

# Sigma Sugars and Carbohydrates FT-IR Spectral Library

## *Introduction*

The Sigma Sugars and Carbohydrates Library consists of 614 FT-IR spectra of interest to those in the biochemical field. The spectra were originally acquired at 2 cm<sup>-1</sup> spectral resolution, and then mathematically deresolved when converted to Nicolet library format.

The spectra are listed in this document in alphabetical order by compound name. The index number of each spectrum appears to the left of the name. If you are using Nicolet's OMNIC spectroscopy software, the molecular formula, CAS (Chemical Abstracts Services) registry number, when known, and the location number of the printed spectrum in *The Sigma Library of FT-IR Spectra* are available on-line. The Sigma location number is in the form:

<volume number> - <page number> <spectrum letter>

For example, the spectrum with the location number 1-234B refers to the second (B) spectrum on page 234 of Volume 1.

## **Abbreviations Used in Compound Names**

Since the compound names associated with the spectra are often very long, in many cases it has become necessary to abbreviate the full name of the substance. The table below defines the abbreviations used in the name field. The sequential index in this manual or the associated data may be consulted for the full name.

<i>Abbreviation</i>	<i>Name</i>
T-BOC	t-Butoxycarbonyl
:BSA	Bovine Serum Albumin conjugate
CBZ	Carbobenzyloxy
CHA	Cyclohexylammonium
CLPH	Chlorophenyl
CNET	Cyanoethyl
DANSYL	5-Dimethylamino-1-naphthalenesulfonyl
DCHA	Dicyclohexylammonium
DDZ	3,5-Dimethoxy- $\alpha,\alpha$ -dimethylbenzyloxycarbonyl
DMT	4,4'-Dimethoxytrityl
2,4-DNP	2,4-Dinitrophenyl
DNPYR	3,5-Dinitro-2-pyridyl
Fmoc	9-Fluorenylmethoxycarbonyl
IPREN	Isopropylidene

MESYL	Methanesulfonyl
MSOC	2-(Methanesulfonyl)ethoxycarbonyl
MTH	Methylthiohydantoin
PTH	Phenylthiohydantoin
TFA	Trifluoroacet(ate/yl)
TOSYL	p-Toluenesulfonyl

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In addition to the above abbreviations, occasionally atomic symbols are used in place of element names: e.g. CL = chloro- or chloride. Also, Greek letters (alpha, beta, gamma,...,omega) are given as their lower-case Roman equivalents (a, b, g,...,w), and the standard abbreviations are used for amino acids in polypeptide names.

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# Sigma Sugars and Carbohydrates FT-IR Spectral Library

## Index of Compounds

<u>No.</u>	<u>Compound Description</u>	<u>No.</u>	<u>Compound Description</u>
255	(+/-)-Epi-inosose-2	17	3-O-Acetyl-6-O-benzoyl-5-O-mesyl-1,2-O-ipren-a-D-glucufuranose
46	1-Amino-1-deoxy-b-D-galactose	175	3-O-b-D-Galactopyranosyl-D-arabinose
87	1-Bromoacetamido-1-deoxy-b-D-galactopyranose	322	3-O-Methyl-D-glucopyranose
115	1-Deoxy-1-nitro-D-galactitol	349	4-Methylumbelliferyl-a-D-mannopyranoside
116	1-Deoxy-1-nitro-L-mannitol	343	4-Methylumbelliferyl-a-D-galactoside
35	1-O-Acetyl-2,3,5-tri-O-benzoyl-b-D ribofuranose	345	4-Methylumbelliferyl-a-D-glucoside
324	1-O-Methyl-2,3-O-ipren-5-O-p-tosyl-b-D-ribofuranoside	336	4-Methylumbelliferyl-a-L-arabinofuranoside
300	1-O-Methyl-2-acetamido-2-deoxy-a-D-glucopyranoside	337	4-Methylumbelliferyl-a-L-arabinoside
312	1-O-Methyl-2-deoxy-3,5-di-O-p-nitrobenzoyl-D-ribofuranoside	341	4-Methylumbelliferyl-a-L-fucoside
319	1-O-Methyl-a-D-galactopyranoside	338	4-Methylumbelliferyl-b-D-cellobiopyranoside
321	1-O-Methyl-a-D-glucopyranoside	347	4-Methylumbelliferyl-b-D-glucuronide
306	1-O-Methyl-b-D-arabinopyranoside	348	4-Methylumbelliferyl-b-D-mannopyranoside
320	1-O-Methyl-b-D-galactopyranoside	340	4-Methylumbelliferyl-b-D-fucoside
323	1-O-Methyl-b-D-glucopyranoside	344	4-Methylumbelliferyl-b-D-galactoside
307	1-O-Methyl-b-L-arabinopyranoside	346	4-Methylumbelliferyl-b-D-glucoside
477	1-Thio-b-D-galactopyranose, Na salt	350	4-Methylumbelliferyl-b-D-N,N',N'-triacetylchitotriose
481	1-Thio-b-D-glucose tetraacetate	351	4-Methylumbelliferyl-b-D-xyloside
478	1-Thio-b-D-glucose, Na salt	342	4-Methylumbelliferyl-b-L-fucoside
135	1,2:3,4-Di-O-isopropylidene-D-galactopyranose	333	4-Methylumbelliferyl-N-acetyl-b-D-galactosaminide
132	1,2:3,5-Di-O-isopropylidene-a-D-apiose	334	4-Methylumbelliferyl-N-acetyl-b-D-glucosaminide
141	1,2:3,5-Di-O-isopropylidene-D-xylofuranose	335	4-Methylumbelliferyl-N-acetyl-b-D-glucosaminide
134	1,2:4,5-Di-O-isopropylidene-b-D-fructopyranose	176	4-O-(b-D-Galactopyranosyl)-a-D-mannopyranoside
140	1,2:4,5-Di-O-isopropylidene-b-D-psicopyranose	90	5-Bromo-3-indolyl-b-D-galactoside
131	1,2:5,6-Di-O-isopropylidene-a-D-allofuranose	89	5-Bromo-4-chloro-3-indolyl b-D-glucopyranoside
136	1,2:5,6-Di-O-isopropylidene-a-D-glucufuranose	88	5-Bromo-4-chloro-3-indolyl b-D-fucopyranoside
137	1,2:5,6-Di-O-isopropylidene-a-D-gulose	267	5-Keto-D-gluconic acid, Ca salt
139	1,2:5,6-Di-O-isopropylidene-D-mannitol	268	5-Keto-D-gluconic acid, K salt
1	2-Acetamido-1-amino-1,2-dideoxy-b-D-glucopyranose	95	5-O-Carbomethoxy-1,2-O-isopropylidene-D-xylofuranose
3	2-Acetamido-1-azido-1,2-dideoxy-b-D-glucopyranose	94	5-O-Carbomethoxy-1,2-O-ipren-3-(p-tosyl)-D-xylofuranose
5	2-Acetamido-1-bromoacetamido-1,2-dideoxy-b-D-glucopyranose	433	5-Phosphorylribose 1-pyrophosphate, Na salt
2	2-Acetamido-1b-(L-aspartamido)-1,2-dideoxy-D-glucose	479	5-Thio-D-glucose
6	2-Acetamido-2-deoxy-D-allose	480	5-Thio-D-glucose 6-phosphate, diammonium salt
4	2-Acetamido-4,6-O-benzylidene-2-deoxy-D-glucopyranose	8	6-Acetamido-6-deoxy-a-D-glucopyranose
47	2-Amino-2-deoxy-b-D-glucopyranosyl pentaacetate	48	6-Aminohexyl-1-thio-b-D-galactopyranoside
117	2-Deoxy-6-phosphogluconic acid, Na salt	91	6-Bromo-2-naphthyl b-D-galactopyranoside
120	2-Deoxy-a-D-ribose 1-phosphate, di(CHA) salt	92	6-Bromo-2-naphthyl b-D-glucopyranoside
109	2-Deoxy-D-galactose	93	6-Bromo-2-naphthyl-b-D-glucuronide
110	2-Deoxy-D-glucose	100	6-Chloro-6-deoxy-a-D-glucopyranose
111	2-Deoxy-D-glucose	108	6-Deoxy-1,2:3,4-di-O-ipren-6-iodo-a-D-galactopyranoside
113	2-Deoxy-D-glucose-6-phosphate, Na salt	112	6-Deoxy-D-glucose
114	2-Deoxy-D-ribohexopyranose	153	6-Fluoro-6-deoxy-D-galactose
118	2-Deoxy-D-ribose	330	6-Methylthio-2-hydroxypurine
121	2-Deoxyribose 5-phosphate, Na salt	318	6-O-Methyl-D-galactopyranose
243	2-Hexadecanoylamino-4-nitrophenyl-b-D-galactopyranoside	422	6-Phosphogluconic acid, Ba salt
244	2-Hexadecanoylamino-4-nitrophenyl-b-D-glucopyranoside	423	6-Phosphogluconic acid, tri(CHA) salt
266	2-Keto-D-gluconic acid, Ca salt	424	6-Phosphogluconic acid, trisodium salt
352	2-O-Methyl-D-xylose	425	6-Phosphogluconic acid, trisodium salt
147	2',3'-Epoxypropyl-2-acetamido-2-deoxy-b-D-glucopyranoside	126	6,6'-Dichloro-6,6'-dideoxysucrose
133	2,3:4,5-Di-O-isopropylidene-b-D-fructopyranose	247	8-Hydroxyquinoline b-D-glucopyranoside
138	2,3:4,6-Di-O-isopropylidene-2-keto-L-gulonol acid	258	1,2-O-Isopropylidene-3-O-benzyl-rac-glycerol
9	3-Acetamido-3-deoxy-D-glucopyranose	261	1,2-O-Isopropylidene-5-O-p-tosyl-a-D-xylofuranose
7	3-Acetamido-3-deoxy-D-allose	259	1,2-O-Isopropylidene-D-glucufuranose
119	3-Deoxy-D-ribose	262	1,2-O-Isopropylidene-D-xylofuranose

<u>No.</u>	<u>Compound Description</u>	<u>No.</u>	<u>Compound Description</u>
69	1,5-Anhydro-D-glucitol	497	a-D-Xylose 1-phosphate
73	1,5-Anhydro-D-mannitol	170	a-L(-)Fucose
72	1,6-Anhydro-3,4-O-isopropylidene-2-tosyl-D-galactose	437	a-L-Rhamnose
70	1,6-Anhydro-b-D-glucose	270	a-Lactose .H2O
71	1,6-Anhydro-b-D-glucose 2,3,4-triacetate	273	a-Lactose 1-phosphate, Ba salt
107	2,3-Dehydro-2-deoxy-N-acetylneuraminic acid	353	a-Methyl-D-xyloside
142	2,3-Diphospho-D-glyceric acid, penta(CHA) salt	358	a-Naphthyl-a-D-galactopyranoside
143	2,3-Diphospho-D-glyceric acid, pentasodium salt	359	a-Naphthyl-b-D-galactopyranoside
144	2,3-Diphospho-D-glyceric acid, tris salt	363	a-Naphthyl-b-D-glucuronide, Na salt
260	2,3-O-Isopropylidene-b-D-ribofuranosylamine, tosylate salt	10	Acetobromo-a-D-galactose
317	2,5-O-Methylene-D-mannitol	11	Acetobromo-a-D-glucose
124	3,6-Di-O-acetyl-1,2-O-ipren-5-deoxy-5-thioacetyl-a-D-glucofuranose	12	Acetobromo-a-maltose
125	5,6-Dichlorobenzimidazole riboside	13	Acetochloro-a-D-fucose
487	2,3,5-Tri-O-benzoyl-1-O-p-nitrobenzoyl D-ribofuranoside	15	Acetochloro-a-D-glucosamine
490	2,3,5-Tri-O-benzyl-1-O-p-nitrobenzoyl-D-arabinofuranoside	16	Acetochloro-a-D-mannose
488	2,3,5-Tri-O-benzyl-b-D-arabinofuranose	14	Acetochloro-a-L-fucose
489	2,3,5-Tri-O-benzyl-b-L-arabinofuranose	36	Adonitol
468	1,2,3,4-Tetra-O-acetyl-6-diphenylphosphoryl-b-D-manopyranose	502	Agarose type IV
471	1,2,3,4-Tetra-O-acetyl-b-D-glucopyranose	503	Agarose type IX
472	1,2,3,5-Tetra-O-acetyl-b-D-ribofuranose	504	Agarose type V
473	1,2,3,5-Tetra-O-benzoyl-a-D-xylofuranose	506	Agarose type VII
474	2,3,4,6-Tetra-O-benzyl-D-glucopyranose	505	Agarose type VIII
475	2,3,4,6-Tetra-O-methyl-D-glucopyranose	37	Alginic acid type III
85	a-Benzyl-N-CBZ-3,4,6-tri-O-acetylglucosaminide	68	Amylopectin anthranilate
83	a-Benzyl-N-CBZ-D-glucosaminide	74	Apigenin 7-O-hesperidoside
515	a-Cellulose	507	Arabic acid
517	a-Chaconine from potato sprouts	508	Arabinogalactan
98	a-Chloralose	80	Aurothioglucose; (1-Thio-D-glucopyranosato)gold
529	a-Cyclodextrin	86	b-Benzyl-N-CBZ-3,4,6-tri-O-acetyl-D-glucosaminide
298	a-D(+)-Melibiose	84	b-Benzyl-N-CBZ-D-glucosaminide
169	a-D(+)-Fucose	99	b-Chloralose
208	a-D(+)-Glucose anhydrous	530	b-Cyclodextrin
209	a-D(+)-Glucose pentaacetate	156	b-D(-)Fructose
279	a-D(+)-Maltose 1-phosphate, Ba salt	210	b-D-(+)-Glucose pentaacetate
280	a-D(+)-Maltose 1-phosphate, di(CHA) salt	38	b-D-Allose
281	a-D(+)-Maltose 1-phosphate, dipotassium salt	185	b-D-Galactose pentaacetate
291	a-D(+)-Mannose 1-phosphate, di(CHA) salt	222	b-D-Glucose 1-phosphate, di(CHA) salt
293	a-D(+)-Mannose 1-phosphate, disodium salt	498	b-D-Xylose tetraacetate
292	a-D(+)-Mannose-1-phosphate, dipotassium salt	192	b-Gentiobiose
178	a-D-Galactosamine 1-phosphate	193	b-Gentiobiose octaacetate
186	a-D-Galactose 1-phosphate, Ba salt type III	549	b-Glucan from barley
187	a-D-Galactose 1-phosphate, dipotassium salt	39	b-L-Allose
184	a-D-Galactose pentaacetate	271	b-Lactose
191	a-D-Galacturonic acid 1-phosphate, Li salt	272	b-Lactose octaacetate
204	a-D-Glucosamine 1-phosphate	354	b-Methyl-D-xyloside
214	a-D-Glucose 1,6-diphosphate, tetra(CHA) salt	361	b-Naphthyl-a-D-glucopyranoside
215	a-D-Glucose 1,6-diphosphate, tetra(CHA) salt	360	b-Naphthyl-b-D-galactopyranoside
216	a-D-Glucose 1,6-diphosphate, tetrapotassium salt .H2O	362	b-Naphthyl-b-D-glucopyranoside
217	a-D-Glucose 1-phosphate, dipotassium salt	82	Benzyl-N-acetyl-4,6-O-benzylidene muramic acid
218	a-D-Glucose 1-phosphate, dipotassium salt	509	Carboxymethyl cellulose, Na salt
221	a-D-Glucose 1-phosphate, disodium salt .4H2O	510	Carrageenan type I
219	a-D-Glucose 1-phosphate, disodium salt .H2O	511	Carrageenan type II
220	a-D-Glucose-1-phosphate, disodium salt .H2O	512	Carrageenan type III
232	a-D-Glucuronic acid 1-phosphate, K salt .5H2O	513	Carrageenan type IV
248	a-D-Idopyranose pentaacetate	514	Carrageenan type V
290	a-D-Mannosepentaacetate	516	Cellulose carbonate
440	a-D-Ribose 1-phosphate, di(CHA) salt	519	Chitin
465	a-D-Talose	518	Chitin purified
		520	Chitosan from crab shells
		524	Chondroitin sulfate type A, Na salt

<u>No.</u>	<u>Compound Description</u>	<u>No.</u>	<u>Compound Description</u>
525	Chondroitin sulfate type B, Na salt	190	D-Galacturonic acid, .H2O
526	Chondroitin sulfate type C, Na salt	195	D-Glucoheptono-1,4-lactone
521	Chondroitin sulfate, Na salt, from bovine trachea	196	D-Glucoheptose
522	Chondroitin sulfate, Na salt, from whale/shark cart.	197	D-Glucoheptulose
523	Chondroitin sulfate, Na salt, from whale/shark cart.	202	D-Gluconic acid
527	Chondrosine	198	D-Gluconic acid, hemicalcium salt
528	Colominic acid, Na salt	199	D-Gluconic acid, hemimagnesium salt
105	Cyanomethyl-1-thio-b-D-galactopyranoside	200	D-Gluconic acid, K salt
103	Cyanomethyl-2,3,4,6-tetra-O-acetyl-1-thio-b-D-galactopyranoside	201	D-Gluconic acid, Na salt
104	Cyanomethyl-2,3,4,6-tetra-O-acetyl-1-thio-b-D-glucopyranoside	205	D-Glucosamine 6-phosphate
101	Cyanomethyl-2-acetamido-2-deoxy-1-thio-b-D-glucopyranoside	206	D-Glucosamine 6-phosphate, Na salt
102	Cyanomethyl-2-acetamido-2-deoxy-3,4,6-tri-O-acetyl-1-thio-b-D-glucoside	207	D-Glucosaminic acid
288	D(+)-Mannose	223	D-Glucose 6-phosphate .H2O
485	D(+)-Trehalose	225	D-Glucose 6-phosphate, Na salt
97	D(+)-Cellobiose	226	D-Glucose 6-sulfate, K salt
177	D(+)-Galactosamine .HCl	213	D-Glucose diethyl mercaptal
179	D(+)-Galactose	224	D-Glucose-6-phosphate, K salt
180	D(+)-Galactose, purified	212	D-Glucose-L-cysteine
203	D(+)-Glucosamine .HCl	229	D-Glucuronic acid
493	D(+)-Xylose	230	D-Glucuronic acid lactone
494	D(+)-Xylose	228	D-Glucuronic acid, Na salt
276	D(-)-Lyxosylamine	231	D-Glucuronic acid, Na salt
426	D-(+)-2-Phosphoglyceric acid, Na salt	233	D-Glyceraldehyde
78	D-(+)-Araabitol	236	D-Glyceraldehyde 3-phosphate diethyl acetal, di(CHA) salt
127	D-(+)-Digitoxose	238	D-Gulono-g-lactone
587	D-(+)-Melezitose hydrate	239	D-Gulose
435	D-(+)-Raffinose .5H2O	249	D-Idose
491	D-(+)-Turannose	274	D-Lyxose
427	D(-)-3-Phosphoglyceric acid, Ba salt	282	D-Mandelonitrile b-D-glucoside
428	D(-)-3-Phosphoglyceric acid, Ca salt	283	D-Mannitol
430	D(-)-3-Phosphoglyceric acid, disodium salt	284	D-Mannitol 1-phosphate, Ba salt
431	D(-)-3-Phosphoglyceric acid, disodium salt	285	D-Mannoheptulose
429	D(-)-3-Phosphoglyceric acid, tri(CHA) salt	287	D-Mannosamine .HCl
432	D(-)-3-Phosphoglyceric acid, trisodium salt	294	D-Mannose 6-phosphate, Ba salt
75	D(-)-Arabinose	295	D-Mannose 6-phosphate, disodium salt
438	D(-)-Ribose	296	D-Mannuronic acid lactone
40	D-Altrose	441	D-Ribose 5-phosphate, Ba salt
66	D-Amygdalin from apricot kernels	442	D-Ribose 5-phosphate, disodium salt
150	D-Erythrose	443	D-Ribulose
151	D-Erythrose 4-phosphate, Na salt	444	D-Ribulose 1,5-diphosphate, dibarium salt
159	D-Fructose 1,6-diphosphate, Ba salt	445	D-Ribulose 1,5-diphosphate, tetrasodium salt .H2O
158	D-Fructose 1,6-diphosphate, dicalcium salt	446	D-Ribulose 1,5-diphosphate, tetrasodium salt .H2O
160	D-Fructose 1,6-diphosphate, Na salt	448	D-Ribulose 5-phosphate, Ba salt
161	D-Fructose 1,6-diphosphate, tetra(CHA) salt	449	D-Ribulose 5-phosphate, disodium salt
163	D-Fructose 1-phosphate, Ba salt	447	D-Ribulose o-nitrophenylhydrazone
164	D-Fructose 1-phosphate, di(CHA) salt	451	D-Saccharic acid, Ca salt
165	D-Fructose 1-phosphate, Na salt	453	D-Sedoheptulose 1,7-diphosphate, Na salt
157	D-Fructose 1:2-cyclic,6-diphosphate, Na salt	454	D-Sedoheptulose 7-phosphate, Ba salt
162	D-Fructose 2,6-diphosphate	457	D-Sorbitol 6-phosphate, Ba salt
166	D-Fructose 6-phosphate, Ba salt	456	D-Sorbitol hexaacetate
167	D-Fructose 6-phosphate, disodium salt	464	D-Tagatose mixed anomers
168	D-Fructose 6-phosphate, K salt	499	D-Xylulose
173	D-Galactonic acid g-lactone	501	D-Xylulose 5-phosphate, Na salt
172	D-Galactonic acid, hemicalcium salt	535	Deae-dextran
188	D-Galactose 6-phosphate, Ba salt	538	Dextran sulfate, Na salt M.W. 500,000
189	D-Galactose 6-phosphate, disodium salt	536	Dextran sulfate, Na salt M.W. 5000
183	D-Galactose diethyl dithioacetal	537	Dextran sulfate, Na salt M.W. 8000
		532	Dextran, M.W. 40,000
		533	Dextran, M.W. 100,000-200,000
		534	Dextran, M.W. 200,000-275,000

<u>No.</u>	<u>Compound Description</u>	<u>No.</u>	<u>Compound Description</u>
539	Dextrin type I	79	L-(-)-Arabitol
540	Dextrin type II	289	L-(-)-Mannose
541	Dextrin type III	458	L-(-)-Sorbitol
542	Dextrin type IV from potato	466	L-(-)-Talose
128	Dihydroxyacetone	171	L-Fucosylamine; 1-Amino-1-deoxy-L-fucose
130	Dihydroxyacetone phosphate dimethyl ketal, di(CHA) salt	174	L-Galactonic acid g-lactone
129	Dihydroxyacetone phosphate, Li salt	181	L-Galactose
76	DL-Arabinose	182	L-Galactose
234	DL-Glyceraldehyde	211	L-Glucose
237	DL-Glyceraldehyde 3-phosphate diethyl acetal, Ba salt	235	L-Glyceraldehyde
482	DL-Threitol	240	L-Gulose
484	DL-Threitol tetraacetate	275	L-Lyxose
495	DL-Xylose	286	L-Mannonic acid g-lactone
146	Dulcitol	483	L-Threitol
250	Epi-inositol	500	L-Xylulose
149	Erythritol bis-carbonate	269	Lactobionic acid, Ca salt
543	Ethyl cellulose	573	Laminaribose mixed anomers
152	Ethyl-b-D-thioglucoiside	574	Laminarin crude from laminaria digitata
544	Ethylene glycol chitin	575	Lanatoside a
545	Ficoll type 70	578	Lipopolysaccharide from E. coli serotype 0127:B8
546	Ficoll type 400	577	Lipopolysaccharide from E. coli serotype 0128:B12
547	Fluorescein isothiocyanate dextran M.W. 4,000	576	Lipopolysaccharide from serratia marcescens
154	Fraxin	382	m-Nitrophenyl-a-D-galactopyranoside
155	Fructosazine	579	Maltoheptaose
548	Fucoidan from fucus vesiculosus	580	Maltohexaose
531	g-Cyclodextrin	581	Maltooligosaccharide from corn syrup
194	Glucosaminic acid, Ca salt	582	Maltopentaose
227	Glucuronamide	277	Maltose .H2O
550	Glycogen type II from oyster	278	Maltose .H2O
551	Glycogen type III from rabbit liver	583	Maltotetraose
552	Glycogen type IX from bovine liver	584	Maltotriose
553	Glycol chitosan	586	Mannan from saccharomyces cerevisiae
555	Heparin, ammonium salt from porcine intestinal mucosa	585	Mannan from saccharomyces cerevisiae
556	Heparin, Ca salt from porcine intestinal mucosa	297	Melibionic acid, K salt
557	Heparin, Li salt from porcine intestinal mucosa	299	Mentholglucuronic acid, ammonium salt
560	Heparin, Na salt from bovine lung	301	Methyl 2-acetamido-2-deoxy-b-D-glucopyranoside
558	Heparin, Na salt from porcine intestinal mucosa	316	Methyl 6-deoxy-b-D-glucopyranoside
559	Heparin, Na salt from porcine intestinal mucosa	325	Methyl a-D-mannopyranoside
561	Hesperidin	326	Methyl a-D-mannopyranoside
242	Hesperidin methyl chalcone	311	Methyl a-L-daunosaminide .HCl
565	Hyaluronic acid from bovine vitreous humor	329	Methyl-1,2,3,4-tetra-O-acetyl-b-D-glucuronate
562	Hyaluronic acid from human umbilical cord	331	Methyl-2,3,5-tri-O-benzoyl-a-D-arabinofuranoside
563	Hyaluronic acid, K salt	332	Methyl-2,3,5-tri-O-benzoyl-a-L-arabinofuranoside
566	Hyaluronic acid, K salt from rooster comb	305	Methyl-2,3-anhydro-4,6-O-benzylidene a-D-allopyranoside
564	Hyaluronic acid, Na salt	304	Methyl-3-amino-3-deoxy-a-D-mannopyranoside .HCl
567	Hydroxyethyl starch	303	Methyl-3-amino-3-deoxy-b-D-glucopyranoside
246	Hydroxyethyl-1-thio-b-D-galactopyranoside	308	Methyl-4,6-O-benzylidene-2,3-di-O-p-tosyl-a-D-galactopyranoside
568	Hydroxypropylmethylcellulose approx 50 centipoises	309	Methyl-4,6-O-benzylidene-2,3-di-O-p-tosyl-a-D-glucopyranoside
569	Hydroxypropylmethylcellulose approx 4000 centipoise	310	Methyl-4,6-O-benzylidene-a-D-glucopyranoside
148	i-Erythritol	315	Methyl-6-deoxy-a-D-glucopyranoside
570	Inulin from chicory root	313	Methyl-6-deoxy-a-L-galactopyranoside
571	Inulin from dahlia tubers	314	Methyl-6-deoxy-b-L-galactopyranoside
257	Isomaltose	302	Methyl-a-D-altropyranoside
572	Isomaltotriose	328	Methyl-b-D-ribofuranoside
263	Isopropyl b-D-thiogalactopyranoside	327	Methyl-p-nitrophenyl-2,3,4-tri-O-acetyl-b-D-glucuronate
264	Isopropyl b-D-thioglucoiside	339	Methylumbelliferyl-b-D-N,N'-diacetylchitobiose
265	Kasuganobiosamine-N2-dimedone	355	Metrazamide
496	L-(-)Xylose	356	Mucic acid
77	L-(+)-Arabinose		
439	L-(+)-Ribose		

<u>No.</u>	<u>Compound Description</u>	<u>No.</u>	<u>Compound Description</u>
357	Muramic acid	63	p-Aminophenyl-1-thio-b-D-glucopyranoside
251	Myo-inositol	64	p-Aminophenyl-1-thio-b-D-xylopyranoside
254	Myo-inositol 2-monophosphate, di(CHA) salt	49	p-Aminophenyl-2-acetamido-2-deoxy-b-D-glucopyranoside
252	Myo-inositol hexanicotinate	53	p-Aminophenyl-a-D-galactopyranoside
253	Myo-inositol hexasulfate, hexapotassium salt	55	p-Aminophenyl-a-D-glucopyranoside
467	N,N',N,N'-Tetraacetylchitotetraose	59	p-Aminophenyl-a-D-mannopyranoside
613	N,N',N-Triacetylchitotriose	51	p-Aminophenyl-a-L-fucopyranoside
122	N,N'-Diacetylchitobiose	54	p-Aminophenyl-b-D-galactopyranoside
123	N,N'-Diacetylchitobiose hexaacetate	56	p-Aminophenyl-b-D-glucopyranoside
44	N-(e-Aminocaproyl)-b-D-galactopyranosylamine	60	p-Aminophenyl-b-D-thiofucopyranoside
43	N-(e-Aminocaproyl)-b-L-fucopyranosylamine	58	p-Aminophenyl-b-D-lactopyranoside
45	N-(e-Aminocaproyl)-D-glucopyranosylamine	65	p-Aminophenyl-b-D-xylopyranoside
19	N-Acetyl-a-D-galactosamine-1-phosphate, Na salt	61	p-Aminophenyl-b-L-thiofucopyranoside
22	N-Acetyl-a-D-glucosamine-1-phosphate, Na salt	52	p-Aminophenyl-b-L-fucopyranoside
21	N-Acetyl-b-D-glucosamine naphthol AS-LC	50	p-Aminophenyl-N-acetyl-b-D-thioglucoaminide
25	N-Acetyl-b-D-mannosamine hydrate	367	p-Nitrobenzyl-1-thio-2-acetamidotriacetyl-b-D-glucosamine
18	N-Acetyl-D-galactosamine	404	p-Nitrophenyl-1-thio-b-D-galactopyranoside
20	N-Acetyl-D-glucosamine	399	p-Nitrophenyl-2,3,4,6-tetra-O-acetyl-b-D-glucosaminide
23	N-Acetyl-D-glucosamine-6-phosphate, Na salt	383	p-Nitrophenyl-a-D-galactopyranoside
24	N-Acetyl-lactosamine	384	p-Nitrophenyl-a-D-galactopyranoside
26	N-Acetylmuramic acid	390	p-Nitrophenyl-a-D-glucopyranoside
33	N-Acetylneuramin-lactose from bovine colostrum	394	p-Nitrophenyl-a-D-maltoside
34	N-Acetylneuramin-lactose from human milk	396	p-Nitrophenyl-a-D-mannopyranoside
27	N-Acetylneuraminic acid type II	401	p-Nitrophenyl-a-L-thiofucopyranoside
28	N-Acetylneuraminic acid type III	374	p-Nitrophenyl-a-L-arabinofuranoside
29	N-Acetylneuraminic acid type IV	376	p-Nitrophenyl-a-L-fucopyranoside
30	N-Acetylneuraminic acid type VI	400	p-Nitrophenyl-b-D-thiofucopyranoside
31	N-Acetylneuraminic acid type VII	375	p-Nitrophenyl-b-D-cellobioside
32	N-Acetylneuraminic acid type VIII	379	p-Nitrophenyl-b-D-fucopyranoside
67	N-Amyl-b-D-glucopyranoside	386	p-Nitrophenyl-b-D-galacto-pyranoside
81	N-Benzoyl a-D-glucosamine	388	p-Nitrophenyl-b-D-galacturonide
106	N-Decyl b-D-glucopyranoside	389	p-Nitrophenyl-b-D-gentiobioside
145	N-Dodecyl glucoside	392	p-Nitrophenyl-b-D-glucuronide
554	N-Glycolylneuraminic acid	393	p-Nitrophenyl-b-D-lactopyranoside
241	N-Heptyl b-D-glucopyranoside	395	p-Nitrophenyl-b-D-maltoside
245	N-Hexyl b-D-glucopyranoside	397	p-Nitrophenyl-b-D-mannopyranoside
408	N-Octyl-b-D-glucopyranoside	398	p-Nitrophenyl-b-D-melibiose
96	N2-CBZ-kasuganobiosamine	591	p-Nitrophenyl-b-D-N,N'-diacetylchitobiose
588	Naphthoyl-1-cellulose	407	p-Nitrophenyl-b-D-xylopyranoside
364	Naringin from citrus fruit	402	p-Nitrophenyl-b-L-thiofucopyranoside
365	Neohesperidin dihydrochalcone from citrus fruit	380	p-Nitrophenyl-b-L-fucopyranoside
366	Neohesperidose	373	p-Nitrophenyl-N-acetyl-1-thio-b-D-glucosaminide
589	Neuraminic acid b-methylglycoside	371	p-Nitrophenyl-N-acetyl-a-D-glucosaminide
590	Nigeran tetrasaccharide from aspergillus awamori	369	p-Nitrophenyl-N-acetyl-b-D-galactosaminide
57	o-Aminophenyl-b-D-glucuronide	372	p-Nitrophenyl-N-acetyl-b-D-glucosaminide
403	o-Nitrophenyl-1-thio-b-D-galactopyranoside	405	p-Nitrophenyl-thio-b-D-glucopyranoside
381	o-Nitrophenyl-a-D-galactopyranoside	409	Panose mixed anomers
385	o-Nitrophenyl-b-D-galactopyranoside	593	Pectin from citrus fruits
387	o-Nitrophenyl-b-D-galactopyranoside 6-phosphate	594	Pentosan polysulfate, Na salt
377	o-Nitrophenyl-b-D-fucopyranoside	410	Perseitol
378	o-Nitrophenyl-b-D-fucopyranoside	595	Phenoxyacetylcellulose
391	o-Nitrophenyl-b-D-glucopyranoside	417	Phenyl-a-D-glucoside
406	o-Nitrophenyl-b-D-xylopyranoside	418	Phenyl-a-D-glucoside tetraacetate
370	o-Nitrophenyl-N-acetyl a-D-glucosaminide	416	Phenyl-b-D-galactoside
368	o-Nitrophenyl-N-acetyl-a-D-galactosaminide	419	Phenyl-b-D-glucoside
592	Oligo dT-cellulose	420	Phenyl-b-D-glucuronide
41	p-Aminobenzyl-1-thio-2-acetamido-2 deoxy-b-D-glucopyranoside	421	Phenyl-b-D-thiogalactoside
42	p-Aminobenzyl-1-thio-b-D-galactopyranoside	411	Phenyl-N-acetyl-a-D-galactosaminide
62	p-Aminophenyl-1-thio-b-D-galactopyranoside	412	Phenyl-N-acetyl-a-D-glucosaminide
		413	Phenyl-N-acetyl-b-D-glucosaminide

<u>No.</u>	<u>Compound Description</u>
414	Phenylethyl-b-D-galactoside
415	Phenylethyl-b-D-thio-galactoside
434	Phytic acid, Ba salt from corn

<u>No.</u>	<u>Compound Description</u>
596	Polyamidoxygroseptin
597	Polygalacturonic acid from orange