Table 1.1 Equilibrium composition of solutions of reducing sugars.

Sugar	*Temperature (°C)*	*α-Furanose*	*β-Furanose*	*α-Pyranose*	*β-Pyranose*	*Aldehydo*	*Hydrate*	*Comments*	*Ref.*
Glycolaldehyde	–	–	–	–	–	4	70	At 0.1 M – rest dimer	67
DL-Glyceraldehyde	24	–	–	–	–	2	37	At 1.0 M– rest dimer	68
DL-Glyceraldehyde	45	–	–	–	–	6	44		68
DL-Glyceraldehyde	75	–	–	–	–	16	53		68
Dihydroxyacetone	22	–	–	–	–	80	20		69
D-Erythrose	36	25	63	–	–	–	12		70
D-Erythrose	24	ND	ND	–	–	1	11		68
D-Erythrose	75	ND	ND	–	–	5	6		68
D-Threose	28	48	35	–	–	1	16		68
D-Threose	45	51	36	–	–	3	10		68
D-Arabinose	31	3	1	60	35	–	–		71
D-Lyxose	31	2	1	70	28	–	–		71
D-Lyxose	44	(3.5)	(3.5)	69	27	–	–	*αf*, *βf* not distinguished	71
D-Ribose	31	7	13	21	59	–	–		71
D-Ribose	44	9	15	17	59	–	–		71
D-Xylose	31	(<1)	(<1)	36	63	–	–	Furanoses detected only	71
	44	(<1)	(<1)	37	62	–	–		
D-Allose	24	3	5	15	76	–	–		71
D-Allose	30	3.0	5.3	14.7	77.1	0.003	0.006	1-^{13}C-enriched	72
D-Allose	44	4	6	17	73	–	–		71
D-Altrose	30	18.6	13.4	26.9	41.0	0.014	0.079	1-^{13}C-enriched	72
D-Altrose	44	18	15	29	37	–	–		71

D-Galactose	15	1.2	2.5	33	64	–	–		73
	25	1.8	3.1	32	62	–	–		73
	30	2.3	3.7	31.2	62.8	0.006	0.046	1-^{13}C-enriched	72
	35	4	3	29	64	–	–		71
2-Fluoro-2-deoxy-D-galactose	35	1.0	2.2	41.0	55.7	–	–		74
3-Fluoro-3-deoxy-D-galactose	35	0.7	1.6	40	58	–	–		74
D-Glucose	30	0.11	0.28	37.6	62.0	0.004	0.006	1-^{13}C-enriched	72
D-Glucose	31	–	–	38	62	–	–		70
D-Glucose	44	0.14	–	37	63	–	–		71, 75 (*f*, 43 °C)
D-Gulose	30	0.94	3.04	12.2	83.7	0.006	0.08	1-^{13}C-enriched	72
D-Idose	30	12.14	16.12	33.7	37.4	0.09	0.07	1-^{13}C-enriched	72
D-Idose	37	12.3	15.2	37.9	32.9	α,β sept-	anose1.6		9
D-Idose	44	13	19	37	31	–	–		71
D-Mannose	30	0.64	0.24	66.2	32.8	0.004	0.022		72
D-Mannose	44	0.6	0.3	66	34	–	–		71, 76 (*f*, 36 °C)
D-Talose	30	17.9	11.1	42.2	28.7	0.03	0.05		72
	44	17	14	37	32	–	–		71
D-Fructose	27	4	21	Trace	75	–	–		77
D-Fructose	85	11	33	Trace	66	–	–		77
1-Deoxy-D-fructose	85	10	13	7	44	26			78
L-Sorbose	27	2	–	98	–	–	–		77
L-Sorbose	85	9	–	91	–	–	–		77
D-Tagatose	27	1	4	79	16	–	–		77
D-Psicose	27	39	15	22	24	–	–		77
N-Acetylneuraminic acid	25	–	–	5	95	–	–		79

similarities of handling techniques (they are water-soluble and frequently only sparingly soluble in organic solvents) are often regarded as "honorary" carbohydrates. Where naturally occurring, they are biosynthesised by internal aldol reactions from carbohydrate precursors.

The basic IUPAC system of nomenclature[65] is straightforward: the compounds are named as cycloalkane polyols, with a slash separating substituents on each side of the ring; thus, 1,2,3/4,5 cyclopentane pentol has three adjacent hydroxyls on one side of the ring, and two on the other (there are four cyclopentane pentols, all achiral).

IUPAC cyclitol nomenclature is rarely used for cyclohexane hexols, with the older system based on "inositol" for the parent cyclohexane hexol, and stereochemistry denoted by a Graeco-Latin prefix, being used in the biochemical literature. There are eight inositols, only one of which (*chiro*) is chiral. The rules for carbon numbering and for designation of stereochemistry are complex, and examples of frequently-encountered systems are given in Figure 1.25 (a).

Trivial names are also given to tetrahydroxylated cyclohexenes, conduritol. These are given letters in the sequence of their discovery.[66] Only conduritols A and F occur naturally.

The commonest naturally-occurring inositol is *myo*-inositol, and its structure is readily memorised because in the preferred conformation only one hydroxyl group is axial. Its 1-L phosphate ester is biosynthesised from its isomer glucose-1-phosphate by an oxidation-intramolecular aldol condensation-reduction sequence, see Section 6.8.4.

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