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REVISED ^{13}C -NMR ASSIGNMENTS FOR THE BIOLOGICALLY ACTIVE BUTYROLACTONE (-)-TRACHELOGENIN

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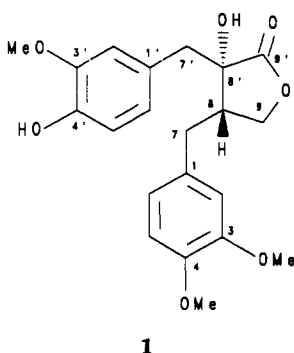
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ABSTRACT.—The biologically active butyrolactone (-)-trachelogenin [1] has been isolated from the leaves of *Glycydendron amazonicum*. The ^{13}C -nmr assignments have been revised on the basis of a 2D nmr analysis.

The butyrolactone (-)-trachelogenin [1] (1) has been shown to be a Ca^{2+} antagonist and to possess potent antihypertensive activity (2). More recently 1 was shown to be an antagonist of platelet activating factor (PAF) (3) and to possess antileukemic (4) and in vitro anti-HIV (5) activities; it has also been synthesized by α -hydroxylation of the corresponding α,β -dibenzylbutyrolactone (6,7). In the course of a phytochemical investigation of *Glycydendron amazonicum* Ducke (Euphorbiaceae) (8), (-)-trachelogenin [1] was isolated as the major compound from the leaves. Since two previous reports (6,9) had conflicting ^{13}C -nmr assignments for 1, we decided to make a 2D nmr analysis.

The ir, uv, and ms data for compound 1 were essentially identical with those reported (10). Although our ^1H and ^{13}C chemical shifts were essentially identical

to those reported in the literature for (-)-trachelogenin (6,9), our ^{13}C assignments differ. A standard HETCOR experiment established direct ^{13}C - ^1H connectivities, while 2- and 3-bond long-range correlations were achieved by the use of the FLOCK (11) pulse sequence. In the FLOCK spectrum, a quaternary aromatic carbon at δ 147.68 (C-3) and a methylene carbon at δ 31.43 (C-7) had cross peaks with a proton at δ 6.62 (δC 112.07). In a similar fashion, another quaternary aromatic carbon at δ 146.60 and a methylene carbon at δ 41.79 had cross peaks with a proton at δ 6.71 (δC 112.74). The results, which are summarized in Table 1, indicated that six of the twelve aromatic carbons were misassigned in the two previous reports (6,9). A listing of ^{13}C assignments from Agrawal and Thakur (9) are included in Table 1 for comparison, and the misassigned carbons are indicated. This appears to be the first reported occurrence of a lignan in the family Euphorbiaceae.



1

EXPERIMENTAL

A Nicolet 5DX FTIR, a Varian XL 400 NMR, and a VG70-250S mass spectrometer and a Perkin-Elmer polarimeter were used.

G. amazonicum was collected in the Essequibo region of Guyana in November, 1987. Voucher specimens have been deposited at the Herbarium of the University of Guyana. Dried ground leaves (500 g) were extracted with 95% EtOH (3 liters), and the resulting extract was taken up in CHCl_3 . The CHCl_3 -soluble material (13.6 g) was chromatographed on SiO_2 with hexane/ Me_2CO mixtures as eluent to give six major fractions. Fraction 2 eluted with 10% Me_2CO and crystallized from $\text{CHCl}_3/\text{MeOH}$ to give friedelin (142 mg), mp 262–265°, identical with an authentic

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TABLE 1. Assigned ^{13}C and ^1H Chemical Shifts and Long-Range Correlations for (-)-Trachelogenin (1).^a

Position	δ_{C}	δ_{H} (J_{HH})	Long-range correlations	$\delta_{\text{C}}^{\text{b}}$
1	131.05	—	6.78, 2.92	131.1
2	112.07	6.62 (2.0)	6.67, 2.92, 2.53	111.6 ^c
3	147.68	—	6.62, 3.85	146.6 ^c
4	148.98	—	6.68, 6.62, 3.84	149.2
5	111.34	6.78 (8.1)	6.67, 6.62, 3.84	112.8 ^c
6	120.78	6.67 (8.1, 2.0)	6.62, 2.92, 2.53	120.9
7	31.43	2.92, 2.53	6.62, 4.02, 2.51	31.6
8	43.66	2.51	4.02, 3.13, 2.93, 2.92, 2.53	43.8
9	70.35	4.02, 4.02	3.43, 2.92, 2.53	70.2
1'	126.27	—	6.83, 6.71, 6.63, 3.13, 2.93	126.2
2'	112.74	6.71 (2.0)	6.63, 3.13, 2.93	112.3 ^c
3'	146.60	—	6.83, 6.71, 3.82	145.1 ^c
4'	144.91	—	6.83, 6.71, 6.63	147.9 ^c
5'	114.36	6.83 (8.0)	6.71	114.4
6'	123.09	6.63 (8.0, 2.0)	6.71, 3.13, 2.93	123.2
7'	41.79	3.13, 2.93	6.71, 6.63, 3.43	42.0
8'	76.82	—	3.13, 2.93	76.5
9'	178.77	—	4.02, 3.13, 2.93	178.6
3-Ome	55.92	3.85		55.9
4-Ome	55.83	3.84		55.9
3'-Ome	55.92	3.82		55.9
4'-OH	—	5.84		
8'-OH	—	3.43		

^aData are for solutions in CDCl_3 . Chemical shifts were measured at 100.6 MHz for ^{13}C and 400 MHz for ^1H . Coupling constants are in Hertz.

^bData in this column are from Agrawal and Thakur (9).

^cMisassigned carbons.

sample. The most polar fraction eluted with 40% Me_2CO and was purified by preparative tlc on SiO_2 with CHCl_3 - MeOH (98:2) as mobile phase to give (-)-trachelogenin (353 mg).

(-)-Trachelogenin (1) was isolated as a pale yellow gum, $[\alpha]_{\text{D}} -36^\circ$ ($c=0.43$, CHCl_3) [lit. (7) -44°]; ir (CHCl_3) 3440 (broad), 1767, 1607, 1592 cm^{-1} ; uv (MeOH) 229 nm (ϵ 8300), 280 nm (ϵ 4700); ms $[\text{M}]^+$ 338 (22%), 178 (2), 177 (2), 151 (19), 137 (100), 122 (6), 106 (4), 94 (5). Exact mass 388.1534, calcd for $\text{C}_{21}\text{H}_{24}\text{O}_7$, 388.1520.

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