SYNTHESIS AND STRUCTURE OF COMPOUNDS OBTAINED FROM THE INTERACTION OF (+)-3-CARENE MONOTERPENE WITH POTASSIUM PERMANGANATE

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At present one of the main features of the chemistry of natural cyclopropanes is determined by the great diversity/variability of their structures and properties. However, the low content of most optically active cyclopropanes obtained from natural sources is a priority and requires the urgent development of readily applicable methods for synthesis from available natural substances, e.g. (+)-3-carene monoterpane 1. A distinctive structural feature of (+)-3-carene is the presence in its molecule of a bicyclic bridge system consisting of methylcyclohexane, 2,2-dimethylcyclopropane moieties and a reactive C=C double bond.

The main aim of the work is to obtain oxygen-containing functional groups in the (+)-3-carene 1 molecule, thus the oxidation properties of (+)-3-carene with permanganate in an acetone solution were studied.

It was found that after 3 hours of mixing of the reagents a mixture of products (TLC data) was formed, which allowed the isolation by SiO₂ column chromatography of three predominant substances. Less polar was substance 2, in the IR spectrum of which there are characteristic stretching vibration frequencies for the unsaturated ketone (1660 cm⁻¹), for methyl (1370 and 1385 cm⁻¹). In the 1H NMR spectrum, the singlet signals of six protons and three protons of two single methyl groups in a strong field are complemented by one proton signals of three vinyl protons and a two proton signal of the methylene group. These data, combined with 13C NMR data, indicate the structure of (2Z,4Z)-3,6,6-trimethylcyclohepta-2,4-dienone 2. (1R,4S,6S)-4-hydroxy-4,7,7-trimethylbicyclo[4.1.0]heptane-3-one 3. The most polar substance was cis-diol (1S,3S,4R,6R)-3,7,7-trimethylbicyclo[4.1.0]heptan-33,4-diol 4.

Thus, it was found that the interaction of monoterpane (+)-3-carene 1 with KMnO₄ occurs with the introduction of both one and two oxygen-containing functional groups, and involves both change and conservation of the carene "scaffold".

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