Letters to the Editor

A useful chiral synthon from (*R*)-4-menthenone

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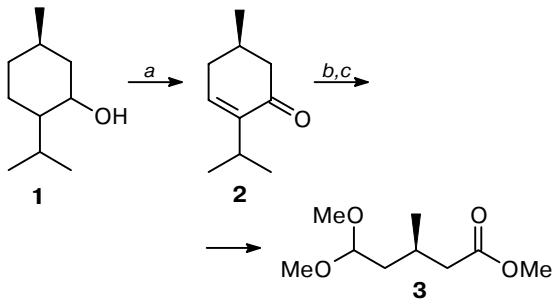
Starting from natural (−)-menthol (**1**) (*ee* ~100%), (*R*)-4-menthenone (**2**) can be obtained.[1] We proposed a synthesis of a promising bifunctional chiral synthon, *viz.*, methyl (*R*)-5,5-dimethoxy-3-methylpentanoate (**3**),[2] by the ozonolytic decyclization of **2**, which was developed by us for the first time. The ozonolysis of enone **2** in cyclohexane or CCl_4 in the presence of MeOH (2 mol. equiv.) followed by treatment of the peroxide products that formed with an excess of MeOH in the presence of an acid affords acetal ester **3** in high yield. The ozonolysis and acetalation of the peroxide products do not involve the asymmetric center, which follows from the value of specific optical rotation.



1 **2** **3**

Reagents: *a*. See Ref. 1; *b*. O_3/*cyclo*-C_6H_{12} (or CCl_4)—MeOH; *c*. MeOH/TsOH.

Thus, a new method for the synthesis of optically pure synthon from accessible natural (−)-menthol was proposed.

Methyl (*R*)-5,5-dimethoxy-3-methylpentanoate (3). An ozone-oxygen mixture (5 : 95) was bubbled through a solution of enone **2** (5.00 g, 32.9 mmol) in *cyclo*-C_6H_{12} or CCl_4 (35 mL) in the presence of anhydrous MeOH (2.82 mL, 65.9 mmol) at 5 °C (the capacity of the ozonator was 40 mmol O_3/h) until 1 mole of O_3 per mole of enone **2** passed. The reaction mixture was purged with Ar, MeOH (50 mL) and TsOH (0.25 g) were added, and the mixture was left at room temperature for 2 days until peroxides disappeared (iodine-starch probe). Then $NaHCO_3$ (2.50 g) was added, and the solvent was evaporated *in vacuo*. Et_2O (100 mL) was added to the residue, and the mixture was washed with brine (to pH ~7), dried with Na_2SO_4, and concentrated. Compound **3** was obtained in 87% yield (5.44 g). $[\alpha]_D^{25}$ −1.54 (*c* 4.76, $CHCl_3$) (*cf.* Ref. 2). The parameters of the ^1H NMR and IR spectra were virtually identical with those described previously.[2] ^{13}C NMR ($CDCl_3$, 75.47 MHz), δ: 19.48 (q, $H_3\underline{C}C(3)$); 26.14 (d, C(3)); 38.38 (t, C(4)); 40.78 (t, C(2)); 50.56, 51.42 and 52.00 (all q, H_3CO); 102.30 (d, C(5)); 172.35 (s, C(1)).

References

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2. K. Mori and S. Kuwahara, *Tetrahedron*, 1982, **38**, 521.

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