

Synthesis of ether derivatives of levoglucosenone and some aspects of their use

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Abstract

Taking into account the results of studies on the use of derivatives of levoglucosenone – cyrene® as an effective aprotic solvent – a substitute for toxic solvents used in industry, and taking into account an important feature of its properties as optical activity, methods have been developed for obtaining some derivatives of levoglucosenone and the possibility of cyrene as a chiral solvent.

The possibility of one- and two-stage syntheses from levoglucosenone of chiral compounds, which can be used as solvents, is shown.

A chemoselective method has been developed for the hydrogenation of the double bond of levoglucosenone on Ni/Ra in ethanol by deactivating it with acetic acid. Regio- and stereoselective reduction of levoglucosenone and cyrene obtained diastereomerically pure hydroxyl-derivatives. For the first time, the possibility of a microbiological method for the reduction of levoglucosenone derivatives has been shown. Reduction of cyrena with baker's yeast (*Saccharomyces cerevisiae*) gave quantitatively diastereomerically pure alcohol. Diastereomerically pure methyl esters were obtained from hydroxyl-derivatives of levoglucosenone, which are promising as chiral solvents.

The Baeyer-Villiger oxidation of cyrene to hydroxymethyl- γ -butanolides using 30% H₂O₂ was carried out. The Bayer-Villiger oxidation of cyrene with commercially available Amberlist-15 is shown.

The possibility of enantioselective hydrogenation of geraniol in cyrene was studied. The methods for utilization of cyrene from the reaction mass have been clarified.

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