



# Analysesysteme

Friedhofstraße 7-9 · D-55234 Bechenheim · Telefon 0 67 36 / 13 01 · Telefax 0 67 36 / 13 05  
E-Mail: SES\_Analysesysteme@t-online.de

Analysegeräte – EDV im Labor

APPENDIX – II, 11

IATROSCAN TLC/FID  
INSTRUMENT APPLICATION

21

Analysis of Surface active agents  
by the IATROSCAN

A) Samples	頁
1) Cationic surface active agents	
1 - 1. Monoalkyl ammoniumchloride	1
1 - 2. Dialkyl ammoniumchloride	1
1 - 3. Stearoyl amidoethyl diethyl amine	1
2) Anionic surface active agents	
2 - 1. Sodium alkyl benzene sulfate	1
2 - 2. $\alpha$ -Olefine sulfonate	1
2 - 3. Sodium N-palmitoyl sarcosinate	2
2 - 4. Sodium N-lauroyl methyltaurate	2
2 - 5. Sodium lauryl sulfate	2
3) Nonionic surface active agents	
3 - 1. POE(2) Monostearate	2
3 - 2. POE(10) Monostearate	2
3 - 3. Diglyceryl monooleate	3
3 - 4. Diglyceryl dioleate	3
3 - 5. Solbitan monooleate	3
3 - 6. Solbitan tristearate	3
3 - 7. ED(4) Alkyl ether	3
3 - 8. ED(10) Nonyl phenyl ether	3
3 - 9. POE(9) Lauryl ether	4
3 - 10. POE(15) Oleyl ether	4
3 - 11. POE(9) Secondary alkyl ether	4
3 - 12. POE(12) Secondary alkyl ether	4
3 - 13. POE(2) Cetyl ether	5
3 - 14. POE(7) Cetyl ether	5
3 - 15. POE(15) Cetyl ether	5
3 - 16. POE(1) POP(4) Cetyl ether	5
3 - 17. POE(20) POP(6) Cetyl ether	6
3 - 18. Sodium POE(3) alkyl ether sulfate	6
3 - 19. Glyceryl monostearate	6

- 4) Amphoteric surface active agents
  - 4 - 1. Lauryl dimethyl aminoacetic acid betaine 7
  - 4 - 2. Cocoyl amidopropyl dimethyl aminoacetic acid betaine 7
  
- 5) Other surface active agents
  - 5 - 1. Sugar ester 7
  
- 6) Mixture
  - 6 - 1. Sodium alkyl benzene sulfates + EO(4) Alkyl ether 7

B) Conditions

Spotting: ca. 1  $\mu$ l of the sample solution containing 10-20  $\mu$ g of surface active agents

Stationary phase: CHROMAROD-SIII

Gas flow: H<sub>2</sub> 160 ml/min, Air 2.0 l/min

Scanning speed: 30sec/scan

Iatrocorder TC-11

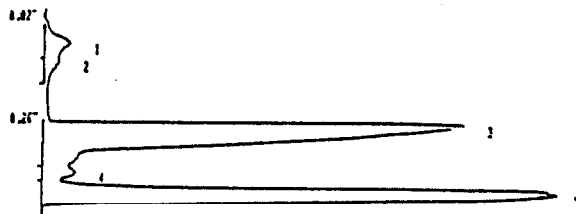
Playback attenuation 16-32mV f.s.

1) Cationic surface active agents

Fig 1-1. Monoalkyl ammoniumchloride

Mobile phase :

Acetone : Water : conc Ammonia (63 : 6 : 1)

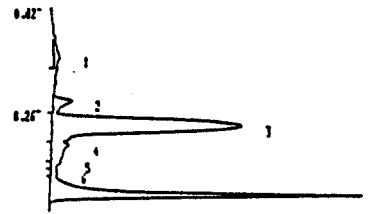


NO.	NAME	RT	n OR H	HL	CONC
1		0.101	4101	H	2.2953
2		0.141	1729	H	1.2375
3		0.303	6875	H	49.5745
4		0.405	2154	H	2.2751
5		0.465	6060	H	43.8943
TOTAL			13851		100.0000

Fig 1-2. Dialkyl ammoniumchloride

Mobile phase :

Acetone : Water : conc Ammonia (63 : 6 : 1)

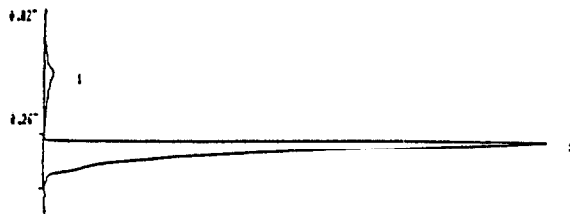


NO.	NAME	RT	n OR H	HL	CONC
1		0.133	1051	H	2.5614
2		0.344	1306	H	3.1836
3		0.383	2142	H	52.1827
4		0.346	1324	H	4.8397
5		0.336	401	H	0.9791
6		0.412	363	H	0.8250
7		0.487	14574	H	35.5162
TOTAL			41033		100.0000

Fig 1-3. Stearoyl amidoethyl diethyl amine

Mobile phase :

Acetone : Water : conc Ammonia (63 : 6 : 1)



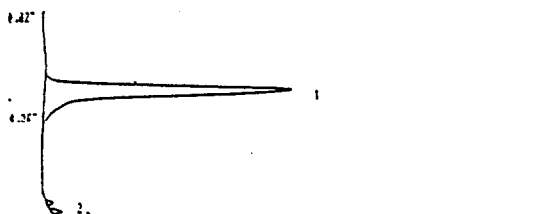
NO.	NAME	RT	n OR H	HL	CONC
1		0.173	1316	H	4.7546
2		0.343	28251	H	95.2453
TOTAL			29567		100.0000

2) Anionic surface active agents

Fig 2-1. Sodium alkyl benzene sulfate

Mobile phase :

Chloroform : Methanol : Formic acid (30 : 30 : 1)

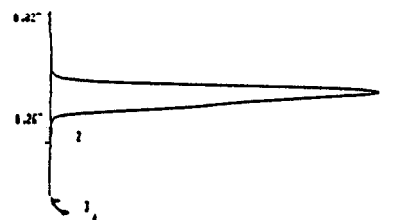


NO.	NAME	RT	n OR H	HL	CONC
1		0.217	24733	H	37.5143
2		0.486	230	H	0.3503
3		0.502	331	H	1.1023
TOTAL			25429		100.0000

Fig 2-2. α-Olefine sulfonate

Mobile phase :

Chloroform : Methanol : Formic acid (30 : 30 : 1)

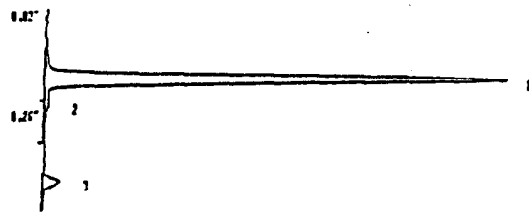


NO.	NAME	RT	n OR H	HL	CONC
1		0.222	54120	H	35.0369
2		0.313	151	H	0.1279
3		0.476	140	H	0.2564
4		0.503	274	H	0.4236
TOTAL			54685		100.0000

Fig 2-3. Sodium N-palmitoyl sarcosinate

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 10 : 1)

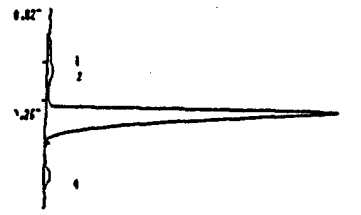


CAL. METHOD	00	SF	PA	PF	
	.100000e+03	.100000e+01	.100000e+01		
NO.	NAME	RT	A OR H	HK	CONC
1		0.129	19456	H	94.1287
2		0.248	402	H	1.3153
3		0.434	796		3.8558
TOTAL			20655		100.0000

Fig 2-4. Sodium N-lauroyl methyltaurate

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 10 : 1)

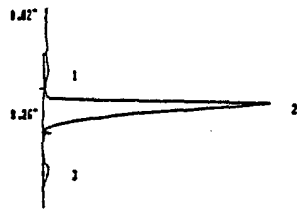


CAL. METHOD	00	SF	PA	PF	
	.100000e+03	.100000e+01	.100000e+01		
NO.	NAME	RT	A OR H	HK	CONC
1		0.132	309	H	1.7620
2		0.171	592	H	3.3746
3		0.271	16183		92.1909
4		0.431	470		2.8322
TOTAL			17355		100.0000

Fig 2-5. Sodium lauryl sulfate

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 10 : 1)



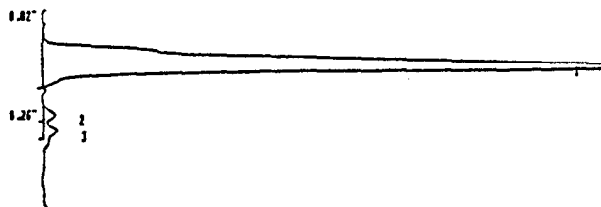
CAL. METHOD	00	SF	PA	PF	
	.100000e+03	.100000e+01	.100000e+01		
NO.	NAME	RT	A OR H	HK	CONC
1		0.170	414	H	3.1722
2		0.252	12134		92.9453
3		0.418	506		3.8824
TOTAL			13055		100.0000

3) Nonionic surface active agents

Fig 3-1. POE(2) Monostearate

Mobile phase :

Ethyl acetate : Acetone : Water (45 : 20 : 3)

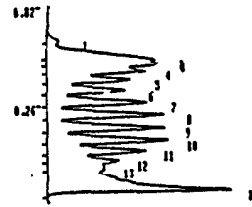


CAL. METHOD	00	SF	PA	PF	
	.100000e+03	.100000e+01	.100000e+01		
NO.	NAME	RT	A OR H	HK	CONC
1		0.146	21157	H	37.4332
2		0.276	252	H	1.1613
3		0.316	307	H	1.4153
TOTAL			21717		100.0000

Fig 3-2. POE(10) Monostearate

Mobile phase :

Ethyl acetate : Acetone : Water (45 : 20 : 3)



CAL. METHOD	00	SF	PA	PF	
	.100000e+03	.100000e+01	.100000e+01		
NO.	NAME	RT	A OR H	HK	CONC
1		0.104	176	H	0.7973
2		0.148	1984	H	9.2674
3		0.157	1716	H	7.7557
4		0.179	1329	H	6.9104
5		0.201	1183	H	5.5476
6		0.238	1176	H	5.7160
7		0.256	1513	H	6.1422
8		0.285	1496	H	7.4661
9		0.317	1724	H	7.3018
10		0.348	1729	H	8.1720
11		0.373	1552	H	7.9143
12		0.398	1920	H	4.3704
13		0.420	1759	H	4.7986
14		0.472	4121	H	19.9457
TOTAL			22126		100.0000

SAMPLE 77 14112 HNE. OF 1989

Fig 3-3. Diglyceryl monooleate

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

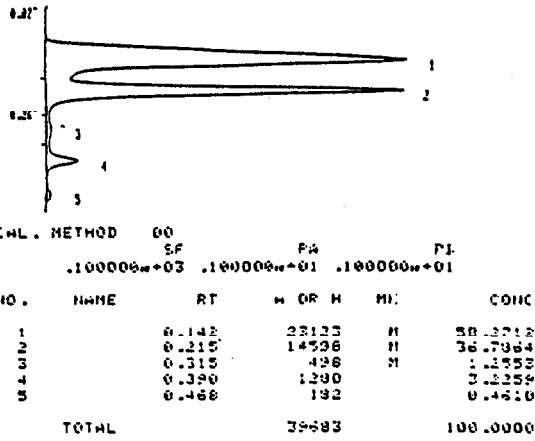


Fig 3-5. Solbitan monooleate

Mobile phase :

Chloroform : Methanol : Formic acid (65 : 2 : 1)

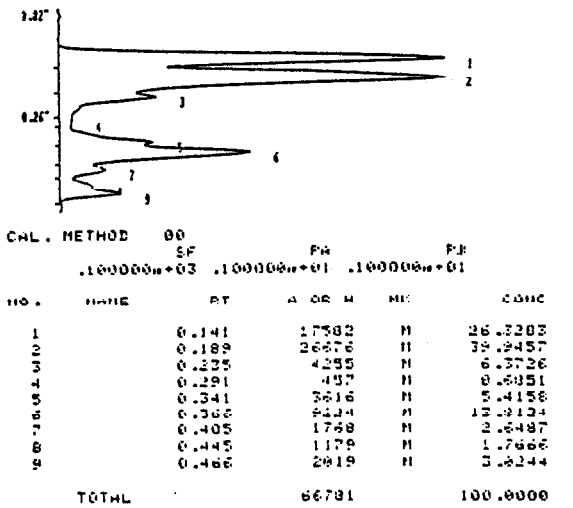


Fig 3-7. ED(4) Alkyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

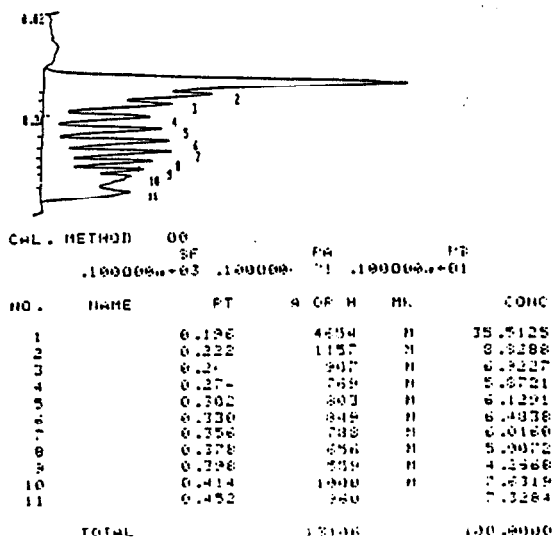


Fig 3-4. Diglyceryl dioleate

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

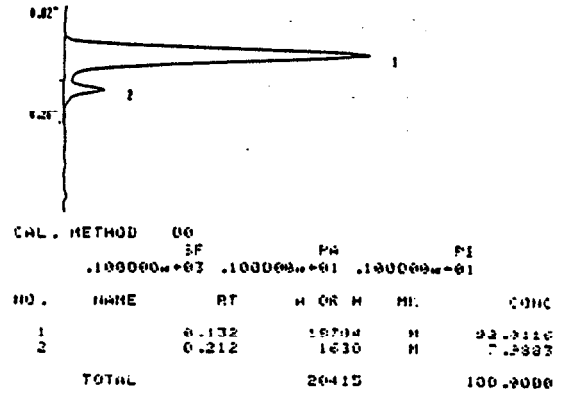


Fig 3-6. Solbitan tristearate

Mobile phase :

Chloroform : Methanol : Formic acid (65 : 2 : 1)

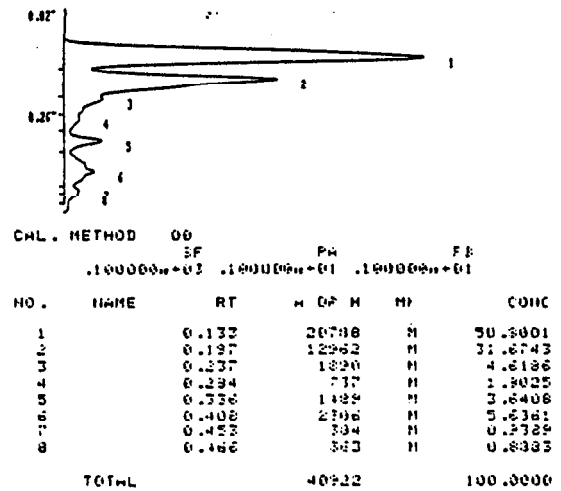


Fig 3-8. ED(10) Nonyl phenyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

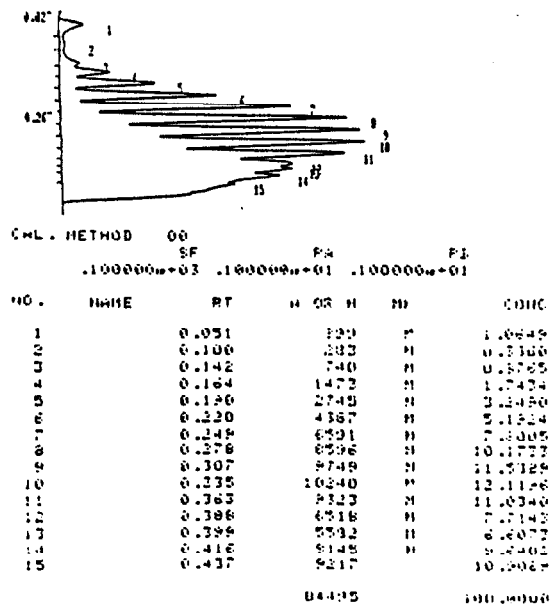
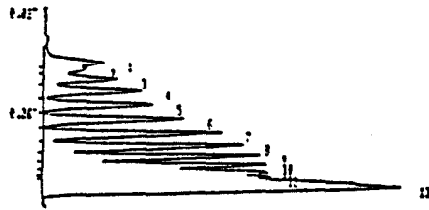


Fig. 3-9. POE(9) Lauryl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

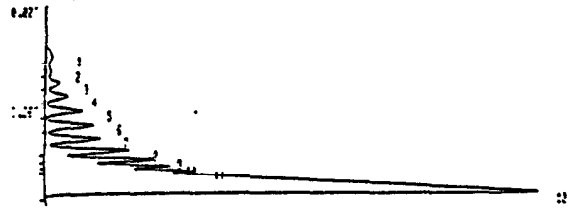


CAL. METHOD					
NO.	NAME	RT	H OR H	HL	CONC
1		0.155	1120	H	7.7407
2		0.173	591	H	11.7945
3		0.186	1910	H	10.3108
4		0.220	1233	H	4.1048
5		0.229	1475	H	4.7148
6		0.239	1793	H	11.8678
7		0.253	3231	H	11.3925
8		0.274	2547	H	6.0521
9		0.278	2513	H	3.2370
10		0.400	2542	H	11.2075
11		0.419	4048	H	11.1362
12		0.432	1592	H	4.7542
12		0.453	8913	H	23.2937
TOTAL			21574		100.0000

Fig 3-10. POF(15) Oleyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

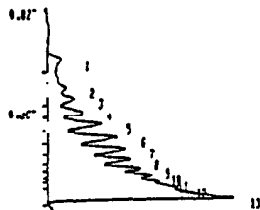


CAL. METHOD					
NO.	NAME	RT	H OR H	HL	CONC
1		0.141	409	H	0.2242
2		0.132	373	H	0.5265
3		0.211	452	H	1.0211
4		0.243	698	H	1.5773
5		0.276	991	H	2.2927
6		0.310	1220	H	2.2927
7		0.342	1491	H	3.1857
8		0.371	1389	H	4.1931
9		0.392	2439	H	5.1094
10		0.409	2546	H	5.7473
11		0.421	2199	H	5.4154
12		0.458	2979	H	48.9002
TOTAL			44230		100.0000

Fig 3-11. POE(9) Secondary alkyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

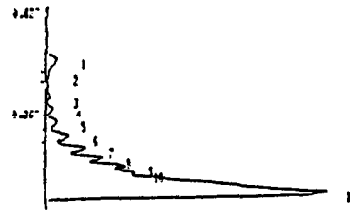


CAL. METHOD					
NO.	NAME	RT	H OR H	HL	CONC
1		0.143	408	H	2.7029
2		0.181	319	H	3.1204
3		0.229	524	H	3.4771
4		0.271	731	H	4.2401
5		0.303	985	H	6.2348
6		0.333	1232	H	6.1722
7		0.362	1732	H	8.2140
8		0.386	1127	H	5.6055
9		0.407	1470	H	8.1382
10		0.423	1224	H	6.1127
11		0.438	820	H	5.4407
12		0.453	1431	H	10.8199
13		0.476	2324	H	22.0326
TOTAL			15881		100.0000

Fig 3-12. POE(12) Secondary alkyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

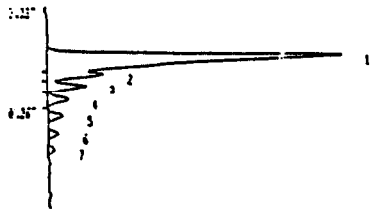


CAL. METHOD					
NO.	NAME	RT	H OR H	HL	CONC
1		0.143	301	H	2.1758
2		0.181	56	H	0.1102
3		0.236	76	H	0.3722
4		0.265	175	H	0.2320
5		0.299	361	H	1.1341
6		0.332	432	H	2.1349
7		0.361	605	H	4.2433
8		0.382	729	H	5.2116
9		0.403	971	H	7.0110
10		0.416	1917	H	7.2907
11		0.462	2177	H	25.2442
TOTAL			1385		100.0000

Fig 3-13. POE(2) Cetyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

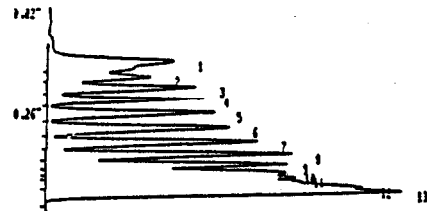


NO.	NAME	RT	μ OR H	HL	CONC
		0.146	6175	H	75.3301
		0.194	733	H	0.3553
		0.212	734	H	0.3551
		0.248	295	H	3.5061
		0.287	214		3.6211
		0.328	148		1.3901
		0.365	90		1.0221
TOTAL			8132		100.0000

Fig 3-14. POE(7) Cetyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)



NO.	NAME	RT	μ OR H	HL	CONC
1		0.150	7211	H	0.5111
2		0.187	1473	H	3.9509
3		0.213	2082	H	5.3948
4		0.244	2901	H	5.7606
5		0.277	2213	H	5.9360
6		0.312	2586	H	6.1923
7		0.345	2786	H	7.4741
8		0.373	2939	H	8.1041
9		0.397	3926	H	7.8941
10		0.418	2798	H	7.4701
11		0.438	1971	H	5.2386
12		0.453	5341	H	14.3329
13		0.462	4905	H	13.1358
TOTAL			37397		100.0000

Fig 3-15 POE(15) Cetyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)

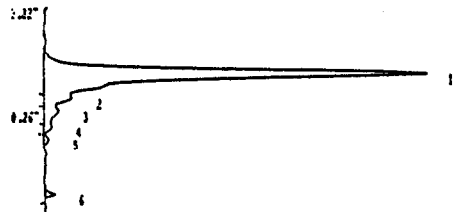


NO.	NAME	RT	μ OR H	HL	CONC
1		0.132	723	H	1.1046
		0.141	724	H	1.1157
		0.156	407	H	1.2905
		0.208	142	H	0.4886
		0.241	123		0.4371
		0.278	195	H	0.5296
		0.316	270	H	0.5231
		0.347	329	H	1.3629
		0.373	571	H	1.2913
		0.463	26366	H	20.6957
TOTAL			28295		100.0000

Fig 3-16 POE(1) POP(4) Cetyl ether

Mobile phase :

Ethyl acetate : Acetone : Water (52 : 15 : 3)



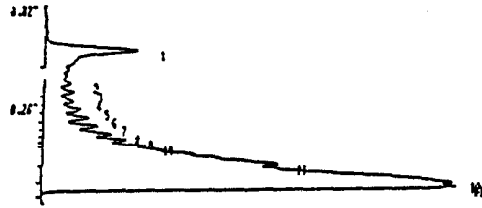
NO.	NAME	RT	μ OR H	HL	CONC
1		0.178	9000	H	58.0141
2		0.235	508	H	4.2720
3		0.265	383	H	3.0754
4		0.302	122	H	1.1236
5		0.333	31		0.7902
6		0.467	129	H	1.2487
TOTAL			10126		100.0000



Fig 3-17. POE(20) POP(6) Cetyl ether

Mobile phase :

Ethyl acetate : Acetone : Water : Formic acid  
(30 : 30 : 3 : 1)

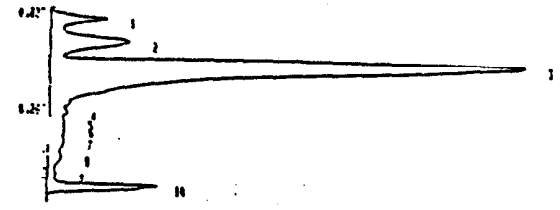


NO.	NAME	RT	A	OR	H	HI.	CONC
1		0.173	2329			H	7.5190
2		0.215	190			H	1.2321
3		0.237	419			H	1.3081
4		0.239	417			H	1.3064
5		0.278	525			H	1.5466
6		0.279	536			H	1.5527
7		0.318	599			H	2.1752
8		0.338	975			H	3.5129
9		0.352	943			H	2.9549
10		0.366	928			H	2.9326
11		0.413	7183			H	22.5071
12		0.453	11317			H	36.0791
13		0.462	5932			H	15.7624
TOTAL			31325				100.0000
SAMPLE 59							14143 MAR. 17 1984

Fig 3-18. Sodium POE(3) alkyl ether sulfate

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 10 : 1)

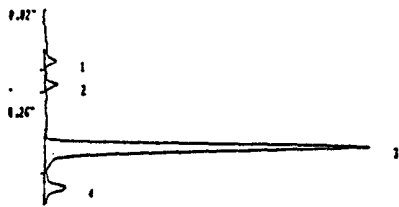


NO.	NAME	RT	A	OR	H	HI.	CONC
1		0.049	2045			H	3.7741
2		0.108	4306			H	8.1232
3		0.167	4907			H	75.9959
4		0.237	746			H	1.5720
5		0.308	568			H	1.3466
6		0.325	523			H	1.2432
7		0.356	822			H	1.5460
8		0.396	771			H	1.3494
9		0.438	196			H	0.3701
10		0.471	7206			H	5.9175
TOTAL			34180				100.0000

Fig 3-19. Glyceryl monostearate

Mobile phase :

Chloroform : Methanol : Formic acid (70 : 1 : 0.3)



NO.	NAME	RT	A	OR	H	HI.	CONC
1		0.154	456			H	3.1832
2		0.212	446			H	3.1125
3		0.366	1237			H	86.5001
4		0.456	1931			H	7.1990
TOTAL			14332				100.0000

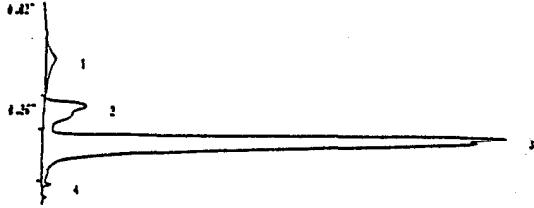
4) Amphoteric surface active agents

Fig 4-1. Lauryl dimethyl aminoacetic acid

betaine

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 20 : 1)



NO.	NAME	RT	H OR N	HI	CONC
1		0.158	398	N	2.7491
2		0.271	2977	N	9.4446
3		0.357	31218	N	98.7322
4		0.462	167	N	0.4740
TOTAL			35261		100.0000

Fig 4-2. Cocoyl amido propyl dimethyl aminoacetic

acid betaine

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 20 : 1)



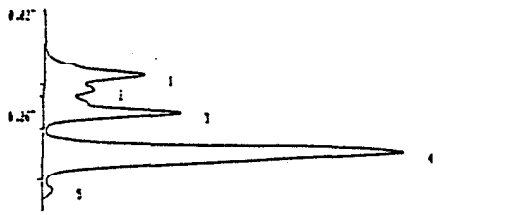
NO.	NAME	RT	H OR N	HI	CONC
1		0.085	125	N	0.6272
2		0.157	1171	N	5.8425
3		0.245	793	N	1.2614
4		0.291	476	N	2.7733
5		0.314	633	N	3.2481
6		0.388	126	N	0.6362
7		0.428	17105	N	35.3080
TOTAL			20056		100.0000

5) Other surface active agents

Fig 5-1. Sugar ester

Mobile phase :

Chloroform : Methanol : Formic acid (50 : 10 : 1)



NO.	NAME	RT	H OR N	HI	CONC
1		0.183	6020	N	14.1181
2		0.219	2154	N	5.0759
3		0.274	7624	N	17.8778
4		0.371	26342	N	61.7717
5		0.456	433	N	1.1627
TOTAL			42373		100.0000

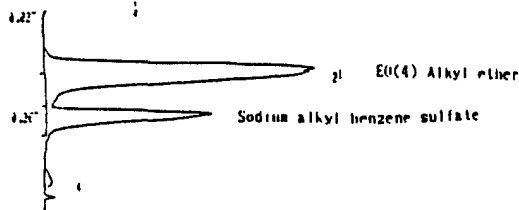
6) Mixture

Fig 6-1. Sodium alkyl benzene sulfate

+EO(4) Alkyl ether

Mobile phase :

Chloroform : Methanol : Formic acid (60 : 10 : 1)



NO.	NAME	RT	H OR N	HI	CONC
1		0.172	11219	N	25.1006
2		0.180	12993	N	27.3333
3		0.276	8117	N	15.6347
4		0.436	476	N	1.0312
TOTAL			31264		100.0000