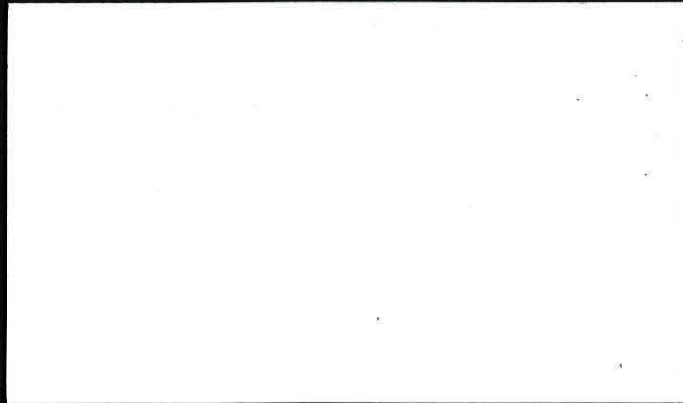


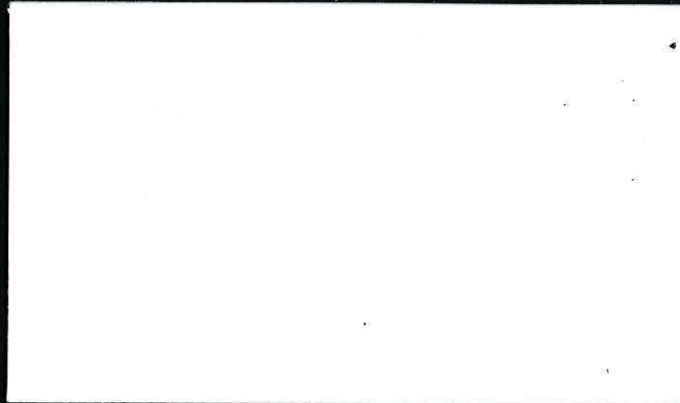
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**INVESTIGATION OF
ADHESIVE SAMPLES
FOR
THE PERRY LITHGOW PARTNERSHIP**

Distribution:

**Richard Lithgow
The Perry Lithgow Partnership
1 Langston Lane
Station Road
Kingham
Oxon
OX7 6UW**

Signed
Brian W Singer BA BSc MEd PhD

April 2001

Investigation of Adhesive samples from Peterborough Cathedral, Naive Ceiling

Protein analysis

Experimental

Samples were hydrolysed with concentrated hydrochloric acid for three days at 80°C. The samples were then treated with a borate buffer solution and the pH was adjusted to 7-8 prior to derivatisation with Fmoc reagent. The derivatised samples were then analysed for its amino acid content by reverse phase High Performance Liquid Chromatography (HPLC) using acetate buffer / acetonitrile gradient elution.

Results and Discussion

Sample 1 Glue impregnated hessian form reverse of Ceiling boards (figure 1) The amino acid analysis almost matches that for our animal glue standard (figure 5). The presence of hydroxy proline and the large peak present for glycine coupled with the alanine and proline content suggest the presence of animal glue

Sample 2 Glue from 'Glue drip with small white lead paint flake attached' (figure 2) The amino acid analysis almost matches that for our animal glue standard (figure 5). The presence of hydroxy proline and the large peak present for glycine coupled with the alanine and proline content suggest the presence of animal glue.

Sample 3 Glue from 'Glue drip without paint flake attached' (figure 3) The amino acid analysis almost matches that for our animal glue standard (figure 5). The presence of hydroxy proline and the large peak present for glycine coupled with the alanine and proline content suggest the presence of animal glue.

Sample 4 Glue from 'Glue drip with black oil paint flake attached' (figure 4) The amino acid analysis almost matches that for our animal glue standard (figure 5). The presence of hydroxy proline and the large peak present for glycine coupled with the alanine and proline content suggest the presence of animal glue.

Conclusion The adhesive present in each sample is animal glue.

SAMS - Fmoc Amino acid analysis: HPLC 260nm

FIGURE 1

Date : 5/3/2001

Time : 18:4:15

Date Acquired : 5/3/2001

Time Acquired : 16:52:39

Channel : 1

Sample Type : Unk

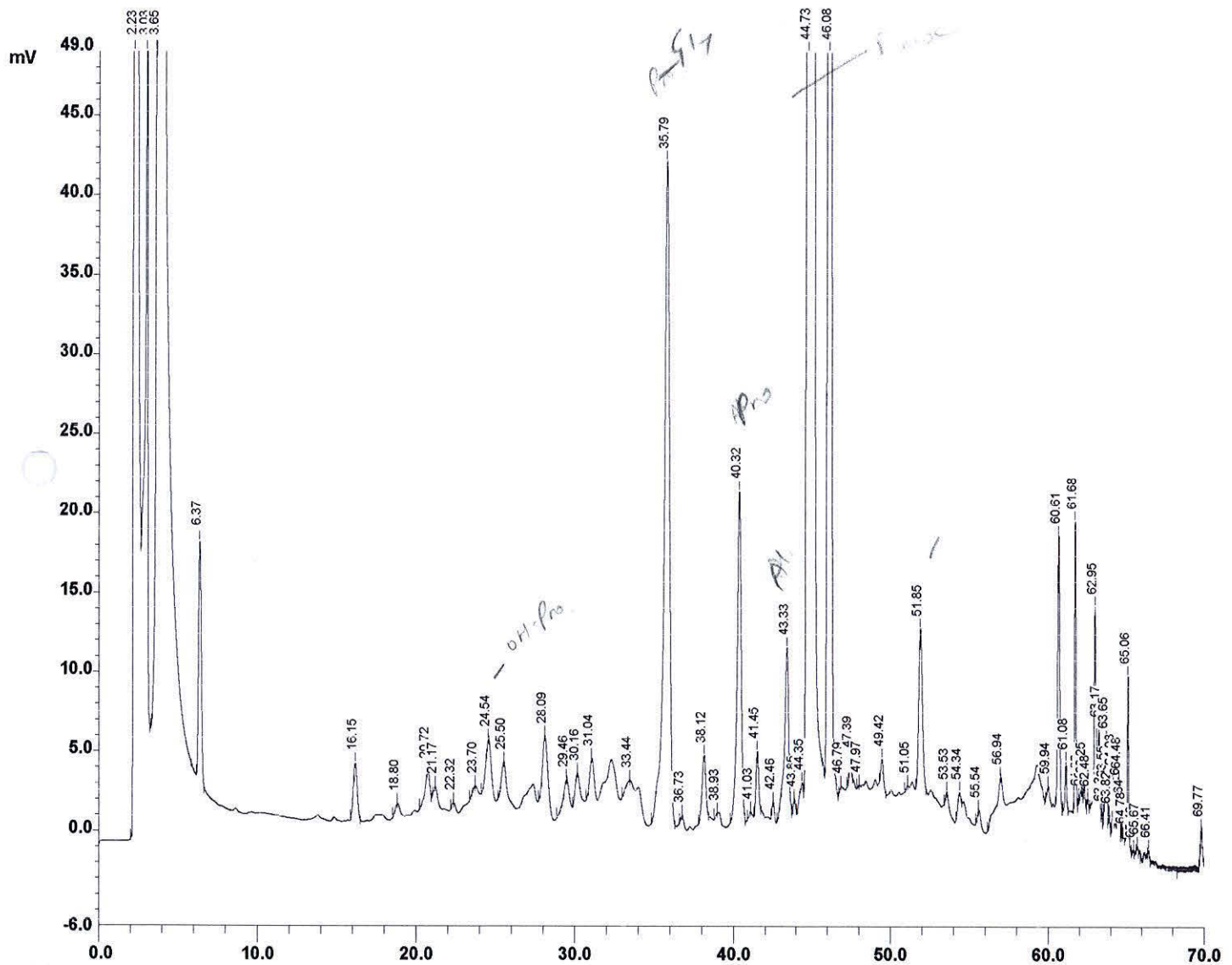
Data File : c:\jcl\data\standard\PB1.WD1

Configuration : C:\JCL\METH\amino11

Run Number 10 of 13

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : P'borough 1 - glue fabric



Pk #	Ret. Time	Hgt.	Height %	Area	Area %
1	2.23	441624	37.24	49781307	14.55
2	3.03	25726	2.17	4144652	1.21
3	3.64	4693	0.40	57912	0.02
4	3.65	199	0.02	18166309	5.31
5	6.37	7900	0.67	1812646	0.53
6	16.15	1856	0.16	589342	0.17
7	18.80	16	0.00	9913	0.00
8	20.72	985	0.08	366905	0.11
9	21.17	29	0.00	8075	0.00
10	22.32	17	0.00	5251	0.00
11	23.70	21	0.00	16774	0.00
12	24.54	45	0.00	17405	0.01
13	25.50	36	0.00	11597	0.00
14	28.08	54	0.00	15140	0.00
15	29.46	20	0.00	4806	0.00
16	30.16	37	0.00	12723	0.00

Date : 5/3/2001

Time : 18:4:28

Date Acquired : 5/3/2001

Time Acquired : 16:52:39

Channel : 1

Sample Type : Unk

Data File : c:\jcl\data\standard\PB1.WD1

Configuration : C:\JCLMETH\amino11

Run Number 10 of 13

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : P'borough 1 - glue fabric

Pk #	Ret. Time	Hgt.	Height %	Area	Area %
17	31.04	49	0.00	10688	0.00
18	33.44	16	0.00	32889	0.01
19	35.79	21881	1.84	10052746	2.94
20	36.72	30	0.00	7458	0.00
21	38.12	2106	0.18	638178	0.19
22	38.93	10	0.00	7853	0.00
23	40.32	10907	0.92	3634049	1.06
24	41.03	17	0.00	8101	0.00
25	41.45	2045	0.17	438965	0.13
26	42.46	33	0.00	3852	0.00
27	43.33	5569	0.47	2127315	0.62
28	43.85	23	0.00	3245	0.00
29	44.35	507	0.04	138642	0.04
30	44.73	522807	44.08	222940208	65.17
31	46.08	86081	7.26	19999478	5.85
32	46.79	25	0.00	4661	0.00
33	47.39	738	0.06	148572	0.04
34	47.97	12	0.00	3280	0.00
35	49.42	923	0.08	196032	0.06
36	51.05	13	0.00	6242	0.00
37	51.85	5304	0.45	1618075	0.47
38	53.53	30	0.00	4969	0.00
39	54.34	564	0.05	122627	0.04
40	55.54	30	0.00	5505	0.00
41	56.94	23	0.00	18891	0.01
42	59.94	32	0.00	8812	0.00
43	60.61	8987	0.76	1418108	0.41
44	61.08	1610	0.14	189229	0.06
45	61.68	9527	0.80	932124	0.27
46	61.92	55	0.00	3197	0.00
47	62.12	207	0.02	12542	0.00
48	62.25	526	0.04	59292	0.02
49	62.48	336	0.03	33843	0.01
50	62.95	6010	0.51	642901	0.19
51	63.17	2147	0.18	227760	0.07
52	63.38	234	0.02	14688	0.00
53	63.55	245	0.02	25684	0.01
54	63.65	2121	0.18	212703	0.06
55	63.82	329	0.03	28783	0.01
56	64.08	1636	0.14	167632	0.05
57	64.40	455	0.04	44291	0.01
58	64.47	717	0.06	75269	0.02
59	64.64	442	0.04	24844	0.01
60	64.78	82	0.01	3708	0.00
61	65.06	5432	0.46	509824	0.15
62	65.43	142	0.01	20066	0.01
63	65.67	238	0.02	24307	0.01
64	66.41	291	0.02	27051	0.01
65	69.77	1200	0.10	193929	0.06

Total Height % 100.00

Total Area % 100.00

Area used for calculations.

Modified response has been scaled to internal standard.

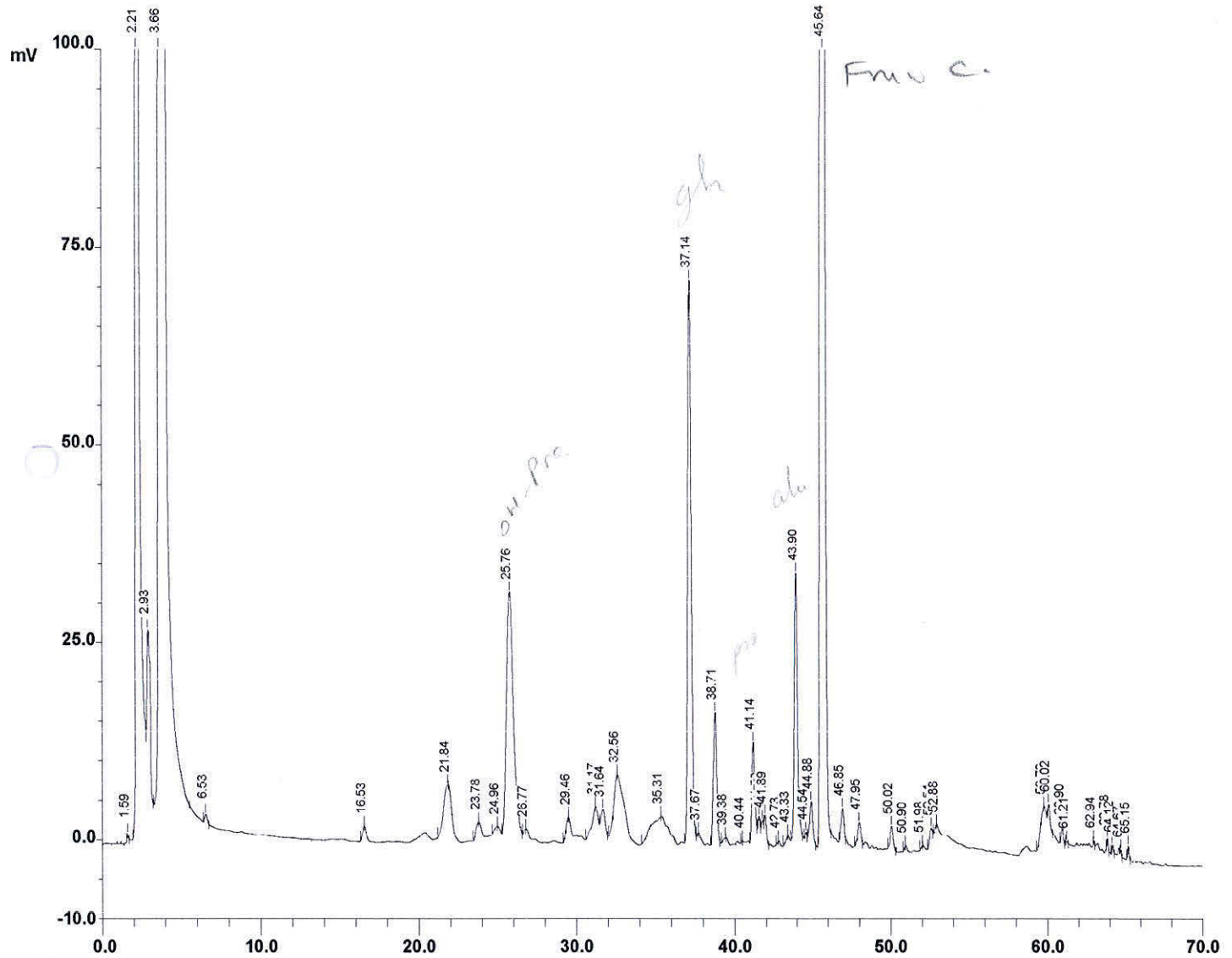
SAMS - Fmoc Amino acid analysis: HPLC 260nm

FIGURE 2

Date : 6/3/2001
 Channel : 1
 Run Number 11 of 13
 Sample Name : P'borough 2

Time : 12:8:28
 Sample Type : Unk
 Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Date Acquired : 6/3/2001
 Data File : c:\jcl\data\standard\PB2.WD1
 Configuration : C:\JCLMETH\amino11



PK #	Ret. Time	Hgt.	Height %	Area	Area %
1	1.59	502	0.03	48834	0.01
2	2.21	498251	31.52	58470412	12.35
3	2.93	8261	0.52	2020827	0.43
4	3.66	521964	33.01	258167462	54.53
5	6.53	566	0.04	111449	0.02
6	16.53	38	0.00	13250	0.00
7	21.83	61	0.00	84626	0.02
8	23.78	34	0.00	41211	0.01
9	24.96	16	0.00	23501	0.00
10	25.76	16060	1.02	9421387	1.99
11	26.77	15	0.00	10946	0.00
12	29.46	45	0.00	21330	0.00
13	31.17	32	0.00	6856	0.00
14	31.64	1284	0.08	396041	0.08
15	32.56	76	0.00	45893	0.01
16	35.31	12	0.00	219138	0.05

Date : 6/3/2001

Time : 12:8:40

Date Acquired : 6/3/2001

Time Acquired : 10:56:53

Channel : 1

Sample Type : Unk

Data File : c:\jcl\data\standard\PB2.WD1

Configuration : C:\JCL\METH\amino11

Run Number 11 of 13

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : P'borough 2

Pk #	Ret. Time	Hgt.	Height %	Area	Area %
17	37.14	37217	2.35	10876379	2.30
18	37.67	23	0.00	3351	0.00
19	38.71	8723	0.55	2214377	0.47
20	39.38	16	0.00	17248	0.00
21	40.44	21	0.00	3083	0.00
22	41.14	6246	0.40	1423869	0.30
23	41.50	857	0.05	112275	0.02
24	41.72	418	0.03	46630	0.01
25	41.89	1042	0.07	151886	0.03
26	42.73	23	0.00	4144	0.00
27	43.33	22	0.00	3234	0.00
28	43.90	17621	1.11	4998188	1.06
29	44.54	381	0.02	41218	0.01
30	44.88	2636	0.17	632484	0.13
31	45.64	447053	28.28	121796061	25.72
32	46.85	2143	0.14	471478	0.10
33	47.95	1494	0.09	376056	0.08
34	50.02	1530	0.10	354137	0.07
35	50.90	27	0.00	4164	0.00
36	51.98	26	0.00	5745	0.00
37	52.54	727	0.05	140354	0.03
38	52.88	33	0.00	11142	0.00
39	59.73	58	0.00	72980	0.02
40	60.02	1180	0.07	164636	0.03
41	60.90	1041	0.07	158021	0.03
42	61.21	196	0.01	18265	0.00
43	62.93	341	0.02	24780	0.01
44	63.78	775	0.05	72196	0.02
45	64.12	629	0.04	65074	0.01
46	64.67	412	0.03	30479	0.01
47	65.15	871	0.06	82436	0.02

Total Height % 100.00
Total Area % 100.00

Area used for calculations.

Modified response has been scaled to internal standard.

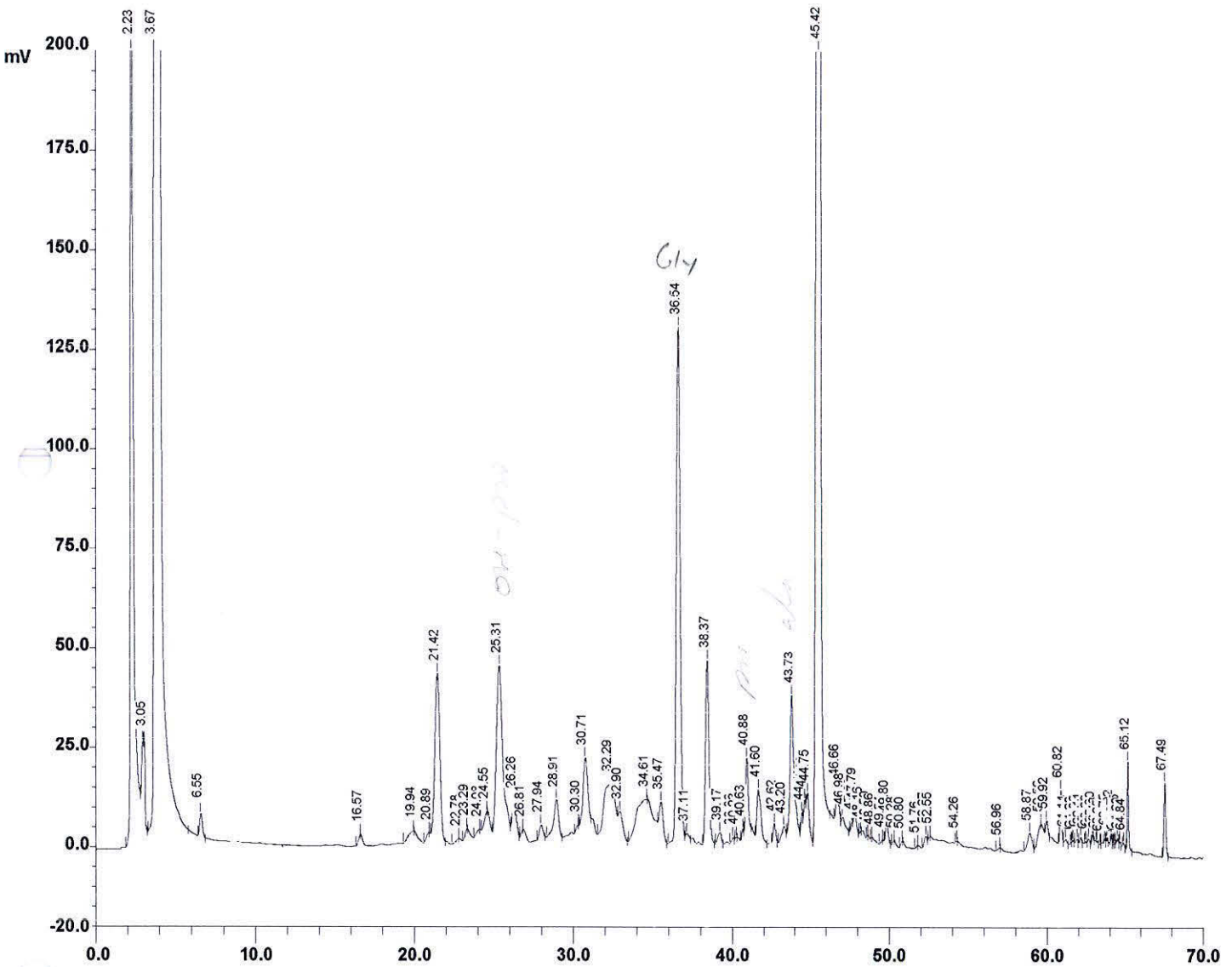
SAMS - Fmoc Amino acid analysis: HPLC 260nm

FIGURE 3

Date : 6/3/2001
 Channel : 1
 Run Number 12 of 13
 Sample Name : P'borough 3

Time : 13:41:3
 Sample Type : Unk
 Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Date Acquired : 6/3/2001
 Data File : c:\jcl\data\standard\PB3.WD1
 Configuration : C:\JCL\METH\amino11



Pk #	Ret. Time	Hgt.	Height %	Area	Area %
1	2.23	393019	33.44	42459868	14.80
2	2.96	2149	0.18	316652	0.11
3	3.04	1378	0.12	83786	0.03
4	3.66	4673	0.40	58522	0.02
5	3.67	206	0.02	18460161	6.43
6	6.55	3013	0.26	627902	0.22
7	16.57	52	0.00	12590	0.00
8	19.94	41	0.00	127865	0.04
9	20.89	40	0.00	32459	0.01
10	21.42	21471	1.83	8612939	3.00
11	22.77	19	0.00	11799	0.00
12	23.29	63	0.01	21473	0.01
13	24.08	29	0.00	37742	0.01
14	24.55	63	0.01	34729	0.01
15	25.31	21577	1.84	11016288	3.84
16	26.26	4014	0.34	1161872	0.40

Date : 6/3/2001
Channel : 1
Run Number 12 of 13
Sample Name : P'borough 3

Time : 13:41:16
Sample Type : Unk
Chan 1 Desc. : HPLC Amino Acids

Date Acquired : 6/3/2001
Data File : c:\jcl\data\standard\PB3.WD1
UV2000 260nm

Time Acquired : 12:28:59
Configuration : C:\JCL\METH\amino11

PK #	Ret. Time	Hgt.	Height %	Area	Area %
17	26.80	35	0.00	17060	0.01
18	27.93	1774	0.15	524985	0.18
19	28.91	4872	0.41	1993169	0.69
20	30.30	50	0.00	23106	0.01
21	30.71	8460	0.72	3116376	1.09
22	32.28	84	0.01	550054	0.19
23	32.90	1313	0.11	380776	0.13
24	34.61	49	0.00	897180	0.31
25	35.47	3608	0.31	1008733	0.35
26	36.54	67481	5.74	20470879	7.13
27	37.11	504	0.04	117147	0.04
28	38.37	24199	2.06	6521341	2.27
29	39.17	1461	0.12	426824	0.15
30	39.99	400	0.03	56435	0.02
31	40.23	24	0.00	5347	0.00
32	40.63	710	0.06	86116	0.03
33	40.88	9462	0.81	1958178	0.68
34	41.60	6279	0.53	1972253	0.69
35	42.62	2501	0.21	453888	0.16
36	43.20	1295	0.11	352685	0.12
37	43.73	18086	1.54	6470276	2.25
38	44.43	1411	0.12	150394	0.05
39	44.60	1301	0.11	128696	0.04
40	44.75	2391	0.20	345520	0.12
41	45.42	513915	43.73	148428882	51.72
42	46.66	4165	0.35	818409	0.29
43	46.98	859	0.07	163418	0.06
44	47.62	333	0.03	35341	0.01
45	47.79	1938	0.16	328775	0.11
46	48.16	20	0.00	4168	0.00
47	48.59	38	0.00	4395	0.00
48	48.86	27	0.00	4206	0.00
49	49.54	25	0.00	6613	0.00
50	49.80	2347	0.20	495713	0.17
51	50.28	37	0.00	7924	0.00
52	50.80	51	0.00	7479	0.00
53	51.76	19	0.00	7596	0.00
54	52.27	802	0.07	156320	0.05
55	52.55	29	0.00	7144	0.00
56	54.26	25	0.00	3166	0.00
57	56.96	17	0.00	6800	0.00
58	58.87	2166	0.18	674886	0.24
59	59.56	77	0.01	70644	0.02
60	59.92	1746	0.15	284369	0.10
61	60.82	6852	0.58	969147	0.34
62	61.14	459	0.04	70199	0.02
63	61.49	149	0.01	9463	0.00
64	61.60	322	0.03	27627	0.01
65	61.85	513	0.04	58258	0.02
66	62.11	809	0.07	93211	0.03
67	62.41	254	0.02	24392	0.01
68	62.62	675	0.06	82885	0.03
69	62.84	419	0.04	26244	0.01
70	62.90	195	0.02	9832	0.00
71	63.13	239	0.02	19197	0.01
72	63.35	73	0.01	3676	0.00
73	63.61	691	0.06	58803	0.02
74	63.75	611	0.05	46451	0.02
75	64.02	1394	0.12	119872	0.04
76	64.18	117	0.01	6536	0.00
77	64.27	185	0.02	11415	0.00
78	64.45	788	0.07	88333	0.03
79	64.60	444	0.04	34659	0.01

Date : 6/3/2001

Time : 13:41:22

Date Acquired : 6/3/2001

Time Acquired : 12:28:59

Channel : 1

Sample Type : Unk

Data File : c:\jcl\data\standard\PB3.WD1

Configuration : C:\JCL\METH\amino11

Run Number 12 of 13

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : P'borough 3

Pk #	Ret. Time	Hgt.	Height %	Area	Area %
80	64.84	578	0.05	59450	0.02
81	65.12	11500	0.98	1117809	0.39
82	67.49	9751	0.83	1404969	0.49

Total Height % 100.00

Total Area % 100.00

Area used for calculations.

Modified response has been scaled to internal standard.

SAMS - FMOc Amino acid analysis: HPLC 260nm

FIGURE 4

Date : 19/3/2001

Time : 12:38:23

Date Acquired : 19/3/2001

Time Acquired : 11:25:32

Channel : 1

Sample Type : Unk

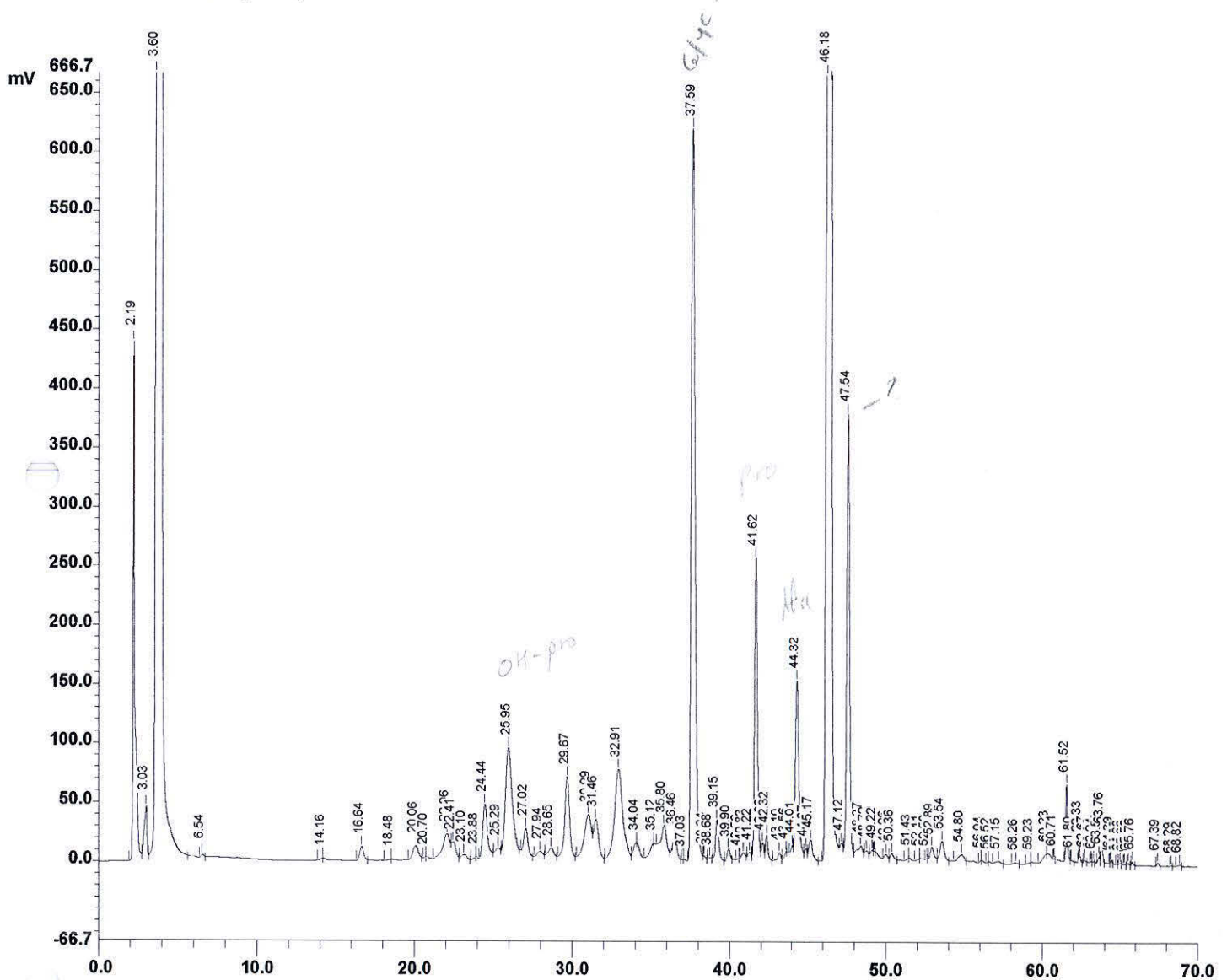
Data File : c:\jcl\data\standard\PB4REP.WD1

Configuration : C:\JCL\METH\amino11

Run Number 1 of 3

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : PB Cathed, sample 4 repeat



PK #	Ret. Time	Hgt.	Height %	Area	Area %
1	2.19	229600	10.78	30522160	4.29
2	3.03	21761	1.02	4607841	0.65
3	3.60	521994	24.51	296934219	41.72
4	6.54	1139	0.05	218332	0.03
5	14.16	29	0.00	9964	0.00
6	16.64	5997	0.28	1970936	0.28
7	18.48	12	0.00	6462	0.00
8	20.05	5668	0.27	2391405	0.34
9	20.70	23	0.00	4096	0.00
10	22.06	5614	0.26	2047635	0.29
11	22.41	2005	0.09	466065	0.07
12	23.10	1705	0.08	609123	0.09
13	23.88	33	0.00	14360	0.00
14	24.44	22970	1.08	8381496	1.18
15	25.29	1379	0.06	375971	0.05
16	25.95	45458	2.13	25095270	3.53

Date : 19/3/2001

Time : 12:38:38

Date Acquired : 19/3/2001

Time Acquired : 11:25:32

Channel : 1

Sample Type : Unk

Data File : c:\jcl\data\standard\PB4REP.WD1

Configuration : C:\JCL\METH\amino11

Run Number 1 of 3

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : PB Cathed, sample 4 repeat

PK #	Ret. Time	Hgt.	Height %	Area	Area %
17	27.02	10735	0.50	3385728	0.48
18	27.94	1845	0.09	711401	0.10
19	28.65	3328	0.16	1282389	0.18
20	29.67	35363	1.66	13879062	1.95
21	30.99	11570	0.54	5038685	0.71
22	31.46	9419	0.44	2863616	0.40
23	32.91	38991	1.83	26458007	3.72
24	34.03	167	0.01	139083	0.02
25	35.12	102	0.00	56848	0.01
26	35.80	10468	0.49	3892983	0.55
27	36.46	8440	0.40	2735208	0.38
28	37.03	19	0.00	4988	0.00
29	37.59	324513	15.24	105871206	14.87
30	38.34	380	0.02	56531	0.01
31	38.68	641	0.03	115219	0.02
32	39.15	17459	0.82	4554728	0.64
33	39.90	5007	0.24	1128991	0.16
34	40.56	31	0.00	6012	0.00
35	40.83	1918	0.09	448103	0.06
36	41.22	1678	0.08	261294	0.04
37	41.62	131500	6.17	29574810	4.16
38	42.06	4532	0.21	662775	0.09
39	42.32	9128	0.43	1500460	0.21
40	43.10	3200	0.15	649566	0.09
41	43.56	736	0.03	94202	0.01
42	44.01	1823	0.09	210609	0.03
43	44.32	75004	3.52	19659356	2.76
44	44.87	2395	0.11	312870	0.04
45	45.17	7221	0.34	1969970	0.28
46	46.18	259954	12.21	49384476	6.94
47	47.12	2216	0.10	364235	0.05
48	47.54	193555	9.09	44970350	6.32
49	48.37	2974	0.14	943181	0.13
50	48.72	1111	0.05	187829	0.03
51	49.09	921	0.04	124123	0.02
52	49.22	220	0.01	16781	0.00
53	49.96	1738	0.08	395246	0.06
54	50.36	2257	0.11	551758	0.08
55	51.43	39	0.00	4743	0.00
56	52.11	35	0.00	13175	0.00
57	52.59	30	0.00	4470	0.00
58	52.89	4925	0.23	1224081	0.17
59	53.54	7864	0.37	2558257	0.36
60	54.80	2827	0.13	1152709	0.16
61	56.04	50	0.00	11333	0.00
62	56.52	31	0.00	5929	0.00
63	57.15	949	0.04	350866	0.05
64	58.26	464	0.02	135802	0.02
65	59.23	30	0.00	15944	0.00
66	60.23	80	0.00	38479	0.01
67	60.71	348	0.02	32387	0.00
68	61.52	33711	1.58	4820209	0.68
69	61.80	233	0.01	22730	0.00
70	62.33	7934	0.37	831756	0.12
71	62.67	972	0.05	100929	0.01
72	63.08	367	0.02	34410	0.00
73	63.24	513	0.02	50840	0.01
74	63.58	2429	0.11	263229	0.04
75	63.76	11518	0.54	1251645	0.18
76	64.30	97	0.00	4713	0.00
77	64.39	1311	0.06	127183	0.02
78	64.80	13	0.00	4162	0.00
79	64.97	307	0.01	27568	0.00

Date : 19/3/2001

Time : 12:38:45

Date Acquired : 19/3/2001

Time Acquired : 11:25:32

Channel : 1

Sample Type : Unk

Data File : c:\jcl\data\standard\PB4REP.WD1

Configuration : C:\JCL\METH\amino11

Run Number 1 of 3

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : PB Cathed, sample 4 repeat

Pk #	Ret. Time	Hgt.	Height %	Area	Area %
80	65.26	236	0.01	23174	0.00
81	65.50	780	0.04	71764	0.01
82	65.76	1466	0.07	150625	0.02
83	67.39	1355	0.06	161294	0.02
84	68.29	208	0.01	22993	0.00
85	68.82	573	0.03	116169	0.02

Total Height % 100.00

Total Area % 100.00

Area used for calculations.

Modified response has been scaled to internal standard.

SAMS - FMOc Amino acid analysis: HPLC 260nm

FIGURE 5

Date : 13/3/2001

Time : 14:10:4

Date Acquired : 13/3/2001

Time Acquired : 12:57:24

Channel : 1

Sample Type : Unk

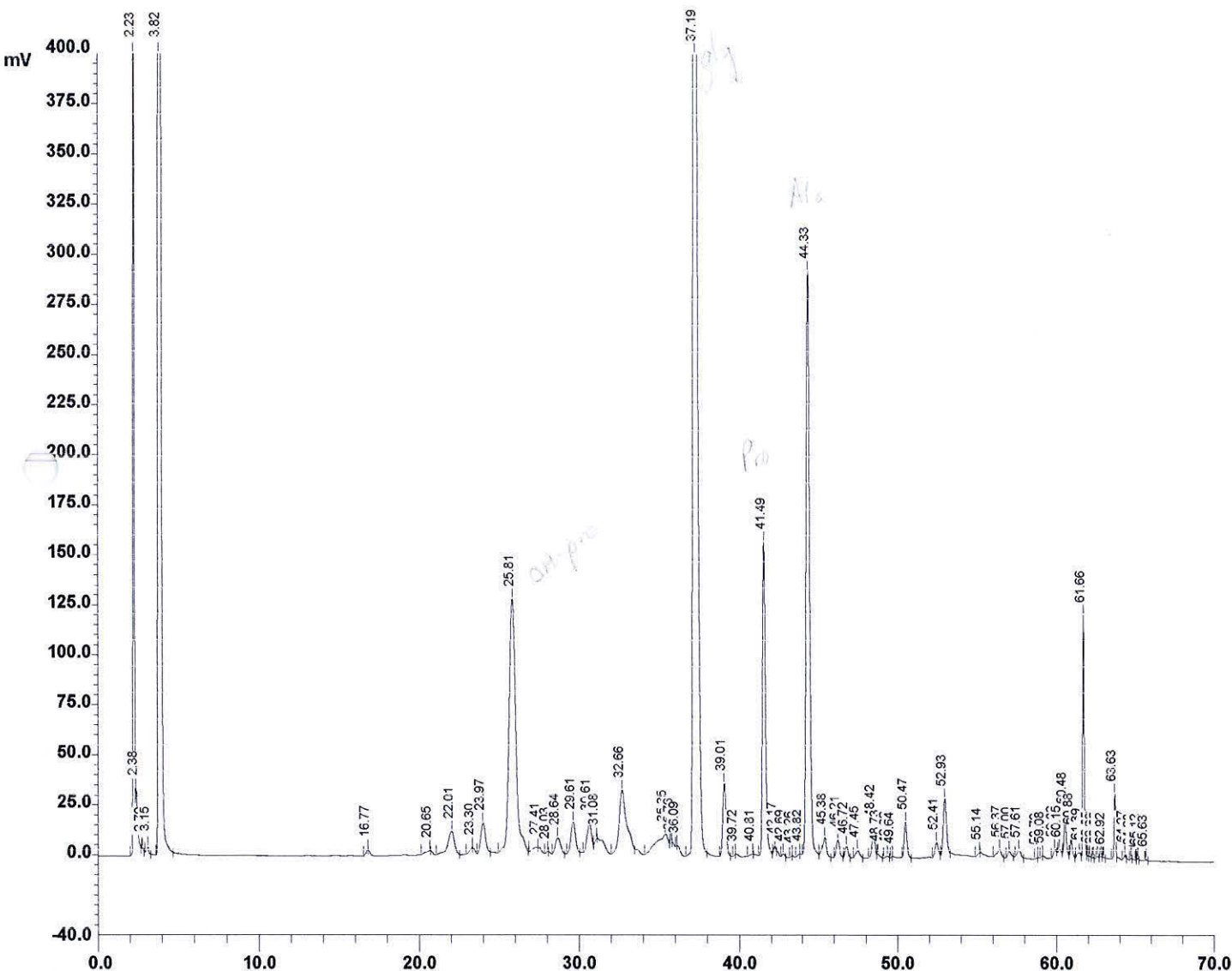
Data File : c:\jcl\data\standard\GLUE1332.WD1

Configuration : C:\JCL\METH\amino11

Run Number 2 of 15

Chan 1 Desc. : HPLC Amino Acids UV2000 260nm

Sample Name : Animal glue - diluted sample 1



PK #	Ret. Time	Hgt.	Height %	Area	Area %
1	2.23	263977	16.06	22344440	5.48
2	2.38	3054	0.19	196813	0.05
3	2.79	526	0.03	44191	0.01
4	3.15	1629	0.10	244199	0.06
5	3.82	524233	31.89	114708128	28.11
6	16.77	57	0.00	13168	0.00
7	20.65	17	0.00	37952	0.01
8	22.01	6106	0.37	3470099	0.85
9	23.30	42	0.00	12915	0.00
10	23.97	7832	0.48	3105578	0.76
11	25.81	66317	4.03	37400543	9.16
12	27.41	26	0.00	94132	0.02
13	28.03	22	0.00	10157	0.00
14	28.64	4152	0.25	1755933	0.43
15	29.61	7987	0.49	2967731	0.73
16	30.61	6419	0.39	1964132	0.48

Date : 13/3/2001 Time : 14:10:22 Date Acquired : 13/3/2001 Time Acquired : 12:57:24
 Channel : 1 Sample Type : Unk Data File : c:\jcl\data\standard\GLUE1332.WD1 Configuration : C:\JCL\METH\amino11
 Run Number 2 of 15 Chan 1 Desc. : HPLC Amino Acids UV2000 260nm
 Sample Name : Animal glue - diluted sample 1

Pk #	Ret. Time	Hgt.	Height %	Area	Area %
17	31.08	78	0.00	36826	0.01
18	32.66	16158	0.98	9845502	2.41
19	35.35	3020	0.18	2750717	0.67
20	35.76	29	0.00	5165	0.00
21	36.09	27	0.00	4043	0.00
22	37.19	320958	19.52	114055181	27.95
23	39.01	19082	1.16	5015454	1.23
24	39.72	35	0.00	5731	0.00
25	40.80	29	0.00	23557	0.01
26	41.49	82052	4.99	19760411	4.84
27	42.17	1688	0.10	252535	0.06
28	42.68	728	0.04	131420	0.03
29	43.26	25	0.00	3899	0.00
30	43.82	27	0.00	33889	0.01
31	44.33	152627	9.28	41733116	10.23
32	45.38	4762	0.29	1554569	0.38
33	46.21	4574	0.28	1156386	0.28
34	46.72	2787	0.17	531434	0.13
35	47.45	1912	0.12	653198	0.16
36	48.42	7154	0.44	1612256	0.40
37	48.72	275	0.02	34214	0.01
38	49.32	412	0.03	86955	0.02
39	49.64	23	0.00	4802	0.00
40	50.47	9146	0.56	2032544	0.50
41	52.41	3477	0.21	886162	0.22
42	52.93	14507	0.88	3707902	0.91
43	55.14	33	0.00	22631	0.01
44	56.37	1878	0.11	682789	0.17
45	57.00	1437	0.09	384144	0.09
46	57.60	1833	0.11	520073	0.13
47	58.79	19	0.00	6784	0.00
48	59.08	22	0.00	6068	0.00
49	59.83	1200	0.07	211436	0.05
50	60.15	601	0.04	101735	0.02
51	60.48	9682	0.59	1589967	0.39
52	60.88	4801	0.29	670867	0.16
53	61.39	1175	0.07	314493	0.08
54	61.66	63111	3.84	7112856	1.74
55	61.92	210	0.01	14080	0.00
56	62.05	217	0.01	17621	0.00
57	62.28	207	0.01	16838	0.00
58	62.55	334	0.02	42298	0.01
59	62.78	259	0.02	26270	0.01
60	62.92	169	0.01	15001	0.00
61	63.63	16772	1.02	1811773	0.44
62	64.27	1075	0.07	149931	0.04
63	64.68	268	0.02	23746	0.01
64	64.98	62	0.00	3392	0.00
65	65.12	368	0.02	34501	0.01
66	65.63	218	0.01	22081	0.01

Total Height % 100.00
 Total Area % 100.00

Area used for calculations.

Modified response has been scaled to internal standard.