LIST OF PUBLICATIONS

Research Publications


Patents taken


It is mentioned on page 24 (of my thesis) that the compound 83 on heating with lithium bromide and pyridinium p-toluenesulfonate in DMF gave a mixture of two rearranged unsaturated ketones 84 and 85. These isomers 84 and 85 were separated by column chromatography. Now, it is observed that the compound which was isolated in earlier fractions and given structure 84 is actually 3-ene-6-one isomer 84A (enclosed \text{CHART VIA}), while the product isolated in later fractions and was given structure 85 is actually 2-ene-6-one isomer 84. The formation of these two compounds depend on reaction period. Thus, heating the 1-ketone acetate 83 with LiBr and pyridinium p-toluenesulfonate in DMF for 4 hrs, followed by column chromatography of the crude reaction product lead to 80% yield of 84 and another rearranged product 85 in 12.5% yield. On heating the reaction mixture for a period of 0.5 hr followed by column chromatography of the reaction product gave compound 84A in 35% yield and compound 84 in 36% yield. The compounds 84 and 84A were converted into their dihydroxy compounds 86 and 86A. These dihydroxy compounds were finally converted into their triacetates 87 and 87A respectively. The detailed experimental data is given below.

Experimental

(20S)-23,24-Dinor-5α-cholan-22-acetoxy-2-ene-6-one 84 and its 4-ene-6-one isomer 85

A mixture of compound (83, 0.280 g, 0.75 mmol) m.p. 127-128°C (ether-petroleum ether, m.p. of compound 83 was not mentioned in the thesis, p. 40, as it is found to be solidified later on): [α]_D^{31} + 35.4° (c=0.9, CHCl₃), lithium bromide (0.028 g, 0.32 mmol) and pyridinium p-toluenesulfonate (0.028 g, 0.11 mmol) in DMF (5 ml) was refluxed for 4 hr.
Reaction mixture was cooled to room temperature, cold water was added to it and then it was extracted with ethyl acetate. Ethyl acetate extract was washed successively with water (2 x 25 ml), saturated sodium bicarbonate (2 x 25 ml), water (2 x 25 ml) brine (25 ml) and it was dried over anhydrous sodium sulfate. Removal of solvent afforded crude product (0.298 g) which was a mixture of two compounds. It was chromatographed over silica gel column. Elution with EtOAc-petroleum ether (5:95) gave compound **84** as a white solid (0.224 g, 80%) m.p. 75°C (ether-petroleum ether); IR (nujol) 1738 (OAc), 1708 (\(\gamma\)C=O) and 1240 cm\(^{-1}\); \(^1\)H-NMR (CDCl\(_3\)) 0.71 (s, 3H, CH\(_3\)-18), 0.73 (s, 3H, CH\(_3\)-19), 1.02 (d, 3H, CH\(_2\)-21, J=7 Hz), 2.04 (s, 3H, OAc), 3.6-4.29 (m, 2H, CH\(_2\)-22), 5.58 (m, 2H, olefinic) \(\text{MS} 372 (M^+)\), 357, 344, 297, 229, 175, 159, 133, 121, 107, 93 (100%), 79, 67, 55; [\(\alpha\)]\(_D\)\(^25\) + 31.3° (c=2.8, CHCl\(_3\)).

Further elution with the same solvent system gave compound **85** (0.030 g, 12.5%) as a gum; IR (CHCl\(_3\)) 1730 (OAc), 1680 (\(\gamma\)C=O) and 1215 cm\(^{-1}\); \(^1\)H-NMR (CDCl\(_3\)) 0.71 (s, 3H, CH\(_3\)-18), 1.0 (s, 3H, CH\(_3\)-19), 1.033 (d, 3H, CH\(_3\)-21, J=7 Hz), 2.04 (s, 3H, OAc), 3.6-4.16 (m, 2H, CH\(_2\)-22), 6.37 (t, 1H, CH-4, J=4 Hz).

The compound which was isolated as **84** (page 41) is actually **84A** (Chart VIA, attached here). This on dihydroxylation with OsO\(_4\) and NMO gave the compound **86A** and not **86**. This **86A** on acetylation gave compound **87A** and not **87** as mentioned on page 41 and 42 of the thesis.
(2R, 3S)-2,3-Dihydroxy-22-acetoxy-23,24-dinor-5α-cholan-6-one (86)

A solution of OsO₄ (0.008 g) in t-BuOH (0.4 ml) was added to compound (84, 0.227 g, 0.83 mmol) in acetone (12.6 ml). Then NMO (0.227 g) and water (0.46 ml) were added to it. The reaction mixture was stirred under nitrogen for 1.5 hr. The reaction was worked up as mention on page 41. Removal of solvent gave white solid (0.244 g, 98%); m.p. 170-171°C (MeOH); $[\alpha]^{24}_D + 0.662^\circ$ (c=2.72, CHCl₃); IR and NMR of this compound are exactly identical with that of compound 86 reported in the thesis p.42, top para.

(2R, 3S)-2,3,22-Triacetoxy-23,24-dinor-5α-cholan-6-one (87)

A mixture of compound (86, 0.208 g, 0.51 mmol), pyridine (1.2 ml), acetic anhydride (0.8 ml) and dimethyl amino pyridine (0.048 g) was heated at 60-65°C with stirring for 8 hr. On usual work up it gave compound 87 as solid (0.250 g, 99% yield). It was crystallized from MeOH, m.p. 205°C (lit.⑨,10 m.p. 212°C; lit.⑩ m.p. 182-185°C); $[\alpha]^{28}_D -4.58^\circ$ (c=1.44, CHCl₃); MS 430 (M-AcOH), 388, 370, 355 (100%), 326, 311, 295, 266, 227, 175, 105, 93, 81, 67, 55; its IR and NMR are exactly identical to that of compound 87 mentioned in the thesis p.42, in the middle.
As pointed out by Prof. Razdan we have critically examined the NMR spectra of compounds 86, 86A and 87, 87A and found that there is some difference. IR, NMR and mass spectrum data of all these four compounds is given below and the difference is underlined.

**Compound 86** (2R, 3S)-2,3-dihydroxy-22-acetoxy-23,24-dinor-5α-cholan-6-one.

**IR:** 3370, 1750, 1715, 1260 and 1050 cm⁻¹.

**NMR:** 0.68 (s, 3H, CH₃-18), 0.76 (s, 3H, CH₃-19), 1.01 (d, 3H, CH₂-21, J=7 Hz), 2.03 (s, 3H, OAc), 2.84 (dd, 1H, CH-5, J=4, 13-Hz), 3.59-4.13 (m, 4H, CH-2, CH-3 and CH₂-22).

**Mass:** 406 (M⁺), 388, 373, 346, 304, 277, 263, 245, 175, 121, 107, 95, 81, 55(100%).

**Compound 86A** (3S, 4S)-3,4-Dihydroxy-22-acetoxy-23,24-dinor-5α-cholan-6-one.

**IR:** 3520, 3440, 1735, 1705 and 1270 cm⁻¹.

**NMR:** 0.67 (s, 3H, CH₃-18), 0.76 (s, 3H, CH₃-19), 0.93 (d, 3H, CH₂-21, J=7 Hz), 1.82 (d, 2H, OH), 2.04 (s, 3H, OAc), 2.64 (dd, 1H, CH-5, J=4, 13 Hz), 3.6-4.29 (m, 4H, CH-2, CH-3 and CH₂-22).

**Mass:** 406 (M⁺), 391, 346, 304(100%), 286, 277, 272, 263, 245, 175, 133, 121, 107, 93, 81.

**Compound 87** (2R, 3S), 2,3,22-Triacetoxy-23,24-dinor-5α-cholan-6-one.

**IR:** 1745, 1735, 1715, 1255, 1235, and 1045 cm⁻¹.

**NMR:** 0.7 (s, 3H, CH₃-18), 0.83 (s, 3H, CH₃-19), 1.02 (d, 3H, CH₂-21, J=7 Hz), 1.99 (s, 3H OAc), 2.06 (s, 3H OAc), 2.08 (s, 3H OAc), 3.62-4.16 (m, 2H, CH₂-22), 4.91 (m, 1H, CH-2), 5.34 (m, 1H, CH-3).

**Mass:** 430 (M-AcOH), 388, 370, 355(100%), 326, 295, 266, 227, 175, 157, 147, 135, 121, 105, 93, 81.

**Compound 87A** (3S, 4S), -3,4,22-Triacetoxy-23,24-dinor-5α-cholan-6-one.

**IR:** 1745, 1720, 1265, 1240, 1165, 1050 and 1030 cm⁻¹.

**NMR:** 0.69 (s, 3H, CH₃-18), 0.82 (s, 3H, CH₃-19), 0.96 (d, 3H, CH₂-21, J=7 Hz), 1.96 (s, 3H OAc), 2.02 (s, 3H OAc), 2.07 (s, 3H OAc), 3.60-4.31 (m, 2H, CH₂-22), 4.89 (m, 1H, CH-4), 5.31 (m, 1H, CH-3).

**Mass:** 490 (M⁺), 430, 388 (100%), 355, 306, 260, 245, 227, 215, 175, 147, 135, 121, 105, 93, 81.
About X-ray data and figure

Crystals are orthorhombic with cell dimensions-
\[ a = 7.444 \ (2), \ b = 9.339 \ (2) \quad \text{and} \quad c = 34.118 \ (5) \ \text{Å} \]

Space group \( \text{P}2_1 \ 2_1 \ 2_1 \) data were collected on
CAD-4F-11 single crystal X-ray diffractometer using MoK\( \alpha \) radiation \( \lambda = 0.7107\text{Å} \).

Refinement is in progress.
Pluto diagram and final co-ordinates will be produced as soon as refinement is over.