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Cannabichromevarin and Cannabigerovarin, Two New Propyl Homologues of Cannabichromene and Cannabigerol[1)]

Two new neutral cannabinoids, cannabichromevarin and cannabigerovarin, were isolated from the "Meao variant," Thailand Cannabis and their structures were determined to be the homologues of cannabichromene and cannabigerol which have a propyl side-chain, respectively, on the basis of spectral and chemical evidences.

In recent years much research has been directed towards the isolation and identification of propyl homologues of cannabinoids from local *Cannabis*,[2-5)] such as cannabidivarin (CBDV),[2)] tetrahydrocannabivarin (THCV)[3)] and cannabivarin (CBV).[4)]

We now wish to describe the isolation and the structure elucidation of two new neutral cannabinoids, the homologues of cannabichromene (CBC) and cannabigerol (CBG) which have a propyl side-chain from the "Meao variant," Thailand *Cannabis*.

After the benzene percolate of the leaves harvested in the vegetative phase was decarboxylated by heating at 160° for 20 min, the neutral cannabinoids fraction was repeatedly column-chromatographed over silica gel with solvent benzene or benzene–hexane–diethyl amine (20:10:1) to give four propyl homologues besides the usual neutral cannabinoids. Two propyl homologues were identified with CBDV[2)] and THCV.[3)] The third new cannabinoid (I) gave a brownish red color with diazotized benzidine and the physical constants were as follows; I, $C_{19}H_{26}O_2$ (Calcd.: 286.193, Found: 286.191), colorless oil, $[\alpha]_D^{19}$ +58° (c=4.28, $CHCl_3$), UV λ_{max}^{MeOH} nm (ε): 281 (7577), 289 (7192, shoulder), IR $\nu_{max}^{CHCl_3}$ cm^{-1}: 3320 (OH), 1623, 1576 (C=C), 1430, 1090, 1040, NMR (in $CDCl_3$) δ: 0.92 (3H, triplet, ω-CH_3), 1.26 (3H, singlet, C_{10}–CH_3), 1.58, 1.67 (3H×2, each singlet, $C_{8,9}$–CH_3), 2.45 (2H, triplet, α-CH_2), 5.10 (1H, triplet, C_6–H), 5.45 (1H, doublet, J=10 Hz, C_2–H), 6.12, 6.26 (1H×2, each singlet, C_3',$_5'$–H), 6.62 (1H, doublet, J=10 Hz, C_1–H), Mass Spectrum m/e: (M^+) 286 (7.2%), 271 (3.8%), 204 (15.8%), 203 (100%), 187 (3.3%), 174 (12.8%).

The nuclear magnetic resonance (NMR) is similar to CBC[6,7)] except for the methylene region and the mass spectrum (MS) has a characteristic fragmentation pattern of CBC,[7)] with the differenciation that all masses are 28 unit (C_2H_4) smaller. All of the properties of I

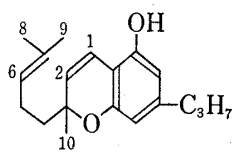
1) This forms part IX of "Cannabis." Part VIII: Y. Shoyama, M. Yagi, T. Yamauchi, and I. Nishioka, *Phytochemistry*, in press.
2) L. Vollner, D. Bieniek, and F. Korte, *Tetrahedron Letters*, **1969**, 145.
3) E.W. Gill, *J. Chem. Soc.*, **1971**, 579.
4) F.W.H. Mercus, *Nature*, **232**, 579 (1971).
5) P.S. Fetterman and C.E. Turner, *J. Pharm. Sci.*, **61**, 1476 (1972).
6) Y. Gaoni and R. Mechoulam, *Chem. Commun.*, **1966**, 20.
7) U. Claussen, F.V. Spulak, and F. Korte, *Tetrahedron*, **22**, 1477 (1966).

mentioned above strongly confirm that I is cannabichromevarin (CBCV), the propyl homologue of CBC.

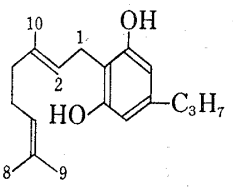
The last cannabinoid (II) gave an orange color with diazotized benzidine and a violet color with Beam's test.[8] The physical constants are as follows; II, $C_{19}H_{28}O_2$ (Calcd.: 288.213, Found: 288.209), mp 52—53°, colorless prisms, UV λ_{max}^{MeOH} nm (ε): 273 (923), 280 (878, shoulder), IR ν_{max}^{KBr} cm^{-1}: 3420 (OH), 1639, 1583 (C=C), 1520, 1448, 1150, 1040, 1017, NMR (in $CDCl_3$) δ: 0.92 (3H, triplet, ω-CH_3), 1.60, 1.68, 1.81 (3H×3, each singlet, $C_{8,9\ and\ 10}$–CH_3), 2.47 (2H, triplet, α-CH_2), 3.42 (2H, doublet, J=6 Hz, C_1–H), 4.90—5.40 (3H, multiplet, $C_{2,6}$–H and OH), 6.27 (2H, singlet, C_3',$_5'$–H), Mass Spectrum m/e: (M^+) 288 (23.8%), 273 (2.3%), 219 (32.3%), 203 (38.8%), 165 (100%).

Each aspect of II suggests that II must be cannabigerovarin (CBGV), the propyl homologue of CBG. II was identified with CBGV synthesized by the modified Mechoulam's method[9] (mixed mp: 53—54°, UV, IR, NMR and MS).

The neutral cannabinoids of the propyl homologues such as CBGV, CBDV, THCV and CBCV should exist as the cannabinoid acids in intact *Cannabis* and the studies on these cannabinoid acids are in progress.



cannabichromevarin(CBCV)



cannabigerovarin(CBGV)

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8) R. Mechoulam, Z. Ben-Zvi, and Y. Gaoni, *Tetrahedron*, **24**, 5615 (1968).
9) R. Mechoulam and Y. Yagen, *Tetrahedron Letters*, **1969**, 5349.

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Structure and Absolute Stereochemistry of Dihydroflorilenalin, A New Sesquiterpene Lactone from Florida *Helenium autumnale* L.

The structure and absolute stereochemistry of dihydroflorilenalin, a new guaianolide isolated from *Helenium autumnale* L., have been determined on the basis of physicochemical data, chemical transformation, and X-ray crystallographic analysis.

The isolation and structure determination of a new guaianolide, florilenalin (I), from Florida *Helenium autumnale* L. were reported in a previous communication.[1] Further investigation of the polar terpenoid fraction from the chloroform extract of this same plant has

1) K.H. Lee, T. Ibuka, M. Kozuka, A.T. McPhail, and K.D. Onan, *Tetrahedron Letters*, **1974**, 2287, and references cited therein.