

KAURANE DERIVATIVES FROM LEAVES OF *SOLIDAGO NEMORALIS*

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We have investigated the diterpenes in the leaves of *Solidago nemoralis* Aiton (Asteraceae) and report the isolation of four kaurane derivatives: (-)-kaur-16-en-19-oic acid (1), 15 α -hydroxy-(-)-kaur-16-en-19-oic acid (2,3), (-)-kauran-16 β -ol (1), and (-)-17-hydroxy-kaur-15-en-19-oic acid (4,5).

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded with the following instruments: ir, Perkin-Elmer 257; low resolution ms, Nuclide 12-90-G; ^1H nmr, Varian T-60 (60 MHz) or Bruker WM 500 (500 MHz); ^{13}C nmr JEOL FX-60Q (15 MHz) or Bruker WM 500 (125 MHz); hplc, Rainin Instruments. Adsorbents for tlc and cc were from E. Merck.

PLANT MATERIALS.—Leaves of *S. nemoralis* were collected in July 1984, from the Cedar Creek Natural History area near Minneapolis, Minnesota. Voucher specimens are deposited in the herbaria at Boston University and at the University of Minnesota.

EXTRACTION AND ISOLATION OF DITERPENES.—Dried, milled leaves of *S. nemoralis* (1350 g) were thoroughly extracted with petroleum ether (36-60 $^\circ$)-Et₂O (2:1) (6). The extracts were separated by flash chromatography on a kieselgel 60 silica column (7) and eluted with petroleum ether/EtOAc mixtures of increasing polarity. Compounds were further purified by silica tlc using CHCl₃/MeOH, and the purity of the compounds was confirmed by hplc with 98% hexane/2% CH₂Cl₂. Four compounds were obtained: (-)-kaur-16-en-19-oic acid (700 mg), 15 α -hydroxy-(-)-kaur-16-en-19-oic acid (30 mg), (-)-kauran-16 β -ol (470 mg), and 17-hydroxy-(-)-kaur-15-en-19-oic acid (15 mg).

The diterpenes were identified from spectral and optical data (1-5), and by co-tlc with authentic samples.

Full details of the isolation and identification of the compounds are available on request to the senior author.

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