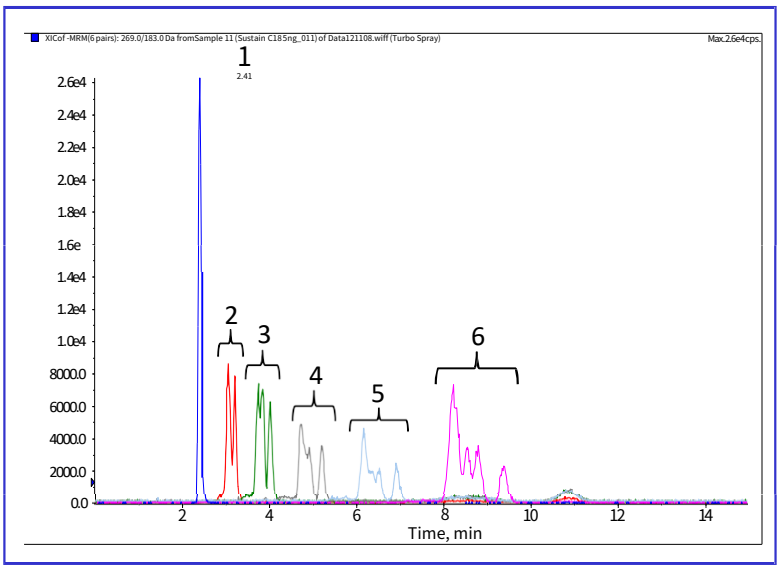
Analysis of Anion Surfactants by LC/MS/MS

In Japan, a draft of analytical method for linear alkylbenzene sulfonate (LAS) and their salts was released for public comments by Ministry of the Environment. In the draft, enrichment by solid-phase extraction (SPE) and determination using LC/MS/MS are described.

In this note, InertSustain C18 was used as an HPLC column for the analysis. As a result, good reproducibility and linearity of the calibration curve were shown.

(M. Takahashi)

A Chromatogram Obtained from Standard Solution



Conditions

Column : InertSustain C18 (3 µm, 150×2.1 mm I.D.)
Eluent : A) CH_3CN
B) 0.1 % HCOOH, 50 mM $HCOONH_4$ in H_2O
A/B = 65/35, v/v
Flow rate : 0.2 mL/min
Col. Temp. : 40°C
Detection : LC/MS/MS
(4000 Q TRAP®: ESI, Negative, MRM)

CUR	CAD	IS	TEM	GS1	GS2
10	4	-4500	600	70	40

Inj. Vol. : 5 µL

Analyte:

	Q1/Q3
1. Sodium Octylbenzenesulfonate(C8) (IS)	269/183
2. Sodium Decylbenzenesulfonate(C10)	297/183
3. Sodium Undecylbenzenesulfonate(C11)	311/183
4. Sodium Dodecylbenzenesulfonate(C12)	325/183
5. Sodium Tridecylbenzenesulfonate(C13)	339/183
6. Sodium Tetradecylbenzenesulfonate(C14)	353/183

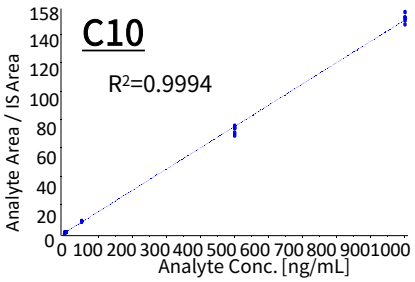
(in CH_3CN/H_2O=65/35 each 5 µg/L)

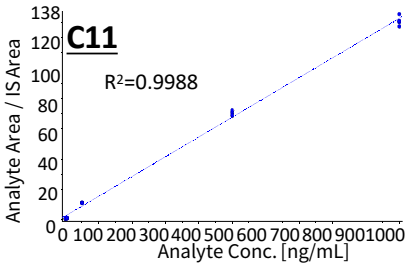
HPLC column

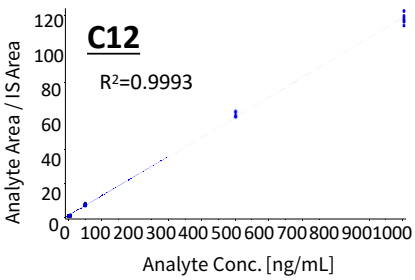
InertSustain C18
(3 µm, 150×2.1 mm I.D.)
Cat.No. 5020-07415

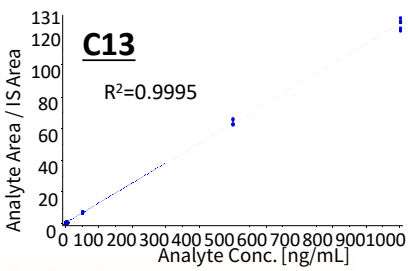
Calibration Curves

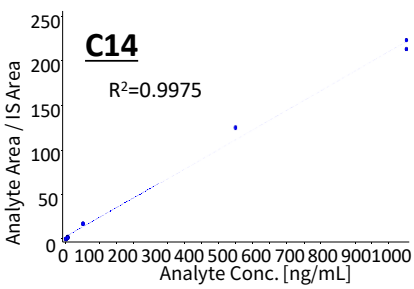
	Regression equqtion	Correlation coefficient	RSD, % (50 ng/mL, n=5, Area)
C10-LAS	y=0.15x -0.0284	0.9994	1.2
C11-LAS	y=0.13x +2.31	0.9988	1.4
C12-LAS	y=0.117x +1.07	0.9993	2.7
C13-LAS	y=0.125x +0.672	0.9995	2.7
C14-LAS	y=0.218x +2.56	0.9975	2.0











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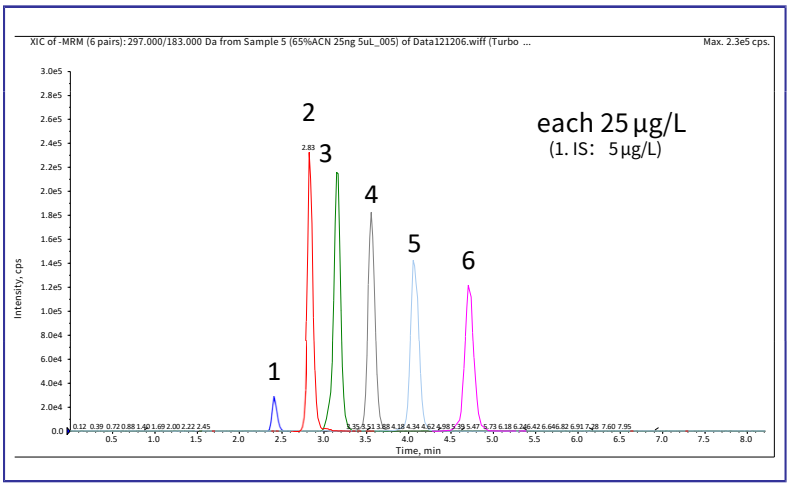
Another Choice: C8 Column



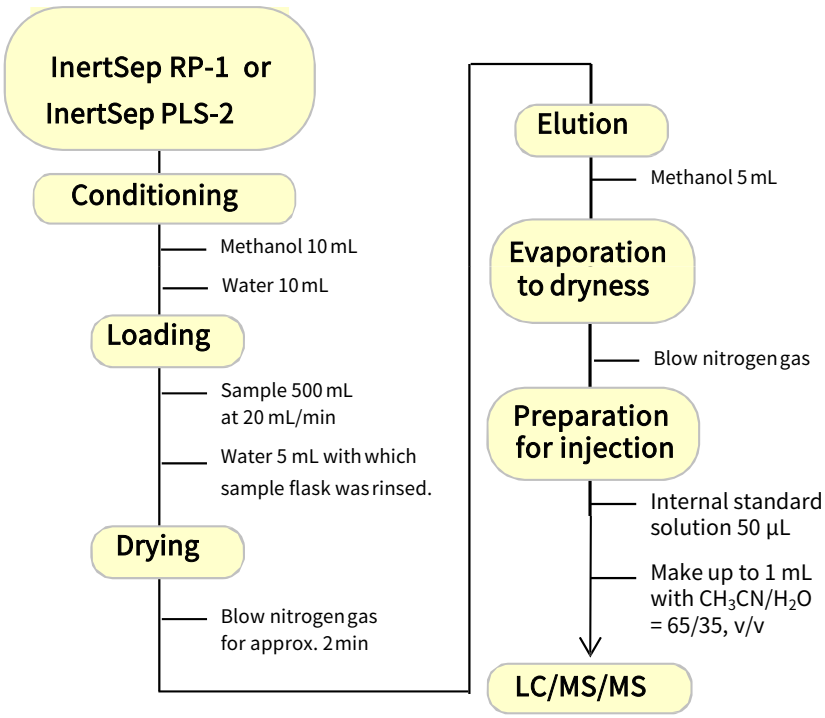
Isomers of each linear alkylbenzene sulfonate are separated to some extent when standard C18 column is used. A chromatogram shown left was obtained by using less retentive C8 column. Each compound was eluted as a single peak because of relatively weak hydrophobic interaction, and peak area can be calculated more easily.

Conditions

Column : Inertsil C8-4 (3 µm, 150×2.1 mm I.D.)
Cat.No. : 5020- 03975

Others are the same as described in the previous page.

Example of Sample Pretreatment using SPE



SPE cartridge:
InertSep RP-1, InertSep PLS-2

"SlimJ" has top and bottom luer fittings.

InertSep SlimJ RP-1 230mg 50 pk Cat. No. 5010-65730

InertSep RP-1 250mg/6mL 30 pk Cat. No. 5010-27000

InertSep SlimJ PLS-2 265mg 50 pk Cat. No. 5010-65721

InertSep PLS-2 265mg/6mL 50 pk Cat. No. 5010-27430

GL Sciences Inc. Japan
22-1 Nishishinjuku 6-chome
Shinjuku-ku, Tokyo
163-1130, Japan

Phone: +81-3-5323-6620
Fax: +81-3-5323-6621
Email: world@gls.co.jp
Web: www.glsciences.com

GL Sciences Inc. USA
4733 Torrance Blvd. Suite 255
Torrance, CA 90503
USA

Phone: +1-310-265-4424
Fax: +1-310-265-4425
Email: info@glsciencesinc.com
Web: www.glsciencesinc.com

GL Sciences B.V.
Dillenburgstraat 7C
5652AM, Eindhoven
The Netherlands

Phone: +31-40-254-9531
Email: info@glsciences.eu
Web: www.glsciences.eu

GL Sciences (Shanghai) Limited
Tower B, Room 2003
Far East International Plaza
No.317 Xianxia Road, Changning District
Shanghai, China 200051

Phone: +86-21-62782272
Email: contact@glsciences.com.cn
Web: www.glsciences.com.cn

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