TDCA and PFOS Separation on Kinetex™ C18 and Luna™ Omega C18 Columns

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Overview

Per- and polyfluorinated alkyl substances (PFAS) are man-made chemicals that are highly stable and strongly bioaccumulate. A significant source of PFAS environmental contamination has been the widespread use of PFAS-containing aqueous firefighting foams (AFFF), which are known to migrate into groundwaters at airports and military bases. The EPA's Office of Water, in partnership with the Department of Defense's (DoD) Strategic Environmental Research and Development Program, has published draft method 1633, a single-laboratory validated method to test for 40 PFAS compounds in various matrices.

Interfering compounds may be present at concentrations several orders of magnitude higher than the native PFAS. Because low levels of PFAS are measured by this method, elimination of interferences is essential. A bile salt check standard containing Taurodeoxycholic Acid (TDCA) or Sodium Taurodeoxychloate Hydrate is used to evaluate the chromatographic separation relative to PFOS in order to eliminate the potential risk of interference from bile salts in tissue samples when using Acetonitrile as the mobile phase. Analytical conditions must be set to allow a 1-minute separation between the check standard and PFOS. This evaluation is required when establishing the chromatographic conditions for the method, regardless of the sample matrices to be analyzed.

In this application note, under EPA 1633 draft method conditions, we show a separation of at least 1 minute is easily achieved between TDCA and PFOS on both a Kinetex C18 and a Luna Omega C18 Column. In addition, we also show the separation of the full suite of 40 PFAS compounds as required in the method.

LC Conditions

Columns: Kinetex 1.7 µm C18
Luna Omega 1.6 µm C18

Dimensions: 50 x 2.1 mm

Part No.: 00B-4475-AN (Kinetex)
00B-4742-AN (Luna)

Mobile Phase: A: Acetonitrile
B: 2 mM Ammonium Acetate in Water / Acetonitrile (95:5, v/v)

Gradient:

Time (min)	%B	Flow Rate (µL/min)
0	98	350
0.2	98	350
4	70	400
7	45	400
9	25	400
10	5	400
10.4	98	400
11.8	98	400
12	98	350
15	98	350

Injection Volume: 5 µL

Temperature: 40 °C

Instrument: Agilent® 1260 Quaternary

Detection: MS/MS

Detector: SCIEX® Triple Quad™ 4500

MS Conditions

Ion Source: Negative

Source Temperature: 600 °C

Curtain Gas (CUR): 35

Collision Gas (CAD): 7

GS1: 50

GS2: 50

Ion Spray Voltage: -4500

EP: -10

Table 1. MS/MS Transitions

Analyte	Q1 (m/z)	Q3 (m/z)
TDCA	498.3	124.1
PFOS	499	80

Figure 1. Chromatogram of PFOS and TDCA on a Kinetex™ 1.7 µm C18

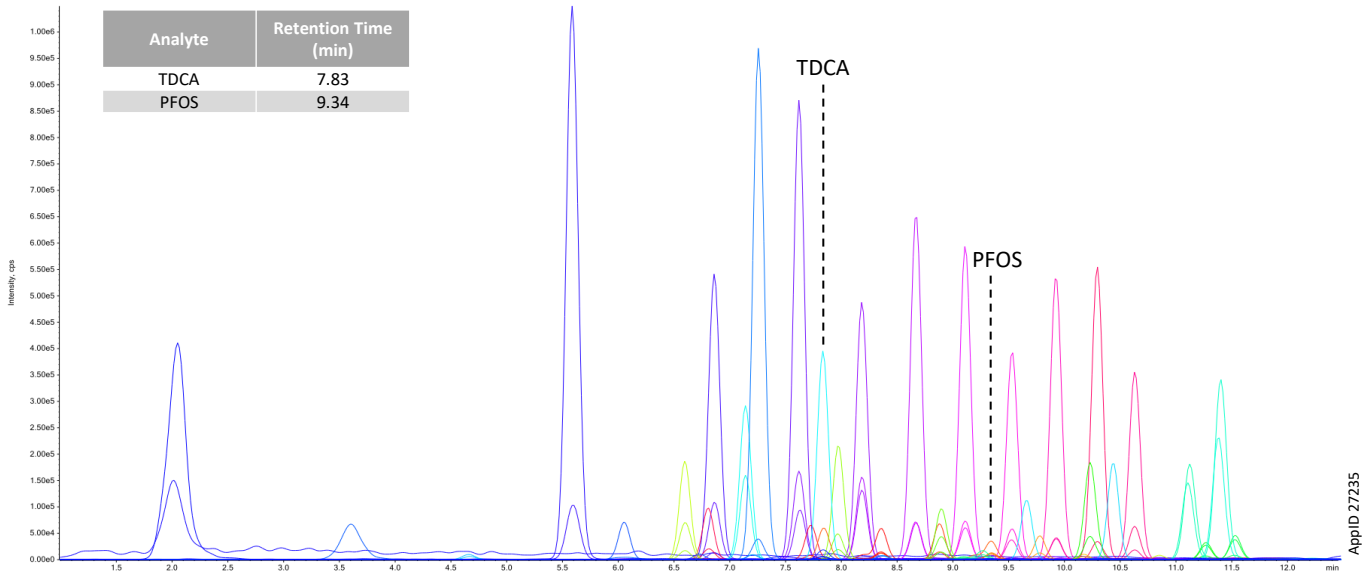
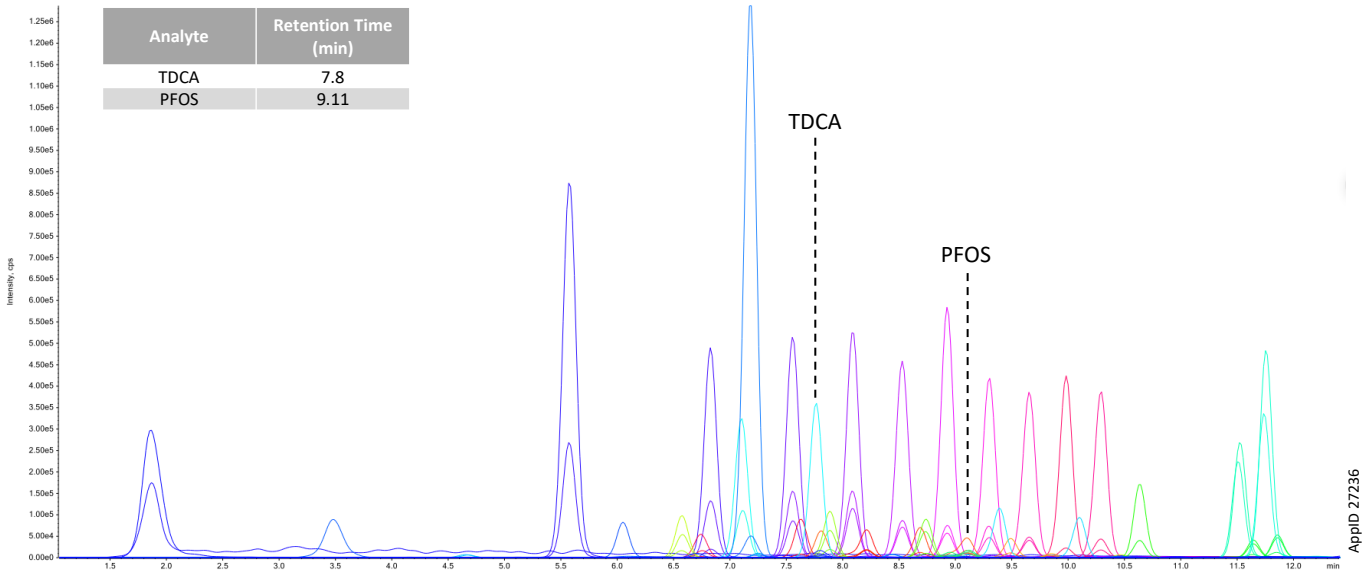


Figure 2. Chromatogram of PFOS and TDCA on a Luna™ Omega 1.6 µm C18



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