STRUCTURE OF TWO EUDESMANOLIDES, MORIFOLIN A AND B

Antonio González González,[†] Jaime Bermejo Barrera, Angel Yanes Hernández, Francisco Estévez Rosas, and Xorge A. Domínguez[+]

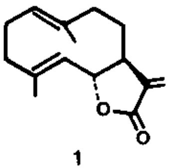
[†]Instituto de Química Orgánica, Universidad de La Laguna;
Instituto de Productos Naturales Orgánicos, CSIC, La Laguna,
Tenerife, Canary Islands, Spain
[+]Departamento de Química, Instituto Tecnológico y de Estudios
Superiores de Monterrey, Monterrey, Mexico

Abstract —— Two new eudesmanolides, morifolin A and B, were isolated in addition to previously known compounds from Critonia morifolia (Compositae). The structures were established by spectroscopic methods.

In the course of our studies on the constituents of Critonia morifolia (Compositae), previously known as Eupatorium morifolium Miller,[1] several sesquiterpene lactones were isolated from the methanolic extract of the dried material of this plant. We recently isolated α- (**2**) and γ-cyclocostunolide (**3**) from Critonia quadrangulare.[2] These compounds were isolated from C. morifolia together with the costunolide (**1**) and two new eudesmanolides morifolin A (**4**) and B (**5**) in the ratio *ca*. 1:1.

Lactones (**1**), (**2**), and (**3**) were identified on the basis of their physical and spectroscopical properties.[3,4] In this communication we describe the structural determination of morifolin A and B.

Morifolin A (**4**), $C_{15}H_{20}O_2$ (m/z 232), was isolated as an oil using repeated silica gel chromatography with a gradient mixture of n-hexane and ethyl acetate, and was found to contain an α-methylene-γ-butyrolactone moiety |IR ($CHCl_3$) 1760 cm^{-1}|; ^{1}H-NMR ($CDCl_3$): δ 5.50 (1H, d, J = 3.2 Hz), 6.25 (1H, d, J = 3.5 Hz) ppm. The complete structure and relative stereochemistry of **4** were deduced mainly on the basis of its 200 MHz ^{1}H-NMR spectrum ($CDCl_3$)[5] as described below. The spectrum of **4** displayed signals due to a tertiary methyl group at δ 0.82 (s, H-15), a vinylic methyl group at δ 1.81 (s, H-14), 5.38 (m, H-3), 5.50 (d, *J* = 3.2 Hz, H-13a), 6.25 (d, *J* = 3.5 Hz, H-13b), 4.58 (dd, *J* = 11.2 Hz, 11 Hz, H-6), 3.24 (m, H-7). On irradiation of this last signal the doublet of doublet signal for H-6 with *J* = 11.2, 11 Hz was changed into a doublet with *J* = 10.7 Hz. This fact indicated that the disposition of H-5, H-6 is *trans*-diaxial. Since the signal of the proton of the closing of the lactone is symmetric, we concluded that the disposition of H-6, H-7 is also *trans*-diaxial. Consequently, the structure of morifolin A is represented as **4**.



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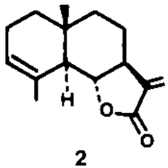

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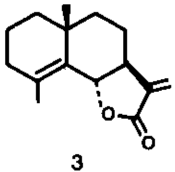

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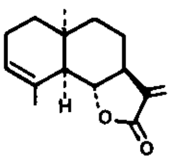

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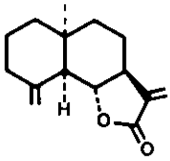

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Morifolin B (**5**) had a ^{1}H-NMR spectrum that was very similar to that of **4**. Thus, it has a tertiary methyl at δ 0.75 (s, H-15), 1.63 (d, *J* = 11.2 Hz, H-5), 4.77 (dd, *J* = 11.2 Hz, 10.3 Hz, H-6), 3.24 (m, H-7). The major differences were the absence of the signal of H-3 in **4** and the appearance of two new signals at δ 4.75 (1H, d, *J* = 1 Hz) and 4.91 (1H, d, *J* = 1 Hz), both characteristic of the exomethylene protons at C-4.

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REFERENCES AND NOTES

1. R.M. King and H. Robinson, *Phytologia*, 1971, **22**, 46.
2. A.G. González, J. Bermejo Barrera, A.C. Yanes Hernández, F. Estévez Rosas, and X.A. Domínguez, (1985) *Phytochemistry*, (in press).
3. J.D. Connolly and I.M.S. Thorton, *Phytochemistry*, 1973, **12**, 631.
4. Y. Asakawa, J.-C. Muller, G. Ourisson, J. Foussereau, and G. Ducomba, *Bull. Soc. Chim. France* (Chim. Mol.), 1976, 1465.
5. Measurements were carried out with a Bruker WP 200 SY nmr spectrometer.

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