

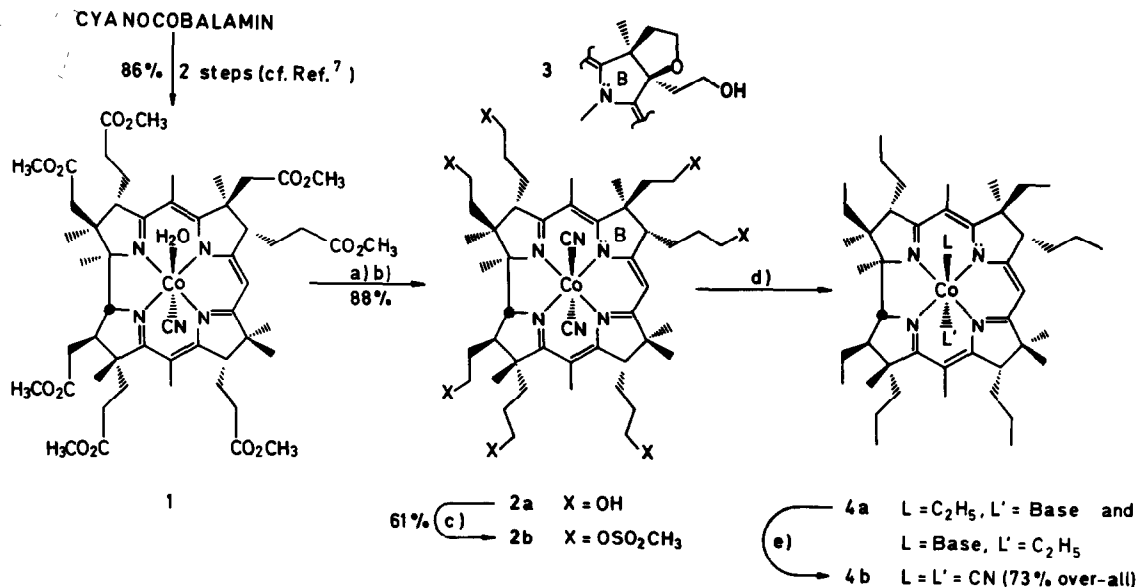
A SIMPLE FIVE-STEP SYNTHESIS OF A PENTADECALKYLCORRIN
 DERIVATIVE FROM COMMERCIAL CYANOCOBALAMIN

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Summary : Dicyano 2,7,18-triethyl-1,2,5,7,12,12,15,17-octamethyl-3,8,13,17-tetrapropyl-Co(III)-corrin has been prepared by reduction of the ester groups of dicyano cobyric acid heptamethylester.

Investigations on the reactivity of the naked corrin chromophore are often hampered by the functional groups present in the compounds which are available from natural sources (e.g. cyanocobalamin or dicyano-cobyric acid heptamethylester). Although corrin derivatives bearing only methyl groups can be obtained by total synthesis ²⁻⁴, the number of reaction steps involved is, even in the most simple cases, prohibitive for large scale preparations. In the scope of our work on the structure of the so-called stable yellow corrinoids ^{5,6}, we have developed an easy synthesis of a corrin derivative (**4b**) bearing only alkyl substituents which is prepared in 34% over-all yield from commercial cyanocobalamin in a five-step reaction sequence :



a) LiAlH₄ in tetrahydrofuran, 0°C, 4 h. b) 1% aq. HCN, isolated by chromatography on DEAE-cellulose with water as eluent. c) H₃C-SO₂Cl/triethylamine in absolute dimethylformamide at -5°C, then 24 h at room temp., isolated by chromatography on silica gel with methylene chloride/methanol (97:3) as eluent. d) LiBH(C₂H₅)₃ in tetrahydrofuran, 0°C, then 60 h in the dark at room temp. e) Irradiation with a 500 W lamp in methanol containing KCN, 3 h, 0°C, isolated by TLC on silica gel with methylene chloride/methanol (99.5:0.5) as eluent.

Although all reaction steps are straightforward, a prolonged work-up of the reaction mixture after reduction of 1 with lithium aluminium hydride is to be avoided since the carbinol 2a cyclizes very readily in solution, to the corresponding *c*-monoether 3. Unlike other corrinoids related to cobyrinic acid heptamethylester, the peralkylated corrin derivative 4b (m. p. 204 °C, dec.) which is soluble in *n*-hexane and other non-polar solvents, can be characterized by conventional mass spectrometry. All available spectroscopic data (UV/VIS-, IR-, ¹H-NMR- and ¹³C-NMR-Spectra) agree with the structure given for compound 4b. Furthermore, the comparison of the chiroptical data of 4b with those of dicyanocobyrinic acid heptamethylester (Fig. 1) points out that during the reaction sequence no epimerization takes place at any of the nine chirality centers of the chromophore.

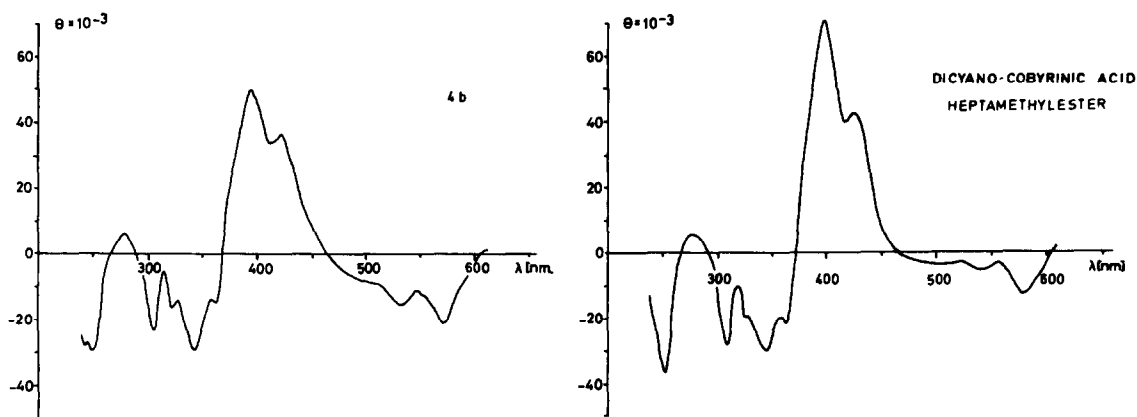


Fig. 1 : CD-Spectra in methanol ($1.08 \cdot 10^{-4}$ and $4.3 \cdot 10^{-5}$ mole/L respectively).

This work was financially supported by the Deutsche Forschungsgemeinschaft (Project No. Go 209/9)

References and Notes

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(Received in Germany 15 June 1979)