



Evaluation of antioxidant activity of levoglucosenone and some of its derivatives

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Abstract

Levoglucosenone (1,6-anhydro-3,4-dideoxy-D-glycero-hex-3-enopyranose-2-ulose) obtained by pyrolysis of cellulose-containing materials is a universal, biorenewable, chiral substrate that has found wide application in biologically active compounds such as prostanoids, nucleosides, tetrodotoxin. The chemistry of levoglucosenone is multifaceted; reactions with its participation lead in good yield to chiral precursors containing various pharmacophore groups, which are attractive for studying biological properties. Currently, levoglucosenone is used not only in stereo-controlled synthesis of building blocks for a number of natural compounds and analogs, but also as a substitute for toxic solvents in green chemistry. So, in recent years, the dihydroderivative of levoglucosenone (*Cyren*) has been successfully used as a solvent for the preparation of drugs.

Previously, the fungicidal activity of levoglucosenone and some of its derivatives against microscopic fungi *Rhizoctonia solani*, *Bipolaris sorokiniana* and *Fusarium oxysporum* was found. The presence of a conjugated double bond in levoglucosenone, which plays a decisive role in the binding of reactive oxygen species, suggests a possible manifestation of antioxidant activity by it. To determine the antioxidant properties in the study of the structure-activity relationship, the following series of compounds were selected in the series of levoglucosenone and its derivatives. Levoglucosenone, cyren, dioxolanic derivative obtained by protecting the keto group of levoglucosenone by the action of ethylene glycol disilyl ether, nonano-9-lactones obtained from Michael's adducts of levoglucosenone and cyclohexanone. Considering the fact that phenols and polyphenols (tocopherols, eugenol, pyrocatechol, gallic acid derivatives) are widely used as antioxidants,

syntheses of aromatic derivatives of levoglucosenone have been developed. The antioxidant activity of the obtained compounds was screened by registering chemiluminescence (reflecting the formation of free radicals) on a *KhLM-003* device. The compounds under study were added to the test system, in which free radical reactions were initiated – the formation of reactive oxygen species (ROS). A phosphate buffer supplemented with citrate and luminol was used as a test system. For the first time, screening of the antioxidant activity of levoglucosenone and some of its derivatives has been performed. The antioxidant activity of levoglucosenone and some of its derivatives was found. It was found that the elimination of the conjugation of the double bond with the keto group leads to a sharp decrease in antioxidant activity.

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