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17-*O*-ACETYL-19,20-DIHYDROVOACHALOTINE, A NEW ALKALOID FROM *VOACANGA CHALOTIANA*

Ezio Bombardelli, Attilio Bonati, Bruno Gabetta, Ernesto Martinelli
and Giuseppe Mustich
Inverni della Beffa, Research Laboratories, 20141 Milano, Italia

and

Bruno Danieli
Istituto di Chimica Organica, Università degli Studi, 20133 Milano, Italia

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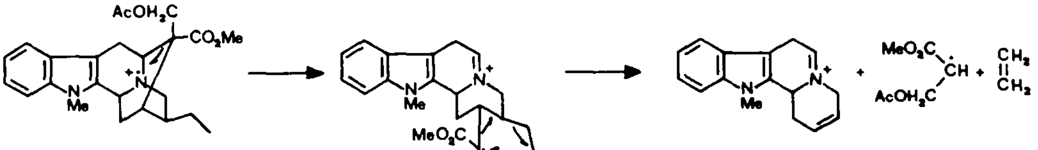
Key Word Index—*Voacanga chalotiana*; Apocynaceae; alkaloid; 17-*O*-acetyl-19,20-dihydrovoachalotine. .

Abstract—The structure of 17-*O*-acetyl-19,20-dihydrovoachalotine, a new alkaloid from the root bark of *Voacanga chalotiana*, has been determined by spectroscopic analysis. The stereochemistry at C-20 has been deduced on the basis of ^{13}C-NMR and comparison with other compounds containing the voachalotine skeleton.

Benzene extraction of the root bark of *Voacanga chalotiana* has provided a number of new indole alkaloids [1–5], one of which, named by us cuanzine [4], has been found to possess interesting pharmacological properties [6]. In the course of the fractionation procedures aimed primarily at the separation of this alkaloid, we have isolated an additional new base. The present communication is concerned with the elucidation of structure **1** for this new compound.

The alkaloid, molecular formula $C_{24}H_{30}N_2O_4$ ($M^+ = 410$), mp 201° (from EtOH), $[\alpha]_D^{20} - 54°$ ($CHCl_3$), UV maxima in MeOH at 228 and 283 nm (log ϵ 4.6 and 3.9, respectively), IR absorption (KBr) at 1738 cm^{-1}, exhibits spectral properties very similar to those [7] of voachalotine (**2**). In fact, its PMR spectrum (60 MHz, $CDCl_3$) contains signals attributable to four aromatic protons (complex system between 7.4–6.8 ppm), a carbomethoxy group at 3.6 ppm and an indole N-Me function at 3.55 ppm, whereas its MS shows peaks at *m/e* 196, 183 and 182, also present in that of voachalotine (**2**). However, in comparison with this alkaloid, the signals of the ethylidene side chain are missing, but a CH_2OAc system and an Et group are present (two protons *s* at 4.12 ppm, three protons *s* at 1.88 ppm and three protons poorly resolved *t* at 0.88 ppm). In addition, the peaks at *m/e* 263 and 349 in voachalotine are shifted to *m/e* 265 and 351 in the MS of **1**. All these data support the structure **1** for the new base, the upfield resonance of the OCO*Me* group being evidence for an interaction of this function with the aromatic region; that is, the stereochemistry at C-16 must be the same as that of **2**. The presence of a peak at *m/e* 237 (ion *a*), absent in the MS of all voachalotine derivatives and arising from the saturation of the 19,20 bond, also supports the assigned structure.

The assignment of the stereochemistry at C-20 can be made from a comparison of the ^{13}C spectra of **1** and **3**. Saturation of the 19,20 double bond would be expected to affect the chemical shift of C-16 if the Et group is β-oriented, whereas, if the side chain is α-orien-



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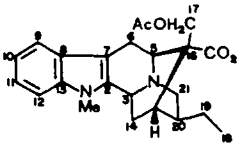

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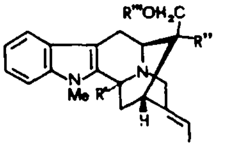

2	R'=R'''= H	R''=CO₂Me	
3	R'=H	R''=CO₂Me	R'''=Ac
4	R'=H	R''=CH₂OAc	R'''=Ac
5	R'=OAc	R''=CO₂Me	R'''=Ac

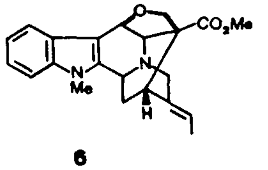

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Table 1*-^{13}C-NMR data of alkaloids **1**–**6**

Carbon	**1**	**3**	**4**	**5**	**6**
C-2	137.6	137.5	136.3	135.3	143.6
C-3	47.4	47.8	48.4	87.6	47.0
C-5	53.8	53.8	57.3	58.6	61.5
C-6	23.4	23.0	22.9	22.4	72.6
C-7	104.9	104.7	105.0	107.5	103.5
C-8	126.7	126.3	126.4	125.6	126.5
C-9	118.3	118.3	118.6	118.7	119.1
C-10	119.3	119.2	119.5	119.5	120.1
C-11	121.3	121.3	121.6	122.1	121.7
C-12	109.0	108.9	109.2	109.2	109.2
C-13	138.8	138.3	138.0	138.1	137.7
C-14	27.1	28.6	28.5	36.2	29.0
C-15	32.7	31.3	31.3	33.7	31.0
C-16	48.5	52.0	41.8	51.7	53.9
C-17	67.2	65.4	62.2	65.0	68.3
C-18	12.5	12.8	12.7	12.8	12.7
C-19	32.7	116.7	117.3	116.5	116.5
C-20	40.5	136.1	136.3	135.3	135.9
C-21	56.2	55.8	55.9	48.9	55.4
NMe	29.2	29.2	29.2	30.4	29.0
Me-CO	20.7	20.7	20.8	20.6^{a}	—
Me-*CO*	169.9	169.9	170.3^{a}	169.7^{b}	—
CO$_2$Me	176.3	174.8	—	174.3	175.9
CO$_2$*Me*	51.9	52.0	—	52.1	52.1
-*CH*$_2$OAc	—	—	68.4	—	
Me*CO*	—	—	171.1^{a}	168.3^{b}	—
*Me*CO	—	—	20.8	21.6^{a}	—

*All the spectra were run at 25.6 MHz in $CDCl_3$ solution. Chemical shifts are given in ppm downfield from TMS.

^{a,b} Assignments may be reversed.

tated, C-14 would be expected to be moved upfield (this phenomenon has been observed in the ^{13}C-NMR of ajmaline and isoajmaline [8]).

Apart from the aromatic shifts, which are assignable by comparison with the values of the recently re-investigated indoloquinolizidine system [9], the ^{13}C-NMR of acetylvoachalotine (**3**) is characterized (Table 1) by the presence of easily attributable signals for C-15,17,18 and 21 and the groups OCO*Me*, N-*Me* and CO$_2$*Me*, due to their multiplicity and chemical shift values. The signals for C-5 and C-3 are at 53.8 and 47.8 ppm, respectively, as in the spectra of dehydrovoachalotine (**6**) and the diacetyl derivative (**4**) a methyne carbon in the 48 ppm region is still present, whereas in these compounds the C-5 signals show the expected downfield shifts. The methylene signals at 23.0 and 28.6 ppm can be assigned to C-6 and C-14, respectively, as indicated by their downfield shifts in the spectra of **6** and **5**, respectively. It must be noted that in these two compounds the C_2-C_7 linkages have the same substitution at C-3 or C-6 as an ordinary olefinic double bond bearing an alkoxy group in an allylic position (upfield shifts for β-carbons, downfield shifts for γ-carbons).

A comparison of the spectra of **1** and **3** shows that the saturation of the 19,20 bond leaves the C-14 chemical shift almost unaffected, whereas C-16 moves upfield in the spectrum of **1** indicating a β-orientation for the Et side chain.

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