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11β,13-DIHYDROLACTUCIN, A SESQUITERPENE LACTONE FROM *LAUNAEA MUCRONATA**

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Key Word Index—*Launaea mucronata*; Compositae; sesquiterpene lactone; guaianolides.

Abstract—The roots of *Launaea mucronata* afforded, in addition to lactucin, lactucin-8-*O*-acetate and the corresponding dihydro derivative, 11β,13-dihydrolactucin.

So far little is known of the chemistry of the genus *Launaea*, only some widespread triterpenes are reported [1]. The roots of *L. mucronata* Forssk. afforded lactucin (**1**) [2], the acetates **2** [3] and **4** [3] as well as the corresponding diol **3**, not isolated previously. The structure followed from the molecular formula ($C_{15}H_{18}O_5$), the ^{1}H NMR spectral data (Table 1) and spin decoupling. Irradiation of a narrowly-split double quartet at δ 6.43 caused a sharpening of two broadened doublets at 4.86 and 4.53, which therefore were the signals of H-15, as the downfield shift of the former signal was typical for a H-3 proton of lactones like lactucin. Irradiation of the triplet at δ 3.65 collapsed the broadened doublet at 3.57 to a doublet and the three-fold doublet at 2.13 to a double doublet, thus allowing the assignment of the H-5 and H-7 signals. The latter was further coupled with a three-fold doublet at δ 3.75 and a double quartet at 2.57. Since the latter was coupled with the methyl doublet δ 1.44 and the signal at 3.75 with two double doublets at 2.71 and 2.32, all signals could be assigned. The coupling $J_{7,11}$ indicated the α-orientation of the C-11 methyl group. Compound **3** therefore was 11β,13-dihydrolactucin. Consequently the ^{1}H NMR spectral data were close to those of the corresponding acetate isolated from a *Lactuca* species [3].

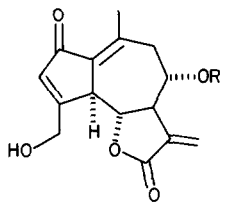
Table 1. ^{1}H NMR spectral data of compound **3** (400 MHz, $CDCl_3$, TMS as int. standard)

H-3	6.43 *dq*	H-9β	2.39 *dd*
H-5	3.57 *dbr*	H-11	2.57 *dq*
H-6	3.65 *t*	H-13	1.44 *d*
H-7	2.13 *ddd*	H-14	2.44 *br s*
H-8	3.75 *ddd*	H-15	4.86 *br d*
H-9α	2.71 *ddbr*	H-15′	4.53 *br d*

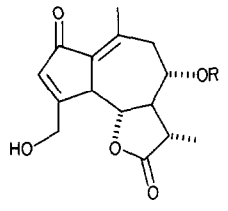
J(Hz): 3,5 = 3,15 = 1.5; 5,6 = 6,7 = 7,8 = 10; 7,11 = 11.5; 8,9α = 11; 8.9β = 1; 4α,9β = 14; 15,15′ = 18.

*Part 402 in the series "Naturally Occurring Terpene Derivatives". For Part 401 see Bohlmann, F., Wegener, P. and Jakupovic, J. (1982) *Phytochemistry* **21**, 1109.

The chemistry of the *Launaea* species supports its placement in the subtribe Crepidinae [4], as several typical genera of this group contain lactucin and closely related lactones [5].



1 R=H
2 R=Ac



3 R=H
4 R=Ac

EXPERIMENTAL

Fresh roots of *L. mucronata* (1 kg) were extracted with 95% EtOH. The filtered and concd extract was diluted with H_2O and extracted with $CHCl_3$. The extract was separated by prep. TLC (Si gel) ($CHCl_3$–MeOH, 9:1) affording **1–4** as major compounds. The identity of **1**, **2** and **4** was established by comparing their ^{1}H NMR spectra with those of authentic material.

11β,13-Dihydrolactucin (**3**). Colourless crystals, mp 91°, IR $\nu_{max}^{CHCl_3}$ cm^{-1}: 3410(OH), 1770 (γ-lactone), 1680, 1635, 1620 (C=CCOC=C); MS *m/z* (rel. int.): 278.115 [M]$^+$ (60)($C_{15}H_{18}O_5$), 260 [M − H_2O]$^+$ (19), 231 [260 − CHO]$^+$ (35), 187 [231 − CO_2]$^+$ (100). $[\alpha]_D$ + 8.7 ($CHCl_3$; *c*0.63).

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