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CONSTITUENTS OF *NAUCLEA DIDERRICHII*. PART VIII. NAUCLEDAL

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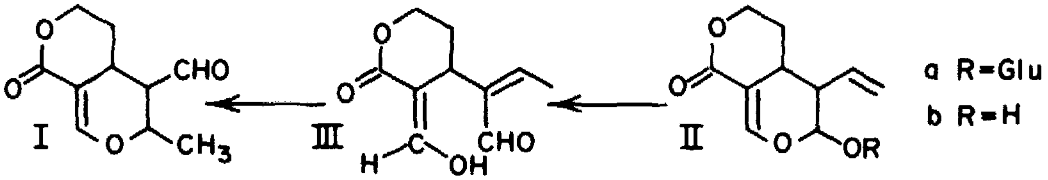
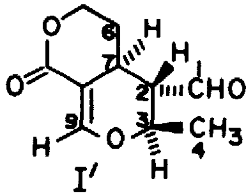
The isolation and tentative assignment of structure I to naucledal has been reported previously[1]. Interest increased subsequently when the revised structure of elenolic acid, an antiviral agent, was reported[2] and its relationship to I was apparent. Naucleol, isolated along with I, bears a similar relationship to a congener of elenolic acid in olive press juice[3].



It seemed reasonable to suppose that sweroside (IIa)[4], which we have isolated from *Lonicera tatarica*, could be converted to I through its aglycone and an intermediate conveniently represented by III. The corresponding transformation of secologanin has been reported very recently[5].

The crystalline aglycone IIb was prepared by enzymatic cleavage of sweroside[6] and preliminary tests, in which nmr spectroscopy was used to follow the reaction, provided evidence that the desired rearrangement sequence was indeed followed and indicated conditions which favored the formation of I. A solution of IIb (70 mg) in 1 ml of pyridine containing 0.1 ml of water was heated to 100-110° under nitrogen for 3 h. After removal of the solvent could be obtained. It is apparent that the material contains, besides naucledal, a closely related minor component that leads to sets of peaks in the nmr spectrum with chemical shifts slightly different from those attributed to naucledal: e.g. a τ 8.78 doublet beside the naucledal τ 8.53 doublet. Chromatography does not appear to remove the minor component, which is probably an equilibratable epimer since its relative abundance (up to 30%) varies with the history of the sample. Corresponding signals can be recognized, despite the high noise level, in the nmr spectrum of the original naucledal[1]. A 220 MHz nmr spectrum of the present material confirms the assignments made to the major component on the basis of the 60 MHz spectrum reported previously[1], and provides the following additional data which lead to the assignment of the relative configuration shown in I': H-7, τ 7.04 (dddd, $\underline{J}^*_{7,9}=2.0$, $\underline{J}_{7,6a}=12.0$, $\underline{J}_{7,6b}=4.0$, $\underline{J}_{7,2}=11.0$); H-2, τ 7.64 (ddd, $\underline{J}_{2,7}=11.0$, $\underline{J}^*_{2,1}=2.8$, $\underline{J}^*_{2,3}=10.0$); H-3, τ 5.80 (dq, $\underline{J}^*_{3,2}=10$, $J^*_{3,4}=6.0$). [Coupling constants are in Hz units; an asterisk indicates an assignment confirmed by decoupling.][8]



I'

When these data are taken in conjunction with the formation of the material (which retains optical activity) by rearrangement of sweroside[4], structure I' is firmly established for the major component and, consequently, for the material designated naucledal[1].

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7. Oxime (stereoisomeric mixture), mp 171-9°: C, 56.90; H, 6.31; N, 6.68.
8. Spectrum determined by Dr. A. Grey, Canadian 220 MHz N.M.R. Center.