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The Synthesis of C-13 Labeled Vitamin E, [6′-^{13}C]*all-rac-α-* Tochopherol*

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The stabilizing effect of biomembranes by vitamin E is presumed to arise from a physicochemical interaction between the isoprenoid side chain of α-tocopherol and the polyunsaturated fatty acid moieties of the phospholipids in biomembranes, though no definite evidence has been obtained. One of possible techniques for the verification of the hypothesis would be measurement of ^{13}C-relaxation time on vitamin E in biomembranes.

In order to examine the hypothesis, we synthesized a vitamin E with a ^{13}C-labeled isoprenoid side chain, [6′-^{13}C]*all-rac*-α-tochopherol, using 6-methoxymethoxy-2,5,7,8-tetramethyl-2-[(*E*)-4-methyl-5-(thiazolin-2-yl)thio-3-penten-1-yl]chroman as a key intermediate and ethyl [1-^{13}C]bromoacetate as a ^{13}C source. The overall yield based on [1-^{13}C]bromoacetate was 19.2%.

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