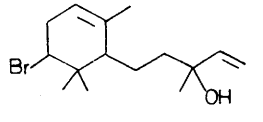
Cyclization of Polyenes.[1] Biogenetic-type Synthesis of Snyderols

By TADAHIRO KATO,* ISAO ICHINOSE, AKIHIRO KAMOSHIDA, and (the late) YOSHIO KITAHARA
(*Department of Chemistry, Faculty of Science, Tohoku University, Sendai* 980, *Japan*)

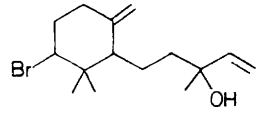
Summary α- and β-Snyderols (**1**) and (**2**) have been synthesised by the reaction of nerolidol (**3**) with 2,4,4,6-tetrabromocyclohexa-2,5-dienone (**4**).

RECENTLY two brominated monocyclic sesquiterpenes, α- and β-snyderols (**1**) and (**2**), have been isolated from the marine red alga *Laurencia* species.[2] These compounds could be biosynthesised *via* the brominative cyclization of nerolidol (**3**).

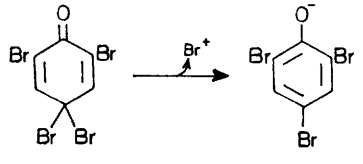
We were interested in finding a reagent system which would cause brominative cyclization of polyenes in a biogenetic fashion and have reported that 2,4,4,6-tetrabromocyclohexa-2,5-dienone (**4**) is an effective reagent for this purpose.[3] We now report the biogenetic-type synthesis of snyderols[4] with this reagent. Nerolidol (1·12 g) and an equimolar amount of the tetrabromoketone (**4**) were



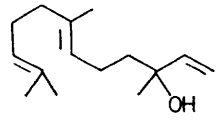
(1)



(2)



(4)



(3)

stirred in dried CH_2Cl_2 at room temperature for 3 h and the resulting neutral fraction was chromatographed on silica gel to give a mixture of alcoholic compounds in 8% yield.† The alcoholic mixture was separated by recycling high pressure liquid–liquid chromatography [column: μ-porasil, solvent: n-hexane–AcOEt (20:1)] and two bromine-containing alcohols were isolated in *ca.* 2% yield each from the starting nerolidol. The n.m.r. and i.r. spectra (CCl_4) and retention time on high pressure liquid–liquid chromatography of one of the products were identical with those of β-snyderol. Physical properties indicated that the other product was probably α-snyderol contaminated with *ca.* 10% of β-snyderol.

Since nerolidol from natural source ($[\alpha]_D^{30} + 13°$) was used in this brominative cyclization, it was expected that the product would be mixture of diastereoisomers. The synthetic β-snyderol showed $[\alpha]_D^{20} - 4{\cdot}60°$ (*c* 2·61) and it is worth noting that the asymmetric unit of nerolidol controlled in part the generation of the two new asymmetric centres.

We thank Dr. W. Fenical for samples of the natural snyderols.

(*Received*, 9*th April* 1976; *Com.* 383.)

† The major product of this reaction is a bromoether the structure of which will be described elsewhere.

[1] For previous paper, see T. Kato, T. Kobayashi, T. Kumagai, and Y. Kitahara, *Synth. Comm.*, in the press.
[2] B. M. Howard and W. Fenical, *Tetrahedron Letters*, 1976, 41.
[3] T. Kato, I. Ichinose, S. Kumazawa, and Y. Kitahara, *Bio-org. Chem.*, 1975, **4**, 188; Y. Kitahara, T. Kato, and I. Ichinose, *Chem. Letters*, 1976, 283.
[4] β-Snyderol has been synthesised: A. G. Gonzalez, J. D. Martin, C. Perez, and M. A. Ramirez, *Tetrahedron Letters*, 1976, 137.