L-*erythro*-2,3-Dihydroxybutanoic Acid and Related Compounds

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THE DL-*erythro*-2,3,-dihydroxybutanoic acid has been described previously (*3*, *4*), but the isomers have not been separated nor individual characteristics reported. The procedure followed here is a similar to that used by Ballou (*1*) in synthesizing the monophosphates of the D-*erythro*-isomer.

Table I. Properties of L-*erythro*-2,3-Dihydroxybutanoic Acid (I) and Related Compounds

Compound	M.P., °C.[a]	$[\alpha]^{25}_D$	Analyses[b]							
			C	H	O	N	C	H	O	N
Methyl 4-*O*-benzyl-α-L-rhamnopyranoside (II)	107–109	−70.0	62.7	7.5	29.8	...	62.6	7.6	29.8	...
L-*erythro*-2-*O*-benzyl-2,3-dihydroxybutanoic acid (III)	110–112	−76.0	62.8	6.7	30.5	...	62.7	6.6	30.5	...
Cyclohexylammonium salt of III	162–165	−50.0	66.1	8.8	20.6	4.5	66.0	9.0	20.4	4.3
L-*erythro*-2,3-dihydroxybutanoic acid (I)	70	+10.4	40.0	6.7	53.3	...	39.7	6.9	53.3	...
Cyclohexylammonium salt of I	117–122	−7.0	54.8	9.7	29.2	6.4	54.6	9.6	29.0	6.6
L-*erythro*-1,2,3-butanetriol tribenzoate	99–101	+25.0	71.7	5.31	22.9	...	71.6	5.5	22.7	...

[a] Melting points were taken on a melting point block. [b] Analyses by Midwest Microlab, Inc., Indianapolis, Ind.

Reduction of II with $NaBH_4$ and subsequent hydrolysis and catalytic debenzylation produced the hitherto unknown L-*erythro*-1,2,3,-butanetriol, characterized finally as the tribenzoate, the properties of which are given in Table I. The DL-*erythro*-1,2,3,-butanetriol has been characterized previously as its *p*-nitrobenzoate (*2*).

The starting point for these syntheses was methyl 4-*O*-benzyl-α-1-rhamnopyranoside (II), the D-isomer of which has been described (*1*). Oxidation of II with sodium metaperiodate produced the corresponding dialdehyde in 75% yield. The crude dialdehyde was oxidized with iodine and then hydrolyzed in aqueous acid. Ether extraction of the acid, concentration of the extract, and addition of cyclohexylamine yielded the cyclohexylammonium salt of L-*erythro*-2-*O*-benzyl-2,3-dihydroxybutanoic acid (III). The crystalline acid is obtained from the salt in 79% yield by acidification and extraction with ether.

After treatment of III with hydrogen and palladium, removal of the catalyst, and concentration of the ethanolic solution, addition of cyclohexylamine gave, in 68% yield, the salt of L-*erythro*-2,3-dihydroxybutanoic acid (IV). The free acid was obtained by treating the salt with Dowex 50 (H^+ form). After three recrystallizations from cold acetone, the free acid showed the properties given in Table I.

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Symmetrical and Unsymmetrical Fluoroalkoxy- and Fluorophenoxy-*s*-triazines and Related Compounds

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GOOD heat stability is exhibited by tris(1,1,5-tri-*H*-perfluoropentyloxy)-*s*-triazine (*5*); therefore, liquid fluoroalkoxy- and fluorophenoxy-*s*-triazine derivatives are potentially useful as high temperature–stable fluids. A systematic series of these compounds and the required intermediates have been prepared and their properties are reported in Table I. Methods suitable for preparing these compounds will be reported elsewhere (*1*). A discussion of the infrared spectra of these compounds has been published (*3*).

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