenient to synthesize highly substituted tetrahydrofurans and pyrans.

The oxidative cleavage of the double bond of 10 gave the aldehyde 11, which was decarbonylated with tris-triphenylphosphinchlororhodium to give 12.

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