Ageratum houstonianum *and* A. conyzoides

Similar investigation of *A. houstonianum* (3·5 kg) gave friedelin (0·015 g), m.p. 264–265° in the light petroleum–benzene (4:1) fractions, friedelan-3β-ol (0·06 g), m.p. 279–281°, $[\alpha]_D$ + 10·0°, in the light petroleum–benzene (1:1) fractions, and a mixture of stigmasterol and β-sitosterol (0·10 g), in the light petroleum–benzene (1:4) fractions. Further extraction of the plant material with EtOH yielded KCl (5 g).

A. conyzoides (4 kg) gave friedelin (0·01 g), the sterol mixture (0·20 g), and KCl (30 g).

Acknowledgements—We thank Mr. H. C. Tang, Government Herbarium, Hong Kong, for identification of plant material, and the Committee on Higher Degrees and Research Grants, University of Hong Kong, for financial assistance.

Phytochemistry, 1971, Vol. 10, pp. 901 to 902. Pergamon Press. Printed in England.

T-MUUROLOL-HAUPTBESTANDTEIL VON *ARNICA LONGIFOLIA*

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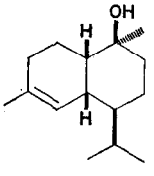
(*Received* 22 *May* 1970, *in revised form* 4 *July* 1970)

Pflanze. Arnica longifolia Eat.

Frühere Arbeiten. Fettsäuren im atherischen Öl der Blütenkörbchen.[1]

Rhizome und Wurzeln: T-Muurolol kristallisiert nach längerem Stehen des Öles bei −20° aus. Schmp. 78–79°, $(\alpha)_D^{23}$-106,8° ($CHCl_3$), Elementaranalyse, Massen-, NMR- und i.r.-Spektrum; p-Nitrobenzoat Schmp. 104–105°, Dinitrobenzoat Schmp. 163–164°; Bildung der Dihydrochloride (−)-Muurolendihydrochlorid und (−)-Cadinendihydrochlorid[2] (Schmp., Mischschmp., spez. Drehung, i.r.) sowie Dehydratisierung mit Thionylchlorid zu (−)-α-Muurolen (i.r. und Bildung der Hydrochloride).



Nach der GC-Analyse ist dieser Sesquiterpenalkohol mit 40–50% Hauptbestandteil des ätherischen Öles. Es ist dies das dritte bekannte Vorkommen von T-Muurolol in Pflanzen. Erstmals wurde dieser Alkohol vor zwei Jahren aus dem Holz von *Taiwania cryptomerioides*[3] (Taxodiaceae) und *Cedrela toona*[4] (Meliaceae) isoliert.

[1] H. KATING, W. RINN und G. WILLUHN, *Planta Med.* **18**, 130 (1970).
[2] L. WESTFELT, *Acta Chem. Scand.* **20**, 2893 (1966).
[3] Y. S. CHENG, Y. H. KUO und Y. T. LIN, *Chem. Commun.* 565 (1967).
[4] B. A. NAGASAMPAGI, L. YANKOV und SUKH DEV, *Tetrahedron Letters* 1913 (1968).

Anerkennung—Herrn Professor Dr. H. Kating, Direktor des Institutes für Pharmakognosie, danke ich für die Förderung dieser Arbeit durch Bereitstellung von Personal und Sachmitteln des Institutes, Herrn Professor Dr. Dr. h.c. H. Böhme, Direktor des Institutes für Pharmazeutische Chemie und Lebensmittelchemie der Universität Marburg, Lahn, für die Genehmigung zur Aufnahme der IR- und NMR-Spektren und Herrn Doz. Dr. H. Stamm vom letztgenannten Institut für Hilfe bei der Diskussion des NMR-Spektrums. Herrn Dr. O. Motl, Institut für Organische Chemie und Biochemie der Tschechoslowakischen Akademie der Wissenschaften, Prag, habe ich für die Überlassung einer Probe von Muurolen- und Cadinendihydrochlorid sowie den i.r.-spektroskopischen Vergleich von-Muurolen zu danken.

Phytochemistry, 1971, Vol. 10, pp. 902 to 903. Pergamon Press. Printed in England.

6-METHOXY-7,8-METHYLENEDIOXYCOUMARIN FROM *ARTEMISIA CARRUTHII**

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(*Received* 3 *October* 1970)

EXAMINATION of *Artemisia carruthii* Wood resulted in the isolation of 6-methoxy-7,8-methylenedioxycoumarin, recently found in *Artemisia dracunculoides* Pursh.[1] Although sesquiterpene lactones were present in the extractives from the plant, no crystalline material of this class has been obtained.†

The coumarin, $C_{11}H_8O_5$, had m.p. 224–225°, and gave u.v. and i.r. spectra that identified it as a coumarin. Its NMR spectrum was in full accord with this conclusion and, in addition, showed the presence of the methoxy and methylenedioxy groupings. Besides a three-proton singlet at δ 3·28 and a two-proton singlet at δ 6·25, the only other signals were a one-proton singlet (H-5) at δ 7·06 and the characteristic signals for the H-3 and H-4 protons of the coumarin ring. These were seen as doublets at δ 6·30 and 7·95, (J = 10 Hz).

The composition and melting point of the coumarin suggested its identity with the newly described 6-methoxy-7,8-methylenedioxycoumarin,[1] and this was confirmed by a direct comparison of the compounds, which proved to be identical (mix m.p., i.r., TLC).‡

EXPERIMENTAL

Dried and ground *Artemisia carruthii* Wood,§ was extracted with $CHCl_3$ and the extract evaporated. The residue was partitioned between hexane (5 l.) and methanol–water (3:1, 800 ml), and the hexane layer discarded. Extraction of the alcoholic solution with $CHCl_3$ gave 73 g of a dark brown syrup. This was chromatographed on silica gel (900 g), eluting with $CHCl_3$, $CHCl_3$–EtOAc, EtOAc–acetone and finally acetone (1 l. fractions).

From the $CHCl_3$ extracts was isolated a colorless, crystalline compound which was recrystallized from pyridine, m.p. 224–225°. (Anal. Calc. for $C_{11}H_8O_5$: C, 60·00; H, 3·67; found, C, 60·25; H, 3·98.) The mass spectrum showed the molecular ion at *m/e* 220 (base peak), with prominent peaks at 205 (M-15), 192 (M-28)

* Contribution No. 2730 from the Department of Chemistry, U.C.L.A.

† As shown by the appearance of the characteristic i.r. band at about 1770 cm^{-1}.

‡ We are grateful to Professor Herz for a specimen of the coumarin, isolated from *A. dracunculoides*.

§ We are indebted to Mr. R. J. Barr, El Paso, Texas, U.S.A., for collection and authentication of the plant material used in this study.

[1] W. HERZ, S. V. BHAT and P. S. SANTHANAM, *Phytochem.* **9**, 891 (1970).