$C_{21}H_{18}O_{10}$ requires: C, 58.96; H, 4.08%) (natural one[8], m.p. 207.5–209°, IR 3390, 3130, 1653, 1604 cm^{-1} (Nujol), UV λ_{max}^{EtOH} nm (log ε): 259 (4.26), 296 (3.92), 355 (4.33)) (lit. m.p. 207–209°[1], 211–213°[2], 199–200°[9]), whose identity with natural one was confirmed by mixed m.p. determination and UV- and IR-spectral comparison. Synthetic axillarin gave, with acetic anhydride, tetraacetate (m.p. 161–161.5°) and, with diethyl sulphate, tetraethyl ether (VIII) (m.p. 110–111.5°) (lit.[2] m.p. 108–110°), which was also prepared from 2,4-diethoxy-6-hydroxy-3, ω-dimethoxyacetophenone (IX) and 3,4-diethoxybenzoic anhydride by unambiguous method.

Partial methylation of VI, followed by debenzylation yielded axillarin 7-methyl ether (II) (m.p. 237–238°, IR 3380, 1651, 1603, 1593 cm^{-1} (Nujol), UV λ_{max}^{EtOH} nm (log ε): 260 (4.32), 356 (4.37). Found: C, 60.21; H, 4.47. $C_{18}H_{16}O_8$ requires: C, 60.00; H, 4.48%) (lit.[3] m.p. 235–236°, UV λ_{max}^{EtOH} nm (log ε): 271 (4.29), 360 (4.31)). Its triacetate (X) (m.p. 158–159°) (lit.[3] m.p. 159–160°) was prepared by acetylation.

On the other hand, debenzylation of VII afforded the tetrahydroxyflavone (III) (m.p. 297–299°, IR 3440, 3360, 3290, 1657, 1616 cm^{-1}, UV λ_{max}^{EtOH} nm (logε): 262 (4.32), 274.5 (4.37), 298 (3.97), 368 (4.25). Found: C, 58.87; H, 3.83. $C_{21}H_{18}O_{10}$ requires: C, 58.96; H, 4.08%) (natural compound[10], m.p. 296–298°) (lit.[4] m.p. 301–303°), whose identity with natural compound was confirmed by mixed m.p. determination and UV-spectral comparison. Its tetraacetate (m.p. 157–158°) (lit.[4] m.p. 149–150°) and tetraethyl ether (m.p. 124.5–125.5°) (lit.[4] m.p. 125–126°) were prepared by a usual method.

Zusammenfassung. Axillarin (5,7,3′,4′-Tetrahydroxy-3,6-dimethoxyflavon), 5,3′,4′-Trihydroxy-3,6,7-trimethoxyflavon und 5,7,3′,4′-Tetrahydroxy-3,8-dimethoxyflavon wurden synthetisiert.

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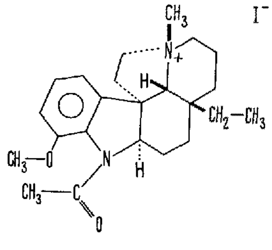
The Absolute Configuration of (-)-Aspidospermine

We report a confirmation of previous assignments of absolute configuration to the *Aspidosperma* alkaloids by use of the X-ray anomalous scattering effect from crystals of (–)-aspidospermine N(b)-methiodide. The X-ray anomalous scattering effect already has been used elegantly in demonstrating the stereospecificity of the transannular cyclization of quebrachamine to aspidospermine[1]. This work resulted in establishing the absolute configuration of 7-ethyl-5-desethyl-aspidospermidine[2]. However, although crystal structures have been reported for a number of *Aspidosperma* and related alkaloids[3–6], including (–)-aspidospermine N(b)-methiodide[7], there has been no previous X-ray determination of absolute configuration of a derivative which is closely related to a naturally occurring *Aspidosperma* alkaloid. Absolute configurations have been inferred from chemical inter-relationships and from optical rotatory dispersion data[8–11].

The determination of absolute configuration is particularly important for these alkaloids, because they are known to occur naturally in 2 series which differ in that their skeletal structures are enantiomeric. Some of these alkaloids, such as (–)-aspidospermine, have so far been found in only 1 series, while others, such as pyrifolidine, have been found to occur in both[11]. It has been suggested that these 2 series arise from a non-asymmetric intermediate in *Aspidosperma* alkaloid biosynthesis[12].

From the data in the Table, the absolute configuration of (–)-aspidospermine N(b)-methiodide is established as (I), from which the absolute configuration of the free base follows.



(I)

It should be noted that the atomic parameters reported by MILLS and NYBURG give the correct absolute configuration provided that these are referred to a right-handed set of crystal axes, as in Figures 1 and 2 of their paper[7]. In their Figure 3, the axial set is left-handed, so that the molecular ion shown has the incorrect absolute configuration.

In the present work, crystals of (–)-aspidospermine N(b)-methiodide[13] were found to be morphologically similar to those described by MILLS and NYBURG[7]. The reported crystal data were assumed ($a = 24.3$, $b = 8.50$, $c = 11.1$ Å; space group $P2_12_12_1$ with 4 molecules in the unit cell). A needle-like crystal of square cross section (0.2 × 0.2 mm) was cut to a length of 0.3 mm and mounted

hkl	(1) $\lvert F_{MN}\rvert$	(2) $\lvert F_{hkl}\rvert$ $\lvert F_{\bar{h}k\bar{l}}\rvert$	(3) $\lvert F_{\bar{h}kl}\rvert$ $\lvert F_{hk\bar{l}}\rvert$	(4) $\left(\frac{\Delta I}{\bar{I}}\right)_{\text{obs.}}$	(5) $\left(\frac{\Delta I}{\bar{I}}\right)_{\text{calc.}}$	(6) $\lvert F_{hkl}\rvert$ calc.	(7) $\lvert F_{\bar{h}\bar{k}\bar{l}}\rvert$ calc.
111	140	141 137	105 104	+ 0.56	+ 0.50	119	92
222	170	169 166	155 154	+ 0.16	+ 0.13	139	130
333	82	81 80	87 85	− 0.13	− 0.13	74	79
444	28	36 35	41 40	− 0.28	− 0.20	37	41
211	101	97 97	102 100	− 0.09	− 0.18	69	75
422	183	163 159	165 161	− 0.03	− 0.06	138	142
633	102	114 113	112 111	+ 0.07	0.00	91	91
112	28	31 32	22 22	+ 0.71	+ 0.68	23	16
224	40	45 45	39 39	+ 0.28	+ 0.45	49	39

Note that the columns of this Table contain: (1) structure amplitudes observed by Mills and Nyburg[14]; (2), (3) structure amplitudes, based on presently measured intensity data and scaled by comparison with the data in column (1). The crystal symmetry class (222) relates the data in column (2) to the form $\{hkl\}$ and the data in column (3) to the form $\{\bar{h}\bar{k}\bar{l}\}$; (4) the intensity difference $(\Delta I/\bar{I})$, given by $2\,(I_{hkl}+I_{\bar{h}k\bar{l}}-I_{\bar{h}kl}-I_{hk\bar{l}})/(I_{hkl}+I_{\bar{h}k\bar{l}}+I_{\bar{h}kl}+I_{hk\bar{l}})$ where I_{hkl} etc. are observed integrated intensities of X-ray reflections. The maximum e.s.d. in $(\Delta I/\bar{I})$ from counting statistics is 0.02. The maximum error in an individual intensity measurement due to X-ray absorption is estimated to be 5%, from a consideration of the variation in intensity of $0k0$ reflections with rotation about the diffractometer Φ-axis; (5) the calculated intensity difference $(\Delta I/\bar{I})_{\text{calc.}}$, given by $2\left(\lvert F_c\rvert^2_{hkl}-\lvert F_c\rvert^2_{\bar{h}\bar{k}\bar{l}}\right)/\left(\lvert F_c\rvert^2_{hkl}+\lvert F_c\rvert^2_{\bar{h}\bar{k}\bar{l}}\right)$; (6), (7) calculated structure amplitudes, based on Mills and Nyburg's atomic parameters. Values for atomic scattering factors, including the CuKα dispersion correction for iodine ($\Delta f' = -1.2$, $\Delta f'' = 7.0$) were taken from 'International Tables for X-ray Crystallography', Vol. 3 (Kynoch Press, 1962).

with the needle axis (b) along the Φ-axis of a G.E. single crystal orienter. Integrated intensity measurements were made using CuKα radiation and a scintillation counter as detector, with $\theta/2\theta$ scans of 2° in 2θ and background counts at each scan limit.

Zusammenfassung. Die absolute Konfiguration von (–)-Aspidospermin-N(b)-jodmethylat wurde röntgenographisch unter Anwendung der anomalen Streuung bestimmt. Dadurch ist die absolute Konfiguration von (–)-Aspidospermin festgelegt.

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Synthetic Peptides Related to Caerulein[1]. Note 1

A number of caerulein-like peptides has been synthesized in our laboratories. This first report describes the activity of the compounds listed in Table I, which shows the amino acid composition and sequence of these peptides, as well as their molecular weight and electrophoretic mobilities.

Synthesis. Compounds 3, 4, 7, 14 were synthesized by the stepwise procedure starting from the known tetrapeptide Trp-Met-Asp-Phe-NH_2[2] and adding the activated ester or the azide of the appropriate *ter*-butyloxycarbonyl amino acid, followed by treatment with AcOH/HCl.

The synthesis of compounds 5, 8, 10, 13, 15 was achieved by treating with pyridine/SO_3, the corresponding peptide having the amino group protected as trifluoroacetyl derivative. After sulphation, the protecting group (or groups) was eliminated by alkaline treatment.

Trifluoroacetyltyrosine azide was obtained according to the scheme: Tfa-Tyr → Tfa-Tyr-NHNH-Boc → Tfa-Tyr-$NHNH_2$ → Tfa-Tyr-N_3, and was condensed with

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