

## $\alpha$ -Methylnonanolide annelated with carbohydrate residue

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### Abstract

Native lactones are of interest as compounds with a wide range of biological activities. On the basis of many of them, important drugs of various pharmacological action have been obtained: antifungal drugs, antibiotics, immunosuppressants, etc.

The insignificant content of them in natural objects makes it necessary to develop effective ways of obtaining them. Many biologically active lactones of medium and large sizes contain alkyl, heteroatomic substituents in their structure. A feature of native lactones is the presence of a substituent in the  $\omega$ -position. In the  $\alpha$ -position can be double bonds, hydroxyl groups or alkyl substituents. So, for example, in foracantolide, (+)-recifeolide, purinolides, aspinalide, dictyostatin in the  $\omega$ -position, and in the erythronolide, cytospolides in the  $\alpha$ -position is the methyl group.

Earlier, we developed a 3-stage scheme for the synthesis of medium and large lactones based on levoglucosenone and cycloalkanones. Later, the possibility of introducing a benzene ring into the lactone cycle was shown and 10 stepwise synthesis of the  $\omega$ -methylated ketodecanolide of the native topology from Michael's adducts of levoglucosenone and cyclohexanone was carried out with a total yield of 11%.

In the continuation of our work on the synthesis of chiral lactones of various cycle sizes based on levoglucosenone, we studied the possibility of applying the previously developed 3-stage synthesis scheme to obtain the  $\alpha$ -methylated lactone.

The key Michael adduct of levoglucosenone and methylcyclohexanone was obtained by the by means of enamine. As a result of the reaction, 4 diastereomeric adducts were obtained in a ratio of 1.0: 0.8: 0.2: 0.1 in 63% yield. The opening of 1,6-anhydro-bridges in adducts by the action of HCl-MeOH led to 2-cetals, cleavage of the C-C bond in which the action of pyridium chlorochromate (PCC) completed the synthesis of diastereomeric lactones {(2*R*,4*aS*,12*aS*)-2,3,3-trimethoxy-9-methyldecahyropyrano[2,3-*c*]oxetine-5,10-dione} containing a methyl substituent in the  $\alpha$ -position, with a total yield of 37% in 3 stages.

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