Anditomin, a new C_{25} Metabolite from *Aspergillus variecolor*

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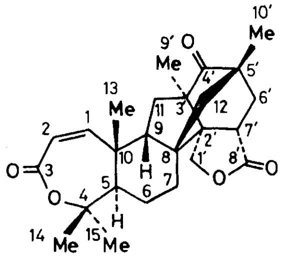
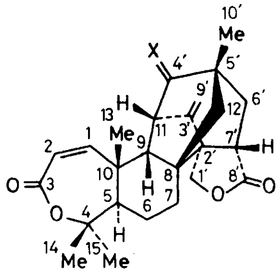
Summary The structure of anditomin, $C_{25}H_{30}O_5$, isolated from *Aspergillus variecolor*, was deduced from a detailed analysis of its ^1H and ^{13}C n.m.r. spectra and was confirmed by *X*-ray crystallography.

WE recently reported the isolation and structure determination of a number of novel C_{25} metabolites[1] related to andibenin,[2] including andilesen C (**1**), $C_{25}H_{32}O_5$, from *Aspergillus variecolor* (strain 212KI69). We now report the isolation of a further metabolite of this series, anditomin, for which we have deduced structure (**2**), along with similar amounts of andilesen C, from *A. variecolor* (C.M.I. 60316).

Anditomin, $C_{25}H_{30}O_5$ (mass spectrum and analysis), crystallised from ethyl acetate as prisms, m.p. >300 °C and showed $[\alpha]_D^{25}$ $-61°$, and ν_{max} $(CHCl_3)$ 1786, 1705, and



(1)

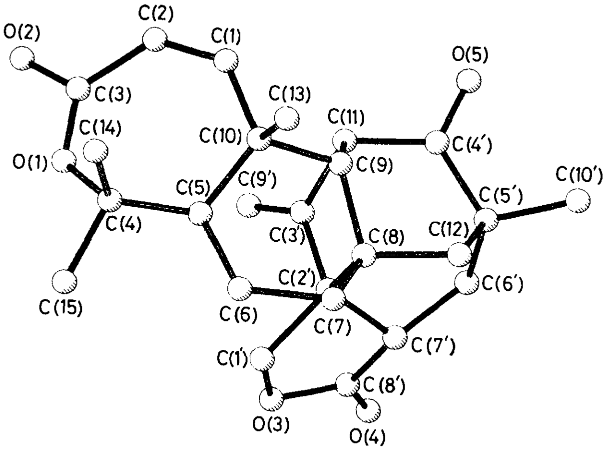


(2) X = O

(3) X = H,OH

1690 cm^{-1}. Comparison of their ^{1}H and ^{13}C n.m.r. spectra indicated a close relationship between andilesen C and anditomin, which showed *inter alia* δ_H 5·94 and 5·84 (C*H*=C*H*–C=O, *J* 12·7 Hz), 4·50 and 4·46 (–CH_2–O–C=O, *J* 8·8 Hz), 1·66 and 3·02 (–CH_2–C*H*–C=O, J_{AB} 14·5, J_{AX} 11·0 and J_{BX} 8·5 Hz), 1·36 and 1·97 (C–CH_2–C, *J* 13·5 Hz), and 1·4—2·1 (m, 5H). However, in contrast with the five tertiary *C*-methyl singlets shown by andilesen C, anditomin showed only four methyl singlets at δ_H 1·08, 1·26, 1·33, and 1·42 and additional resonances at 5·09, 5·08, 3·34, and 1·57 (all 1H, singlets). Similarly, the only significant differences in their ^{13}C n.m.r. spectra were the replacement of the methyl, methylene and quaternary carbon resonances at δ_C 19·5, 38·7, and 56·8 p.p.m. assigned[3] to C(9′), C(11), and C(3′) respectively, in andilesen C by olefinic quaternary and methylene, and aliphatic methine resonances at 148·0, 111·4, and 64·1 p.p.m., respectively, in anditomin. These differences in ^{1}H and ^{13}C resonances are best accommodated by structure (**2**) where the 'absent' methyl has become the exocyclic methylene with migration of the bond to the carbonyl carbon [C(4′)] from C(3′) to C(11). The chemical shift of C(11)-H (3·34 p.p.m.) is entirely consistent with a proton flanked by carbonyl and olefinic functions and was confirmed by sodium borohydride reduction of anditomin, to give (**3**) with δ_H 2·58 and 3·44 (C=C–C*H*–C*H*OH, *J* 3·5 Hz). A Dreiding model of (**2**) shows a dihedral angle of *ca.* 90° between C(11)-H and C(9)-H (δ_H 1·57) consistent with the complete lack of coupling between them. However, in the ^{13}C n.m.r. spectrum of anditomin enriched biosynthetically from [1,2-$^{13}C_2$]acetate, the C(9) and C(11) resonances at 61·5 and 64·1 p.p.m. respectively [assigned by selective decoupling of C(9)- and C(11)-H] showed a mutual ^{13}C–^{13}C coupling of 29·3 Hz to confirm that they are indeed adjacent. Thus all the observed spectroscopic properties are consistent with structure (**2**) for anditomin. As this structure represents a novel skeletal rearrangement in this group of compounds an *X*-ray crystal study was undertaken to provide final confirmation.

Crystal data: $C_{25}H_{30}O_5$, M = 410, clear colourless tetragonal crystals, space group $P4_1$ (No. 76), a = 9·310(5), c = 24·839(12) Å, U = 2153 Å^3, Z = 4, D_c = 1·27 g cm^{-3}, Mo-K_α radiation, λ = 0·71069 Å, μ = 0·94 cm^{-1}. A crystal of dimensions 0·3 × 0·3 × 0·4 mm was used to record layers 0*kl* through 5*kl* with $2\theta_{max}$ = 50° (graphite monochromatised Mo-K_α radiation) on a Stoe Stadi-2 diffractometer. Of the 1810 unique reflections 1271 had $I > 3\sigma(I)$. The highest 230 *E*-values were phased using the MULTAN-77 system.[4] Structure refinement was carried out using SHELX.[5] All hydrogen atoms were included in their calculated positions. All non-hydrogen atoms were refined isotropically to give a final *R* factor of 0·086. The arbitrary assignment of space group $P4_1$ as opposed to $P4_3$ is in accord with the likely stereochemical similarity of anditomin and andilesin C. The structure of the molecule is illustrated in the Figure by a PLUTO drawing.[6]†



FIGURE

(*Received, 22nd April* 1981; *Com.* 466.)

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† The atomic co-ordinates for this work are available on request from the Director of the Cambridge Crystallographic Data Centre, University Chemical Laboratory, Lensfield Road, Cambridge CB2 1EW. Any request should be accompanied by the full literature citation for this communication.

[1] T. J. Simpson, *J. Chem. Soc., Perkin Trans.* 1, 1979, 2118.
[2] A. W. Dunn, R. A. W. Johnstone, T. J. King, and B. Sklarz, *J. Chem. Soc., Chem. Commun.*, 1976, 270.
[3] T. J. Simpson, manuscript in preparation.
[4] P. Main, L. Lessinger, M. M. Woolfson, G. Germain, and J. P. Declercq, MULTAN-77, University of York, England and Louvain-la-neuve, Belgium, 1977.
[5] G. M. Sheldrick, SHELX, University of Cambridge, England, 1976.
[6] W. D. S. Motherwell, PLUTO, Crystallographic Data Centre Manual, University of Cambridge, England, 1976.