Preparation of Some Hydroxycoprostanes; 3α, 7α- and 3α, 12α-dihydroxycoprostane

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In connection with studies on the transformation of cholesterol into bile acids it was of interest to study the metabolism of the coprostanes corresponding to the common bile acids. These compounds have now all been prepared through electrolysis of the appropriate bile acid with *iso*valeric acid. The data for 3α, 7α, 12α-trihydroxycoprostane, that was described recently,[1,2] has also been included for comparison. Some results of the metabolic studies with these compounds have already been published [1,3,4].

Experimental. 3α,12α-dihydroxycoprostane. Deoxycholic acid (2.0 g) was dissolved in methanol (450 ml) and *iso*valeric acid (13.5 ml, isomer-free) and a solution of sodium (290 mg) in methanol (50 ml) was added. The solution was placed in a beaker surrounded by ice. The electrolysis was run for 80 min with 4.2 A between platinum electrodes (5.2 cm^2) placed 0.2 cm from each other.

The mixture was then evaporated to dryness *in vacuo*, the residue was dissolved in a mixture of water and ether, the phases were separated and the aqueous phase reextracted twice with ether. The combined ether phases were washed with dilute sodium hydroxide and water and taken to dryness. The residue (1.84 g) was brought onto a column of silicic acid (30 g, dried at 120° for 24 h) prepared with methylene dichloride. The column was eluted with methylene dichloride containing 1.5 % of methanol, each fraction being 30 ml. Fractions 4 and 5 that contained the bulk of the material (1.35 g) were combined and recrystallized from aqueous acetone three times, when a constant melting point had been reached. Yield 550 mg, m.p. 108—110°C.

In the same way 3α, 7α-dihydroxy and 3α-hydroxycoprostane were prepared from chenodeoxycholic and lithocholic acid, respectively. The 3α-hydroxycoprostane was chromatographed in the system described by Danielson [5] for the reversed phase partition chromatography of monosubstitued C_{27}-steroids.

The data for these compounds together with those obtained earlier for the 3α-7α,12α-trihydroxycoprostane are listed in Table 1. Analysis by Microanalytical Laboratory, Department of Chemistry, University of Copenhagen. All rotations were made in chloroform, m.p.'s are corrected.

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Table 1.

	m.p. °C	$[\alpha]_D^{20°}$	M_D	conc g/100 ml CHLFORM	% C		% H	
					calc.	found	calc.	found
1. 3α-hydroxycoprostane (*cf* [6,7]) $C_{27}H_{48}O$	116—118	30.7	120	1.62	83.4	83.2	12.4	12.5
2. 3α,7α-dihydroxycoprostane $C_{27}H_{48}O_2 \cdot H_2O$	84—86	14.1	59	2.21	76.9	76.7	11.9	11.9
3. 3α,12α-dihydroxycoprostane $C_{27}H_{48}O_2$	108—110	45.0	182	1.06	80.1	80.1	12.0	11.7
4. 3α,7α,12α-trihydroxycoprostane $C_{27}H_{48}O_3$	185—186	30.4	128	1.24	77.1	76.7	11.5	11.4