In the crystal structure of the title compound, C_{13}H_{19}ClO_{8}, extensive intermolecular hydrogen bonding leads to a three-dimensional network, but the Cl substituent is not involved in these interactions.

Comment

We have recently prepared a series of 1-(2-haloethyl)-2,3,5-tri-O-acetyl-β-D-ribofuranose derivatives for use in the synthesis of ribose-functionalized 2,2'-bipyridine (Constable et al., 2004) and 2,2',6',2'-terpyridine ligands. Crystals of 1-(2-chloroethyl)-2,3,5-tri-O-acetyl-β-D-ribofuranose, (I), were grown by freeze–thawing the colourless oil that was obtained after chromatographic purification of the compound.

Fig. 1 shows the molecular structure of (I). Bond distances and angles are unexceptional. The conformation of (I) is very similar to that found in polymorph B of 1,2,3,5-tetra-O-acetyl-β-D-ribofuranose (Bombicz et al., 2003; James & Stevens, 1973; Poppleton, 1976), and the conformations of the two molecules

---

2,3,5-Tri-O-acetyl-1-(2-chloroethyl)-β-D-ribofuranose

Fig. 1

The molecular structure of (I), with displacement ellipsoids drawn at the 50% probability level. H atoms are shown as spheres of arbitrary radii.
are compared in Figs. 2 and 3. Both compounds crystallize in the non-centrosymmetric space group $P2_12_12_1$, with cell dimensions that are similar, suggesting similar packing. Two polymorphs of 1,2,3,5-tetra-O-acetyl-$\beta$-d-ribofuranose exist (Bombicz et al., 2003; Czugler et al., 1981; James & Stevens, 1973; Patterson & Groshens, 1954; Poppleton, 1976) and the relative instability of polymorph $A$ has been attributed to extremely short H···H contacts (Bombicz et al., 2003).

The molecule of (I) exhibits two short intramolecular C–H···O contacts [C2–H21· O8 = 2.25 Å and C2–H21· O8 = 2.671 (2) Å, and C5–H51· O4 = 2.26 Å and C5–H51· O4 = 2.671 (2) Å]. These are, however, non-directional (C2–H21· O8 = 106° and C5–H51· O4 = 105°) (Desiraju & Steiner, 1999). Similar short contacts are observed in 1,2,3,5-tetra-O-acetyl-$\beta$-d-ribofuranose. Intermolecular interactions involve C–H···O contacts (Table 2) and lead to the formation of an extensive network of interconnected molecules. The Cl substituent is not involved in any intermolecular interactions.

**Experimental**

The title compound was prepared as a colourless oil from 1,2,3,5-tri-O-acetyl-$\beta$-d-ribofuranose and 2-chloroethanol in the presence of SnCl$_4$ by a method previously described for the analogous reaction starting from arabinofuranose (Pathak et al., 2001). Crystals were grown by repeatedly dipping a sample of the compound contained in a tube under high vacuum into liquid nitrogen.

**Crystal data**

$C_{13}H_{19}ClO_8$

$M_r = 338.74$

Orthorhombic, $P2_12_12_1$

$a = 7.3407$ (5) Å

$b = 13.5532$ (14) Å

$c = 15.4384$ (9) Å

$V = 1536.0$ (2) Å$^3$

$Z = 4$

$D_m = 1.465$ Mg m$^{-3}$

$\mu = 0.29$ mm$^{-1}$

$T = 173$ K

Block, colourless

$0.28 	imes 0.26 	imes 0.22$ mm

**Table 1**

Selected geometric parameters ($\bar{\AA}$, $^\circ$).

| C1–C7 | 1.7847 (19) | C3–C4 | 1.516 (2) |
| C1–C2 | 1.513 (2)   | C3–C5 | 1.428 (2) |
| C1–C1 | 1.397 (2)   | C4–C5 | 1.506 (2) |
| C2–C1 | 1.421 (2)   | C4–O2 | 1.428 (2) |
| C2–C3 | 1.515 (2)   | C5–C3 | 1.436 (2) |
| C2–C7 | 1.435 (2)   |
| C2–C1 | 106.34 (13) |
| C2–C2 | 105.66 (14) |
| C1–C1 | 111.71 (13) |
| C1–C3 | 100.45 (14) |
| C1–C7 | 106.62 (13) |
| C3–C2 | 109.57 (13) |
| C3–C3 | 102.56 (13) |

**Data collection**

Nonius KappaCCD area-detector diffractometer

$\phi$ and $\omega$ scans

Absorption correction: multi-scan (DENZO/SCALEPACK; Otwinowski & Minor, 1997)

$T_{min} = 0.93, T_{max} = 0.94$

46023 measured reflections

3896 independent reflections

2801 reflections with $I > 3\sigma(I)$

$R_{int} = 0.075$

$\mu = 0.29$ mm$^{-1}$

**Refinement**

Refinement on $F$

$R(F) = 0.035$

$S = 1.07$

2801 reflections

200 parameters

H-atom parameters constrained

$w = [1 - (F_o^2/F_c^2)^2]^{-1}$

$T_2 = 0.945T_1 + 0.132T_3 + 0.288T_4$

where $T_i$ are the Chebychev polynomials and $x = F_c/F_{max}$ (Prince, 1982; Watkin, 1994)

$\Delta\rho_{max} = 0.20$ e Å$^{-3}$

$\Delta\rho_{min} = -0.18$ e Å$^{-3}$

Absolute structure: Flack (1983), with 1663 Friedel pairs

Flack parameter: –0.01 (6)
Table 2

Intermolecular C—H···O interactions (\AA, °) in (I).

<table>
<thead>
<tr>
<th></th>
<th>H—O</th>
<th>C···O</th>
<th>H—C···O</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1—H11···O4′</td>
<td>2.56</td>
<td>3.453 (2)</td>
<td>157</td>
</tr>
<tr>
<td>C9—H92···O6ii</td>
<td>2.55</td>
<td>3.447 (3)</td>
<td>156</td>
</tr>
<tr>
<td>C11—H113···O5iii</td>
<td>2.48</td>
<td>3.428 (2)</td>
<td>168</td>
</tr>
<tr>
<td>C7—H72···O4iv</td>
<td>2.61</td>
<td>3.391 (3)</td>
<td>139</td>
</tr>
<tr>
<td>C6—H61···O2i</td>
<td>2.71</td>
<td>3.249 (2)</td>
<td>117</td>
</tr>
</tbody>
</table>

Symmetry codes: (i) \(-\frac{1}{2} + x, \frac{1}{2} + y, 2 - z\); (ii) \(-\frac{1}{2} - x, \frac{1}{2} + y, 2 - z\); (iii) \(-\frac{1}{2} + x, \frac{1}{2} - y, 2 - z\); (iv) \(x - 1, y, z\).

All H atoms were treated as riding atoms, with C—H = 0.96 \AA and \(U_{iso}(H)\) between 1.0\(U_{eq}(C)\) and 1.2\(U_{eq}(C)\).

Data collection: COLLECT (Nonius, 2001); cell refinement: DENZO/SCALEPACK (Otwinowski & Minor, 1997); data reduction: DENZO/SCALEPACK; program(s) used to solve structure: SIR92 (Altomare et al., 1994); program(s) used to refine structure: CRYSTALS (Betteridge et al., 2003); molecular graphics: ORTEP-3 (Farrugia, 1997); software used to prepare material for publication: CRYSTALS.

We thank the Swiss National Science Foundation and the University of Basel for financial support.

References