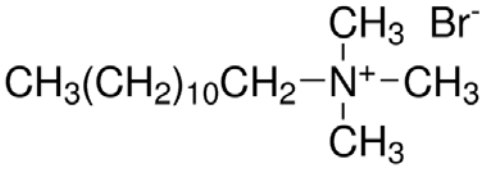
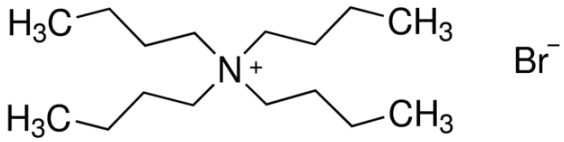
Rapid Quantitation of Quaternary Amine Surfactants by UHPLC-CAD

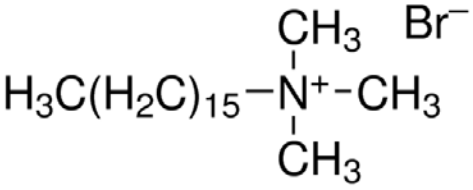
Quaternary amine surfactants, shown in Figure 1, are used as an important tool in biopharmaceutical processes. Hexadecyltrimethylammonium bromide (CTAB) is used to lyse cell membranes and to solubilize RNA and DNA from solutions, and tert-Butylammonium chloride (TBAC), Dodecyltrimethylammonium bromide (DTAB), and Tetradecyltrimethylammonium bromide (TTAB) have uses in proteomics, phase transfer catalysts, and in the study of surface chemistries. None of these surfactants possess a suitable chromophore. This makes the Thermo Scientific Vanquish UHPLC with Charged Aerosol Detection ideal for its ability to detect any non-volatile analyte with good sensitivity and reproducibility an excellent choice, with fast analysis times of 2 minutes.



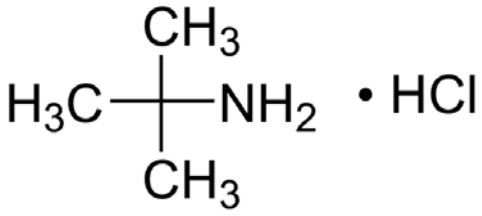
Dodecyltrimethylammonium bromide



Tetradecyltrimethylammonium bromide



Hexadecyltrimethylammonium bromide



tert-Butylammonium chloride

Figure 1. Structures of the four quaternary amine salts used for this evaluation.

HPLC column:	Thermo Scientific Vanquish C18, 1.5 µm, 2.1 x 100 mm
Mobile Phase A:	Water, 0.4% acetic acid
Mobile Phase B:	Methanol
Autosampler Temp:	18 °C
Injection Volume:	2 µL
Pre-heater Temp.:	40 °C
Column Temperature:	40 °C
Detector:	CAD, Data Rate: 20 Hz Filter: 3.6 s Evaporation Temp.: 70 °C Power Function: 1.00 Gas Mode: Analytical

Gradient

Time(min)	Flow Rate (mL/min)	%B
-1.5	0.50	10
0.0	0.60	10
0.2	0.50	70
0.8	0.47	75
0.9	0.45	100
1.0	0.45	100
1.2	0.50	10
2.0	0.50	10

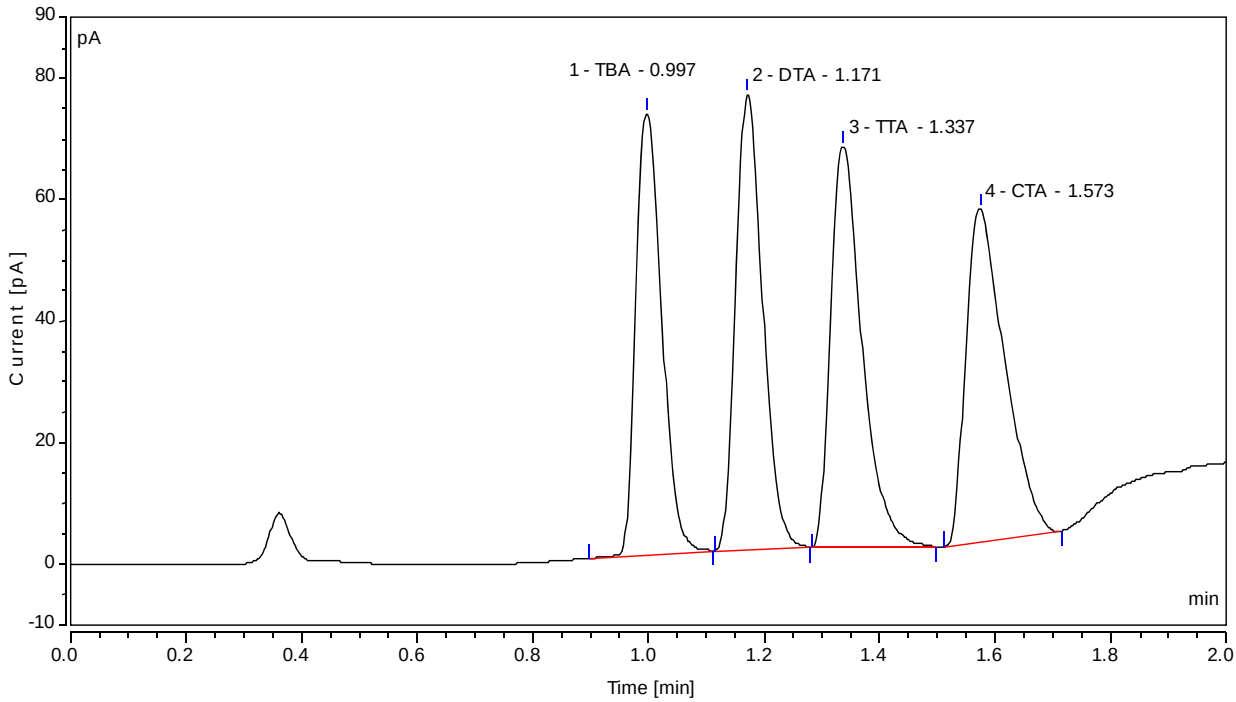


Figure 2. UHPLC-CAD chromatogram of four quaternary amines (TBA, DTA, TTA, and CTA) at 393 ng o.c.