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Report Highlights:

On September 22, 2026, China's NHC and SAMR jointly released the National Food Safety Standard for Determination of Per- and Polyfluoroalkyl Substances in Foods (GB5009.253-2026). This report provides an unofficial translation of the final standard. Stakeholders should conduct their own review of the regulations to assess any market or regulatory impacts on their business.

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Summary:

On September 22, 2026, China's National Health Commission (NHC) and the State Administration for Market Regulation (SAMR) announced (link in Chinese) the National Food Safety Standard for Standard for Determination of Per- and Polyfluoroalkyl Substances in Foods (GB5009.253-2026). The standard specifically regulates determination of Per- and Polyfluoroalkyl substances in foods, and it will enter into force on February 18, 2027.

It specifies an isotope-labeled internal standard method using liquid chromatography-tandem mass spectrometry (LC-MS/MS) for the determination of 30 per- and polyfluoroalkyl substances (PFAS) in foods. It describes the method's scope and analytical principle, required reagents and materials, instruments and equipment, sample extraction and cleanup procedures, reference instrumental conditions, qualitative identification and quantitative determination, precision requirements, and the limits of detection and quantification for the target compounds.

The report provides an unofficial translation of the final standard. Stakeholders should conduct their own review of the regulations to assess any market or regulatory impacts on their business.

BEGIN UNOFFICIAL TRANSLATION

National Food Safety Standard

Determination of Per- and Polyfluoroalkyl Substances in Foods

Foreword

This standard replaces GB 5009.253-2016 'National Food Safety Standard - Determination of Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) in Animal Derived Foods'.

Compared with GB 5009.253-2016, the main changes are as follows:

— Modified the standard title;

— Added the scope of application and target analytes of the method;

— Modified the principle and analytical procedures of the standard.

1 Scope

This standard specifies the isotope dilution liquid chromatography-tandem mass spectrometry method for the determination of per- and polyfluoroalkyl substances in foods.

This standard is applicable to the determination of perfluorobutyric acid, perfluoropentanoic acid, perfluorohexanoic acid, perfluoroheptanoic acid, perfluorooctanoic acid, perfluorononanoic acid, perfluorodecanoic acid, perfluoroundecanoic acid, perfluorododecanoic acid, perfluorotridecanoic acid, perfluorotetradecanoic acid, perfluorobutanesulfonic acid, perfluoropentanesulfonic acid, perfluorohexanesulfonic acid, perfluoroheptanesulfonic acid, perfluorooctanesulfonic acid, perfluorononanesulfonic acid, perfluorodecanesulfonic acid, perfluoro-4-methylheptanoic acid, perfluoro-5-methylheptanoic acid, perfluoro-6-methylheptanoic acid, perfluoro-1-methylheptanesulfonic acid, perfluoro-3-methylheptanesulfonic acid, perfluoro-4-methylheptanesulfonic acid, perfluoro-5-methylheptanesulfonic acid, perfluoro-6-methylheptanesulfonic acid, 9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid, 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid, dodecafluoro-3H-4,8-dioxanonanoic acid, and perfluoro-2-methyl-3-oxahexanoic acid in foods.

2 Principle

An isotope-labeled internal standard is added to the test sample, which is extracted with an alkaline methanol solution (acetonitrile is used for liquid milk samples), enriched and purified using a solid-phase extraction (SPE) cartridge, analyzed by liquid chromatography-tandem mass spectrometry (LC-MS/MS), and quantified using the isotope-labeled internal standard method.

3 Reagents and Materials

Unless otherwise specified, all reagents used in this method are of analytical grade, and water is Grade 1 water as specified in GB/T 6682.

3.1 Reagents

3.1.1 Methanol (CH_3OH): Chromatographic grade.

3.1.2 Acetonitrile (CH_3CN): Chromatographic grade.

3.1.3 Formic acid (HCOOH): Chromatographic grade.

3.1.4 Sodium hydroxide (NaOH).

3.1.5 Ammonia solution ($NH_3 \cdot H_2O$): 28% to 30%.

3.2 Reagent Preparation

3.2.1 Sodium hydroxide methanol solution (50 mmol/L): Weigh 1 g (accurate to 0.001 g) of sodium hydroxide, dissolve in methanol and dilute to 500 mL.

3.2.2 2% Formic acid solution: Pipette 2 mL of formic acid, dilute with water to 100 mL.

3.2.3 Methanol/water solution (50+50): Mix methanol and water evenly at a volume ratio of 50:50.

3.2.4 2% Formic acid methanol/water solution: Pipette 2 mL of formic acid, dilute with methanol/water solution (50+50) to 100 mL.

3.2.5 9% Ammonia methanol solution: Pipette 9 mL of ammonia solution, dilute with methanol to 100 mL.

3.2.6 Ammonium formate solution (pH 4): Pipette 165 μL of formic acid, dilute with water to 500 mL, adjust pH to 4 using ammonia solution.

3.3 Standards

3.3.1 Mixed standard solution of 18 perfluoroalkyl substances: See Appendix A for details. Standard substances or their solutions with a purity of ≥ 99%.

3.3.2 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid ($C_8HF_{16}ClSO_4$, 6:2 Cl-PFESA): Standard substance or its solution with a purity of ≥ 99%.

3.3.3 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid ($C_{10}HF_{20}ClSO_4$, 8:2 Cl-PFESA): Standard substance or its solution with a purity of ≥ 99%.**3.3.4** Dodecafluoro-3H-4,8-dioxanonanoic acid ($C_7H_2F_{12}O_4$, ADONA): Standard substance or its solution with a purity of ≥ 99%.

3.3.5 Perfluoro-2-methyl-3-oxahexanoic acid ($C_6HF_{11}O_3$, HFPO-DA): Standard substance or its solution with a purity of ≥ 99%.

3.3.6 Perfluoro-1-methylheptanesulfonic acid standard solution ($C_8HF_{17}SO_3$, 1m-PFOS): Standard substance or its solution with a purity of ≥ 99%.

3.3.7 Perfluoro-3-methylheptanesulfonic acid standard solution ($C_8HF_{17}SO_3$, 3m-PFOS): Standard substance or its solution with a purity of ≥ 99%.

3.3.8 Perfluoro-4-methylheptanesulfonic acid standard solution ($C_8HF_{17}SO_3$, 4m-PFOS): Standard substance or its solution with a purity of ≥ 99%.

3.3.9 Perfluoro-4-methylheptanoic acid standard solution ($C_8HF_{15}O_2$, 4m-PFOA): Standard substance or its solution with a purity of ≥ 99%.

3.3.10 Perfluoro-5-methylheptanesulfonic acid standard solution ($C_8HF_{17}SO_3$, 5m-PFOS): Standard substance or its solution with a purity of ≥ 99%.

3.3.11 Perfluoro-5-methylheptanoic acid standard solution ($C_8HF_{15}O_2$, 5m-PFOA): Standard substance or its solution with a purity of ≥ 99%.

3.3.12 Perfluoro-6-methylheptanesulfonic acid standard solution ($C_8HF_{17}SO_3$, iso-PFOS): Standard substance or its solution with a purity of ≥ 99%.

3.3.13 Perfluoro-6-methylheptanoic acid standard solution ($C_8HF_{15}O_2$, iso-PFOA): Standard substance or its solution with a purity of ≥ 99%.

3.3.14 Mixed isotope standard solution of 13 perfluoroalkyl substances: See Appendix A for details. Isotope-labeled standard substances or their solutions with a purity of ≥ 99%.

3.3.15 Perfluoro-2-methyl-3-oxahexanoic acid isotope internal standard solution ($^{13}C_3$-HFPO-DA): Isotope-labeled standard substance or its solution with a purity of ≥ 99%.

3.4 Preparation of Standard Solutions

3.4.1 Perfluoro-2-methyl-3-oxahexanoic acid isotope internal standard intermediate solution (2 μg/mL)

Accurately pipette 200 μL of $^{13}C_3$-HFPO-DA (50 μg/mL) into a 5 mL amber volumetric flask, bring to volume with methanol, to prepare a 2 μg/mL 13C3-HFPO-DA intermediate solution. Transfer the solution into an amber glass container and store at ≤ -18°C; valid for 6 months.

3.4.2 Mixed per- and polyfluoroalkyl substances isotope internal standard working solution (50 ng/mL)

Accurately transfer 50 μL of the mixed isotope standard solution of perfluoroalkyl substances (2 μg/mL) and $^{13}C_3$-HFPO-DA intermediate solution (2 μg/mL) into a 2 mL amber volumetric flask, bring to volume with methanol, to prepare a 50 ng/mL mixed isotope internal standard working solution. Transfer the solution into an amber glass container and store at 2°C to 6°C. Prepare fresh before use.

3.4.3 Mixed calibration series standard working solutions containing isotope internal standards

Accurately transfer appropriate amounts of perfluoroalkyl mixed standard solution, polyfluoroalkyl standard solutions, PFOA and PFOS isomer standard solutions, perfluoroalkyl isotope mixed standard solution, and $^{13}C_3$-HFPO-DA intermediate solution. Stepwise dilute with methanol/water solution (50+50) to prepare series calibration solutions of different concentration points. The concentration of each standard point is shown in Appendix A, and the mass concentration of all isotopic internal standards is 2.5 ng/mL.

3.5 Materials

Mixed-mode weak anion exchange reverse-phase sorbent extraction column (150 mg, 6 mL) or equivalent.

4 Apparatus and Equipment

4.1 Liquid chromatography-tandem mass spectrometer (LC-MS/MS): Equipped with electrospray ionization (ESI) source.

4.2 High-speed centrifuge: Speed ≥ 10,000 r/min.

4.3 Analytical balance: Sensitivity of 0.001 g.

4.4 Vortex mixer.

4.5 Ultrasonic bath/shaker.

4.6 Test tube end-over-end rotator/shaker.

4.7 Solid-phase extraction (SPE) manifold.

4.8 Water bath nitrogen evaporator.

4.9 Homogenizer.

5 Analytical Procedures

5.1 Sample Pretreatment

5.1.1 Sample Preparation and Storage

For samples such as vegetables, fruits, fish, meat, and shellfish, take the edible portions (e.g. remove roots from vegetables, peel fruits, debone fish and meat, remove shells from shellfish), and homogenize into a slurry using a homogenizer for later use. Solid samples are ground using a high-speed grinder. Canned foods and similar samples are directly homogenized with a homogenizer. Fresh eggs are deshelled and homogenized. Liquid milk is mixed thoroughly before use. Store samples in polypropylene sample bottles at ≤ -18°C (except solid samples).

5.1.2 Sample Extraction

5.1.2.1 Sample Extraction (Except Liquid Milk Samples)

Weigh 1 g (accurate to 0.001 g) of thawed and homogenized sample into a 50 mL polypropylene centrifuge tube, add 10 µL of mixed isotope internal standard working solution, and mix thoroughly. Add 10 mL of sodium hydroxide methanol solution (50 mmol/L), extract by flipping on a test tube rotator for 1 h, centrifuge at 8,000 r/min for 15 min, and take out the supernatant. Evaporate to near dryness (< 500 µL) under a nitrogen stream in a 40°C water bath, add 8 mL of water, mix thoroughly, and await purification.

5.1.2.2 Liquid Milk Sample Extraction

Weigh 2 g (accurate to 0.001 g) of liquid milk sample into a 15 mL polypropylene centrifuge tube, add 10 µL of mixed isotope internal standard working solution, and mix thoroughly. Add 6 mL of acetonitrile, ultrasonically extract for 20 min, centrifuge at 8,000 r/min for 10 min, and collect the supernatant into another 15 mL polypropylene centrifuge tube. Add 6 mL of acetonitrile to the residue and repeat the extraction process. Combine the two supernatants, evaporate to near dryness (< 500 µL) under a nitrogen stream in a 40°C water bath, add 8 mL of water, mix thoroughly, and await purification.

5.1.3 Sample Purification

Centrifuge the above extract at 8,000 r/min for 15 minutes. Load all the supernatant onto a conditioned mixed-mode weak anion exchange reverse-phase extraction column (conditioned sequentially with 6 mL 9% ammonia methanol solution, 6 mL methanol, and 6 mL water). Rinse sequentially with 2 mL 2% formic acid solution, 2 mL 2% formic acid methanol/water solution, and 2 mL methanol; discard all effluents. Elute with 3 mL 9% ammonia methanol solution (without drying the extraction column). Evaporate the eluate to dryness under nitrogen in a 40°C water bath. Accurately add 0.2 mL methanol/water solution (50+50) to dissolve the residue, transfer to a 1.5 mL centrifuge tube, centrifuge at 10,000 r/min for 15 min, and collect the supernatant for testing.

5.2 Instrumental Reference Conditions

5.2.1 Liquid Chromatography Reference Conditions

a) Analytical column: Pentafluorophenyl (PFP) column 2.1 mm × 150 mm, 1.8 μm, or equivalent column.
b) Pre-adsorption column: Two C18 columns (2.1 mm × 5 mm, 1.7 μm) in series, or equivalent, connected between the LC pump mixer outlet and the autosampler six-port valve [avoid using LC tubing and accessories containing per- and polyfluoroalkyl substances; if background contamination is below the limit of detection, the pre-adsorption column is not required].
c) Column temperature: 40°C.
d) Injection volume: 10 μL.
e) Flow rate: 0.2 mL/min.
f) Mobile phase A: Methanol; Mobile phase B: Ammonium formate solution (pH 4); Gradient elution program is listed in Table 1.

Table 1. Gradient Elution Program for the Mobile Phase

Time (min)	Methanol (%)	Ammonium Formate Solution (pH 4) (%)
0.00	40.0	60.0
2.00	60.0	40.0
8.00	60.0	40.0
10.00	75.0	25.0
15.00	100.0	0.0
20.00	100.0	0.0
20.10	40.0	60.0
25.00	40.0	60.0

5.2.2 Mass Spectrometry Reference Conditions

a) Ion source: Electrospray Ionization in negative ion mode (ESI-).
b) MS scanning mode: Multiple Reaction Monitoring (MRM).
c) Capillary voltage: 0.95 kV.
d) Ion source temperature: 120°C.
e) Desolvation temperature: 400°C.
f) Desolvation gas flow rate: 800 L/h.

g) Collision gas flow rate: 0.30 mL/min.
h) Characteristic ions: See Appendix B for details.

5.3 Calibration Curve Preparation

Inject standard working calibration solutions into the LC-MS/MS system, measure peak areas, and plot calibration curves with analyte concentration as X-axis and peak area ratio of analyte to corresponding isotope internal standard as Y-axis. Chromatograms of standard solutions are shown in Appendix B.

5.4 Sample Solution Determination

Inject test sample solution into LC-MS/MS, measure peak areas, obtain peak area ratio of target compound to internal standard, and calculate analyte concentration in test solution according to calibration curve.

5.5 Qualitative Determination

The retention time of the chromatographic peak of the target compound in the test sample shall be compared with that of the corresponding peak in the standard solution, and the deviation shall be within ±2.5%.

Table 2. Maximum Permissible Deviation in Relative Ion Abundance for Qualitative Identification

Relative Ion Abundance (k) (%)	$k \geq 50$	$20 \leq k < 50$	$10 \leq k < 20$	$k < 10$
Maximum Permissible Deviation (%)	±20	±25	±30	±50

The mass spectrometric qualitative ions for each compound shall be detected and shall include one precursor ion and two product ions. For certain compounds, only one product ion is available; in such cases, qualitative identification shall be performed in conjunction with the retention time of the corresponding chromatographic peak in the standard solution. Within the same analytical batch, the relative abundance ratio of the two product ions of a target compound in the sample shall be compared with that in a standard solution of a comparable concentration, and the allowable deviation shall not exceed the range specified in Table 2.

5.6 Quantitative Determination

Calculate the ratio of the peak area of each per- and polyfluoroalkyl substance (PFAS) to that of its corresponding isotope-labeled internal standard, and perform quantitative analysis using the

internal standard method. Determine the concentration of the analyte in the test solution or blank solution from the calibration curve. The response values of the analytes in both the standard working solutions and the test solutions shall fall within the linear response range of the calibration curve. If the analyte concentration exceeds the calibration range, adjust the sample weight and repeat the analysis.

5.7 Blank Test

All procedures shall be the same as those for the test sample, except that no test sample is added.

6 Expression of Results

The content of per- and polyfluoroalkyl substances in the test sample is calculated according to Formula (1):

$$X = [(C - C0) \times V \times 1000] / [m \times 1000] \quad \text{----------(1)}$$

Where:
X — the content of the per- and polyfluoroalkyl substance (PFAS) to be determined in the test sample, expressed in micrograms per kilogram (μg/kg);
C — the mass concentration of the PFAS to be determined in the test solution, obtained from the calibration curve, expressed in micrograms per liter (μg/L);
C0 — the mass concentration of PFAS in the blank solution, obtained from the calibration curve, expressed in micrograms per liter (μg/L);
V — the final volume of the test solution, expressed in milliliters (mL);
m — the mass of the test sample, expressed in grams (g).
The calculation result shall be reported to two significant figures.

7 Precision

The absolute difference between two independent determination results obtained under repeatability conditions shall not exceed 30% of the arithmetic mean.

8 Others

When 1 g of the test sample is weighed (2 g for liquid milk samples), the limits of detection and quantification for per- and polyfluoroalkyl substances (PFAS) using this method are specified in Table 3.

Table 3 — Limits of Detection and Quantification of Per- and Polyfluoroalkyl Substances in Foods

Compound Name	Abbreviation	LOD (µg/kg)	LOQ (µg/kg)
Perfluorobutyric acid	PFBA	0.007	0.020
Perfluoropentanoic acid	PFPeA	0.007	0.020
Perfluorohexanoic acid	PFHxA	0.007	0.020
Perfluoroheptanoic acid	PFHpA	0.007	0.020
Perfluoro-4-methylheptanoic acid	4m-PFOA	0.015	0.045
Perfluoro-5-methylheptanoic acid	5m-PFOA	0.013	0.039
Perfluoro-6-methylheptanoic acid	iso-PFOA	0.021	0.062
Perfluorooctanoic acid	PFOA	0.007	0.020
Perfluorononanoic acid	PFNA	0.007	0.020
Perfluorodecanoic acid	PFDA	0.007	0.020
Perfluoroundecanoic acid	PFUdA	0.007	0.020
Perfluorododecanoic acid	PFDoA	0.007	0.020
Perfluorotridecanoic acid	PFTrDA	0.007	0.020
Perfluorotetradecanoic acid	PFTeDA	0.007	0.020
Perfluorobutanesulfonic acid	PFBS	0.007	0.020
Perfluoropentanesulfonic acid	PFPeS	0.007	0.020

Perfluorohexanesulfonic acid	PFHxS	0.007	0.020
Perfluoroheptanesulfonic acid	PFHpS	0.007	0.020
Perfluoro-1-methylheptanesulfonic acid	1m-PFOS	0.007	0.020
Perfluoro-3-methylheptanesulfonic acid / Perfluoro-4-methylheptanesulfonic acid	3m+4m-PFOS	0.013	0.040
Perfluoro-5-methylheptanesulfonic acid	5m-PFOS	0.007	0.020
Perfluoro-6-methylheptanesulfonic acid	iso-PFOS	0.007	0.020
Perfluorooctanesulfonic acid	PFOS	0.007	0.020
Perfluorononanesulfonic acid	PFNS	0.007	0.020
Perfluorodecanesulfonic acid	PFDS	0.007	0.020
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	6:2 Cl-PFESA	0.007	0.020
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	8:2 Cl-PFESA	0.007	0.020
Dodecafluoro-3H-4,8-dioxanonanoic acid	ADONA	0.007	0.020

Perfluoro-2-methyl-3-oxahexanoic acid	HFPO-DA	0.030	0.100

Appendix A: Information on PFAS Reference Standards, Mass Spectrometric Acquisition Parameters, and Calibration Series

Tables A.1, A.2, and A.3 provide, respectively, information on the reference standards for the mixed standard solution containing 30 per- and polyfluoroalkyl substances (PFAS) and the mixed isotope-labeled standard solution containing 14 isotopically labeled standards; the mass spectrometric acquisition parameters for PFAS; and the concentrations of the calibration series solutions.

Table A.1 — Information on the Reference Standards for the Mixed Standard Solution Containing 30 PFAS and the Mixed Isotope-Labeled Standard Solution Containing 14 Isotopically Labeled Standards

Compound	Formula	CAS No.	MassConc. (µg/mL)	Quantification Internal Standard
PFBA	C4HF7O2	375-22-4	2.0	13C4-PFBA
PFPeA	C5HF9O2	2706-90-3	2.0	13C5-PFPeA
PFHxA	C6HF11O2	307-24-4	2.0	13C5-PFHxA
PFHpA	C7HF13O2	375-85-9	2.0	13C4-PFHpA
4m-PFOA	C8HF15O2	1144512-18-4	2.20	13C8-PFOA
5m-PFOA	C8HF15O2	909009-42-3	1.96	13C8-PFOA
iso-PFOA	C8HF15O2	15166-06-0	3.10	13C8-PFOA
PFOA	C8HF15O2	335-67-1	2.0	13C8-PFOA
PFNA	C9HF17O2	375-95-1	2.0	13C9-PFNA
PFDA	C10HF19O2	335-76-2	2.0	13C6-PFDA
PFUdA	C11HF21O2	2058-94-8	2.0	13C7-PFUdA
PFDoA	C12HF23O2	307-55-1	2.0	13C2-PFDoA

PFTrDA	C13HF25O2	72629-94-8	2.0	13C2-PFDoA
PFTeDA	C14HF27O2	376-06-7	2.0	13C2-PFTeDA
PFBS	C4HF9O3S	375-73-5	2.0	13C3-PFBS
PFPeS	C5HF11O3S	2706-91-4	2.0	13C3-PFBS
PFHxS	C6HF13O3S	355-46-4	2.0	18O2-PFHxS
PFHpS	C7HF15O3S	375-92-8	2.0	18O2-PFHxS
1m-PFOS	C8HF17O3S	927670-12-0	1.00	13C8-PFOS
3m-PFOS	C8HF17O3S	-	1.00	13C8-PFOS
4m-PFOS	C8HF17O3S	-	1.00	13C8-PFOS
5m-PFOS	C8HF17O3S	747385-21-3	1.00	13C8-PFOS
iso-PFOS	C8HF17O3S	255831-20-0	1.00	13C8-PFOS
PFOS	C8HF17O3S	1763-23-1	2.0	13C8-PFOS
PFNS	C9HF19O3S	68259-12-1	2.0	13C8-PFOS
PFDS	C10HF21O3S	335-77-3	2.0	13C8-PFOS
6:2 Cl-PFESA	C8HClF16O4S	756426-58-1	50	13C8-PFOS
8:2 Cl-PFESA	C10HClF20O4S	763051-92-9	50	13C8-PFOS
ADONA	C7H2F12O4	919005-14-4	50	13C8-PFOA
HFPO-DA	C6HF11O3	13252-13-6	50	13C3-HFPO-DA

Table A.2: Mass Spectrometry Parameters for Target Compounds

Compound	Precursor Ion (m/z)	Product Ion (m/z)	Cone Voltage (V)	Collision Energy (eV)
PFBA	213	169	10	10

$^{13}C_4$-PFBA	217	172	10	10
PFPeA	263	219	12	10
$^{13}C_5$-PFPeA	268	223	12	10
PFHxA	313	269*	15	10
	313	119	15	17
$^{13}C_5$-PFHxA	318	273	15	12
PFHpA	363	319*	15	12
	363	169	15	15
$^{13}C_4$-PFHpA	367	322	15	12
4m-PFOA	413	119*	15	25
	413	369	15	10
5m-PFOA	413	219*	15	15
	413	369	15	10
iso-PFOA	413	369*	15	10
	413	219	15	15
PFOA	413	369*	15	10
	413	219	15	15
$^{13}C_8$-PFOA	421	376	15	10
PFNA	463	419*	13	12
	463	219	13	13
$^{13}C_9$-PFNA	472	427	13	12
PFDA	513	469*	15	10
	513	269	15	15
$^{13}C_6$-PFDA	519	474	15	10

PFUdA	563	519*	13	13
	563	269	13	17
$^{13}C_7$-PFUdA	570	525	13	13
PFDoA	613	569*	15	14
	613	319	15	17
13C2-PFDoA	615	570	15	14
PFTrDA	663	619*	16	14
	663	169	16	22
PFTeDA	713	669*	17	15
	713	319	17	20
13C2-PFTeDA	715	670	17	15
PFBS	299	80*	50	35
	299	99	50	35
13C3-PFBS	302	80	50	35
PFPeS	349	80*	50	35
	349	99	50	35
PFHxS	399	80*	50	35
	399	99	50	35
18O2-PFHxS	402	80	50	35
PFHpS	449	80*	50	35
	449	99	50	35
1m-PFOS	499	419*	40	25
3m+4m-PFOS	499	80*	50	48
	499	99	50	48

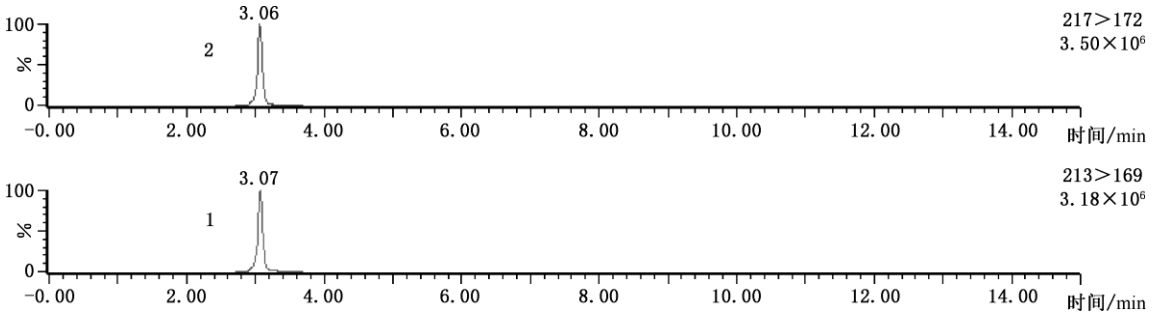
5m-PFOS	499	80*	50	48
	499	99	50	48
iso-PFOS	499	80*	50	48
	499	99	50	48
PFOS	499	80*	50	48
	499	99	50	48
$^{13}C_8$-PFOS	507	80	50	48
PFNS	549	80*	50	48
	579	99	50	48
PFDS	599	80*	50	48
	599	99	50	48
6:2 Cl-PFESA	531	351*	50	24
	531	83	50	24
8:2 Cl-PFESA	631	451*	50	24
	631	83	50	24
ADONA	377	251*	15	10
	377	85	15	12
HFPO-DA	285	169*	10	10
	285	185	10	15
$^{13}C_3$-HFPO-DA	287	169	10	10
Note 1: 3m + 4m-PFOS includes 3m-PFOS and 4m-PFOS. These two isomers are quantified together, while all other target compounds are quantified individually. Note 2: If matrix interference peaks occur in the quantitative ion channels for PFHxS (399 > 80) and PFOS (499 > 80), the corresponding qualitative ions may be used for quantification.				
* indicates quantitative ion.				

Table A.3: Concentration Levels of Calibration Standard Working Solutions (ng/mL)

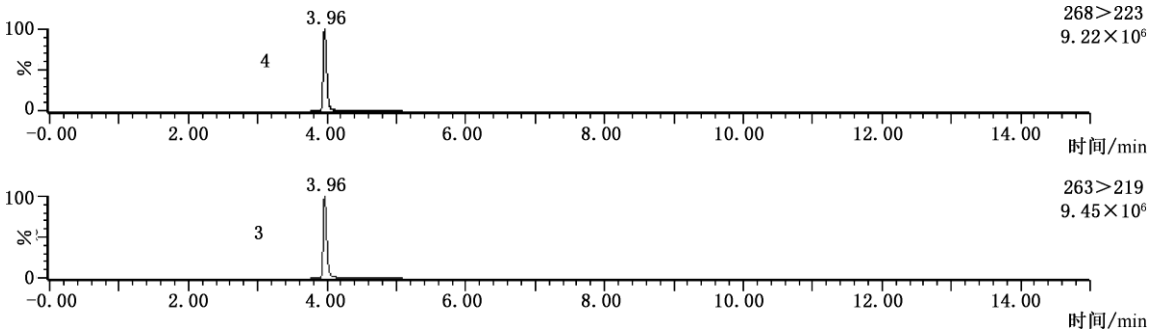
Compound	Level 1	Level 2	Level 3	Level 4	Level 5
PFBA	0.1	0.5	2.5	10	50
PFPeA	0.1	0.5	2.5	10	50
PFH xA	0.1	0.5	2.5	10	50
PFH pA	0.1	0.5	2.5	10	50
4 m-PFOA	0.22	1.1	2.2	11	22
5 m-PFOA	0.196	0.98	1.96	9.8	19.6
iso-PFOA	0.31	1.55	3.1	15.5	31
PFOA	0.1	0.5	2.5	10	50
PFN A	0.1	0.5	2.5	10	50
PFDA	0.1	0.5	2.5	10	50
PFUdA	0.1	0.5	2.5	10	50
PFDoA	0.1	0.5	2.5	10	50
PFTrDA	0.1	0.5	2.5	10	50
PFTeDA	0.1	0.5	2.5	10	50
PFBS	0.1	0.5	2.5	10	50
PFPeS	0.1	0.5	2.5	10	50
PFH xS	0.1	0.5	2.5	10	50
PFH pS	0.1	0.5	2.5	10	50
1m-PFOS	0.1	0.5	1	5	10
3 m +4 m-PFOS	0.2	1	2	10	20
5 m-PFOS	0.1	0.5	1	5	10
iso-PFOS	0.1	0.5	1	5	10
PFOS	0.1	0.5	2.5	10	50
PFNS	0.1	0.5	2.5	10	50
PFDS	0.1	0.5	2.5	10	50
6:2 Cl-PFESA	0.1	0.5	2.5	10	50
8:2Cl-PFESA	0.1	0.5	2.5	10	50
ADO N A	0.1	0.5	2.5	10	50
HFPO -DA	0.5	2.5	12.5	50	250

Appendix B Ion Channel Chromatograms of the 30 Per- and Polyfluoroalkyl Substances (at the Third Concentration Level of the Calibration Series) and Isotope-Labeled Internal Standards

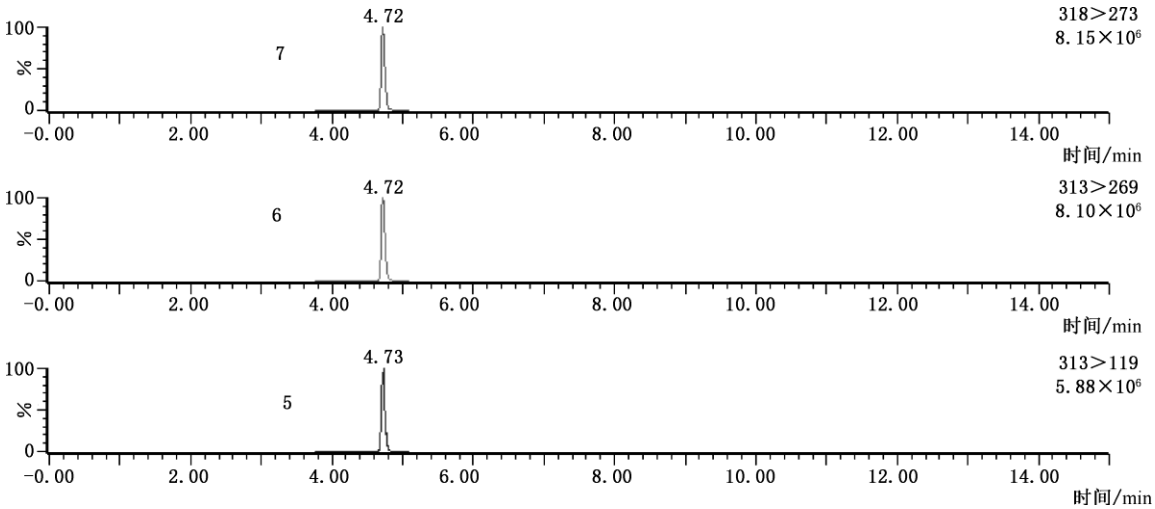
The ion channel chromatograms of the 30 per- and polyfluoroalkyl substances (at the third concentration level of the calibration series) and isotope-labeled internal standards are shown in Figure B.1



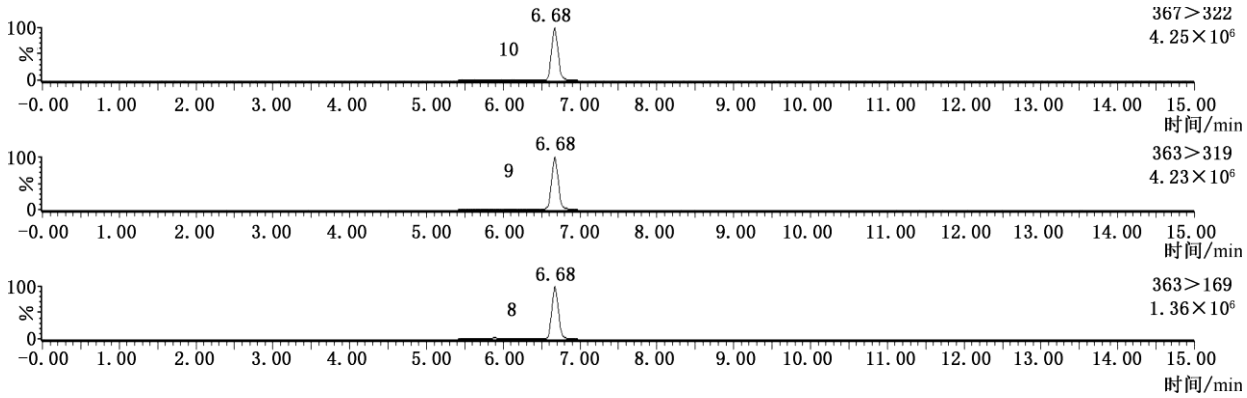
a) Extracted ion chromatograms of PFBA and its isotopic internal standard



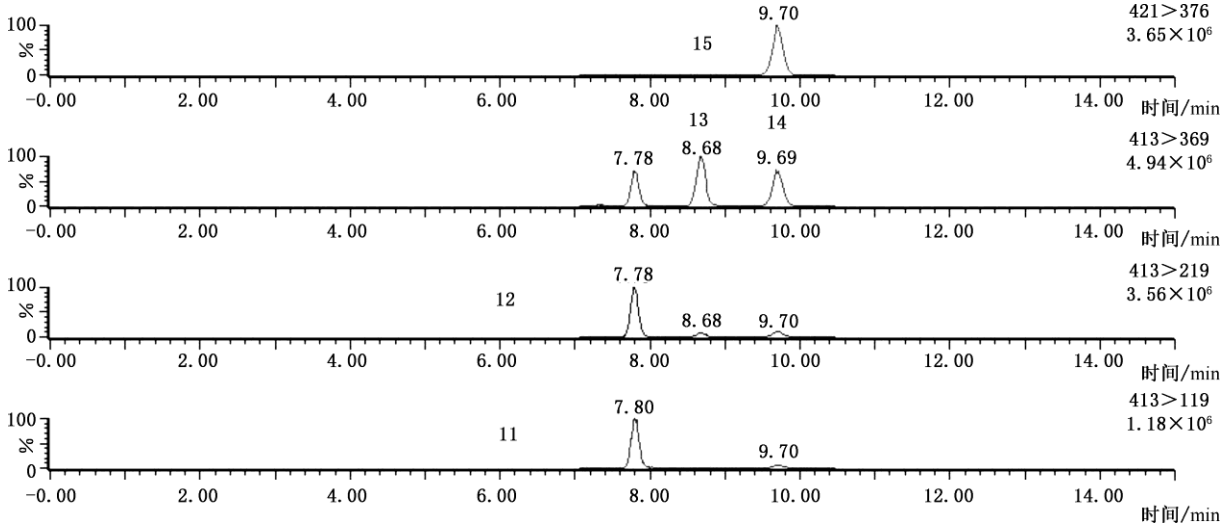
b) Extracted ion chromatograms of PFPeA and its isotopic internal standard



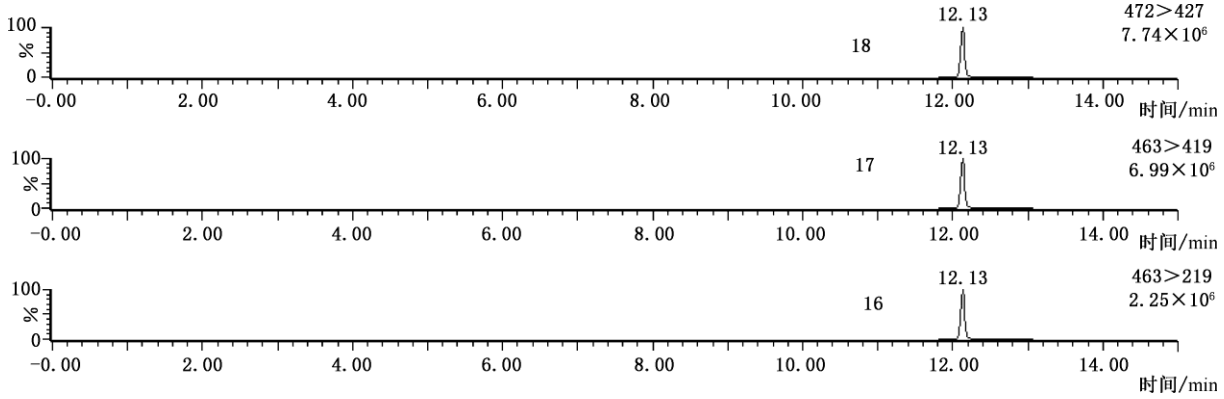
c) Extracted ion chromatograms of PFHxA and its isotopic internal standard



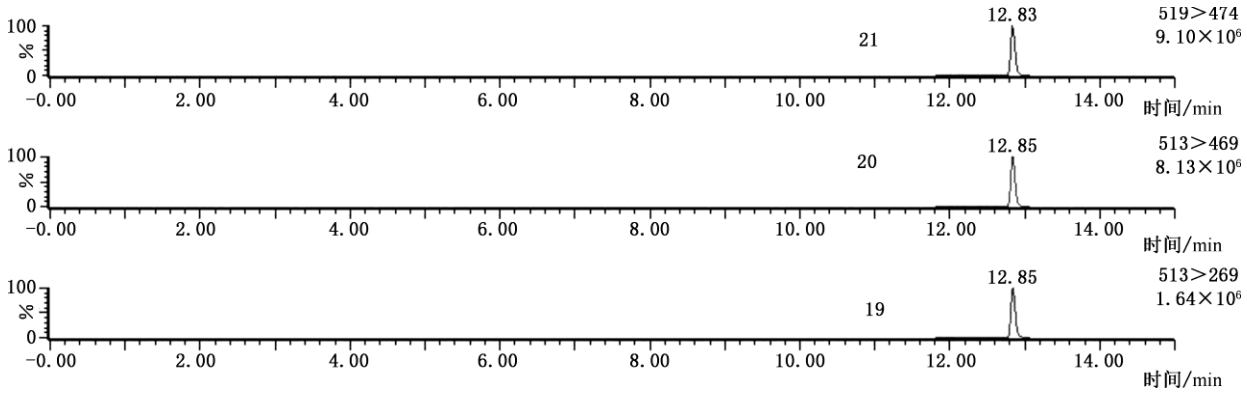
d) Extracted ion chromatograms of PFHpA and its isotopic internal standard



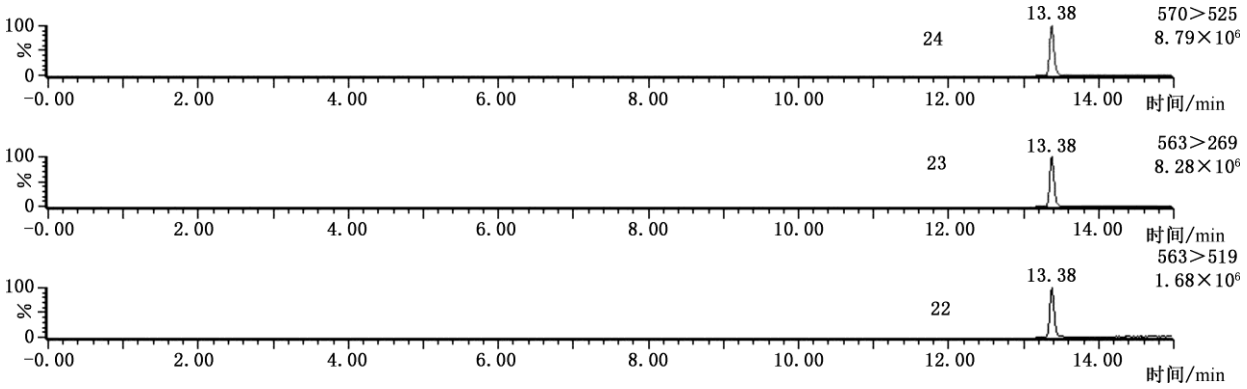
e) Extracted ion chromatograms of 4m-PFOA,5m-PFOA,iso-PFOA,PFOA and their isotopic internal standard



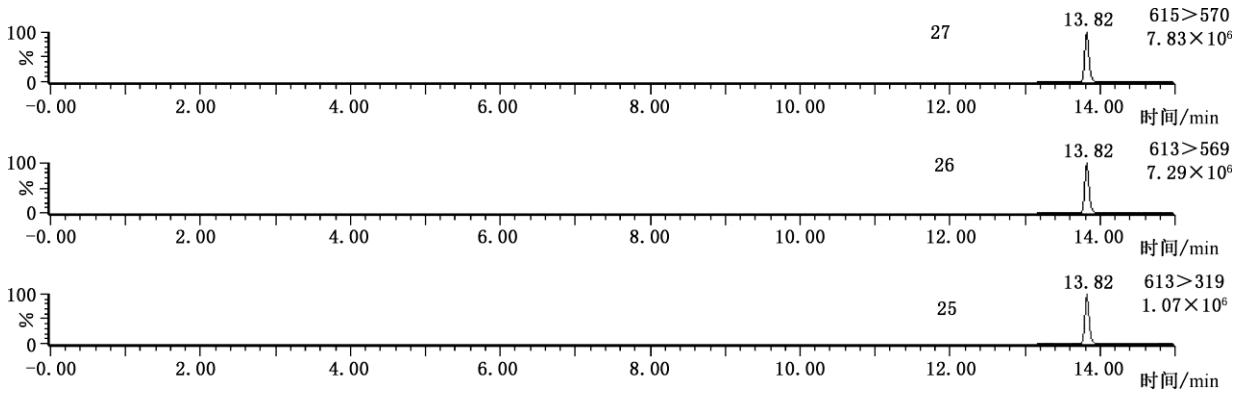
f) Extracted ion chromatograms of PFNA and its isotopic internal standard



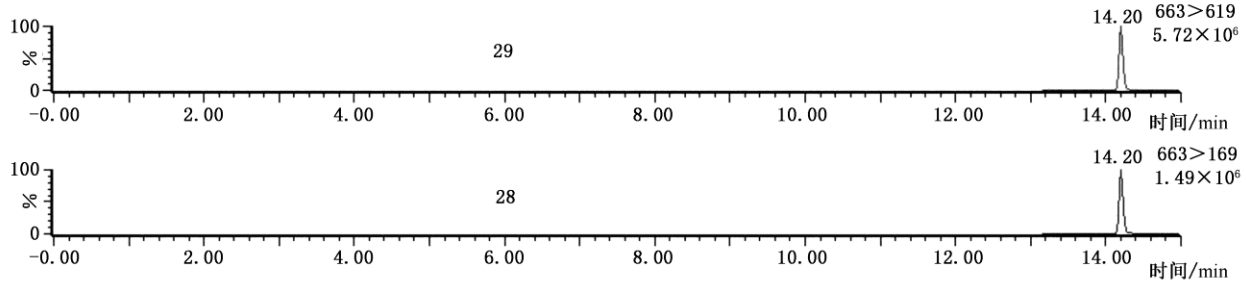
g) Extracted ion chromatograms of PFDA and its isotopic internal standard



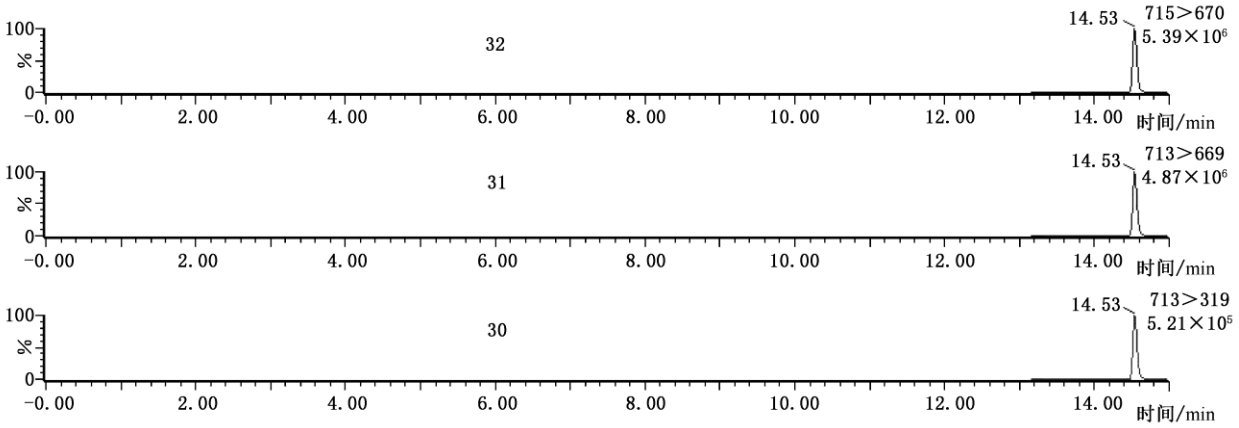
h) Extracted ion chromatograms of PFUdA and its isotopic internal standard



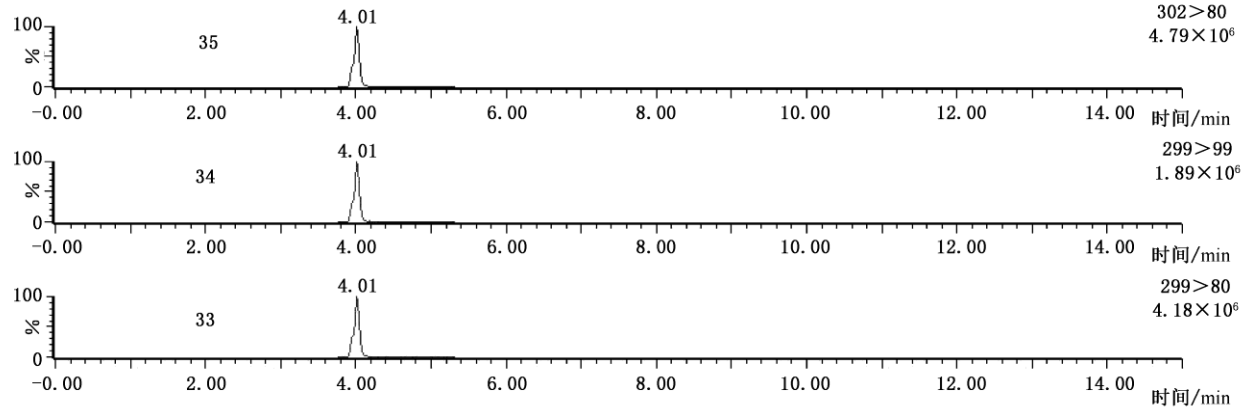
i) Extracted ion chromatograms of PFDoA and its isotopic internal standard



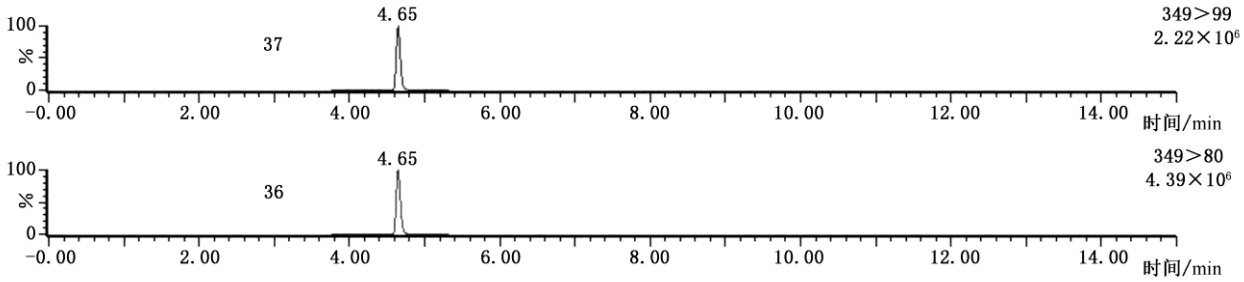
j) Extracted ion chromatograms of PFTrDA



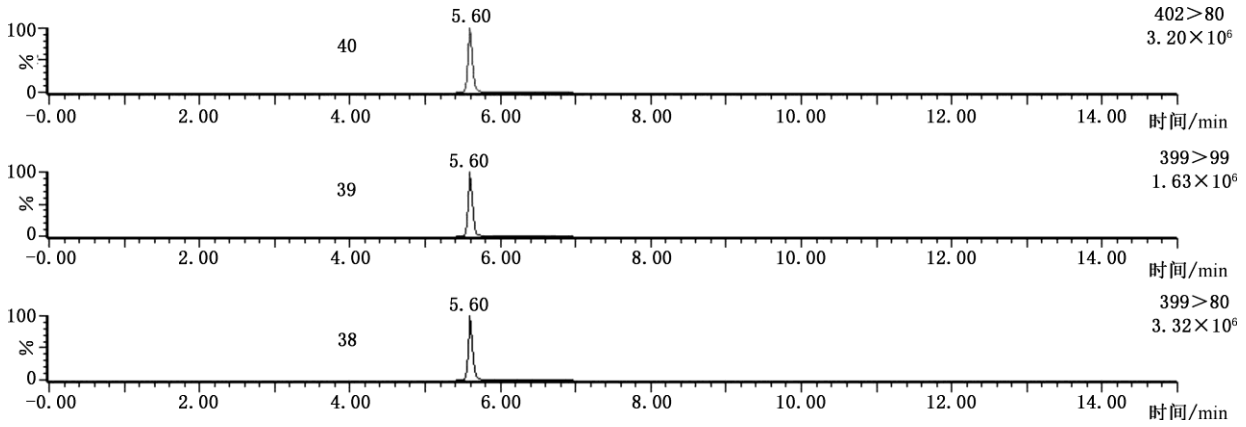
k) Extracted ion chromatograms of PFTeDA and its isotopic internal standard



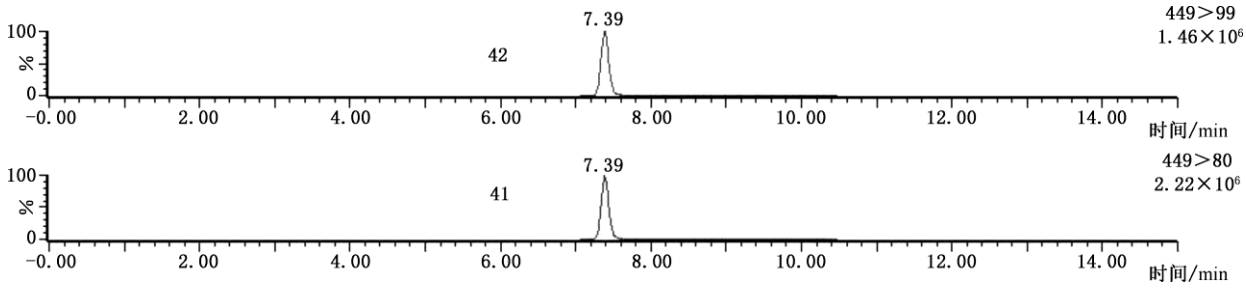
l) Extracted ion chromatograms of PFBS and its isotopic internal standard



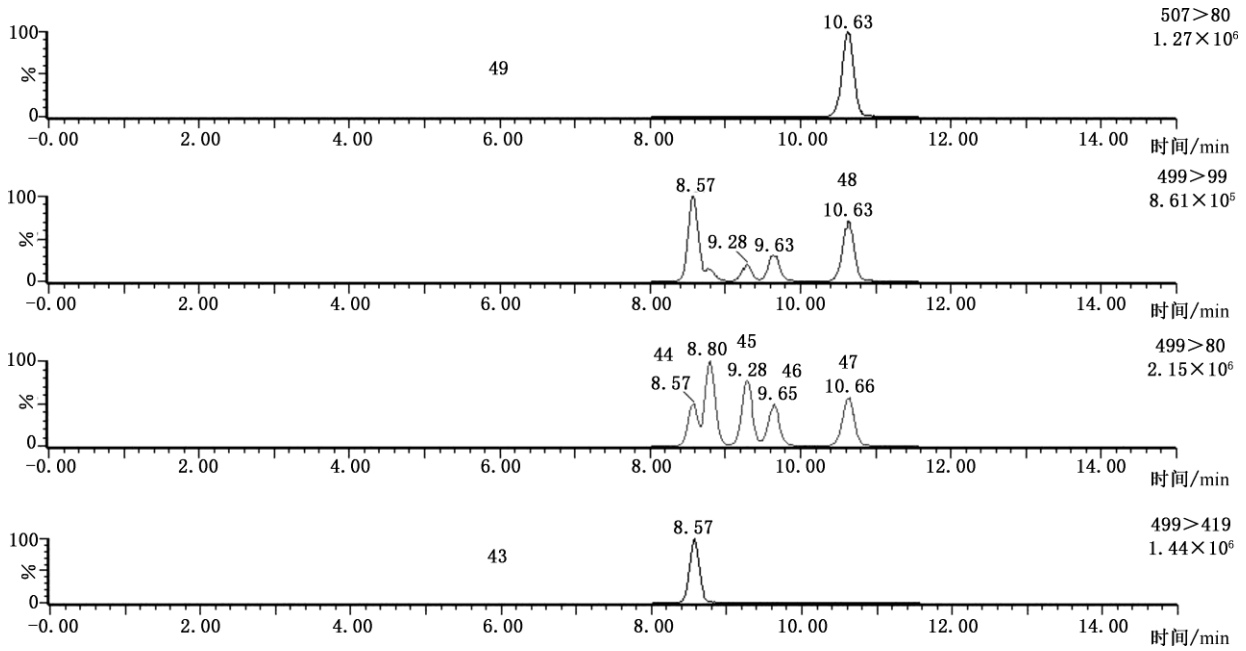
m) Extracted ion chromatograms of PFPeS



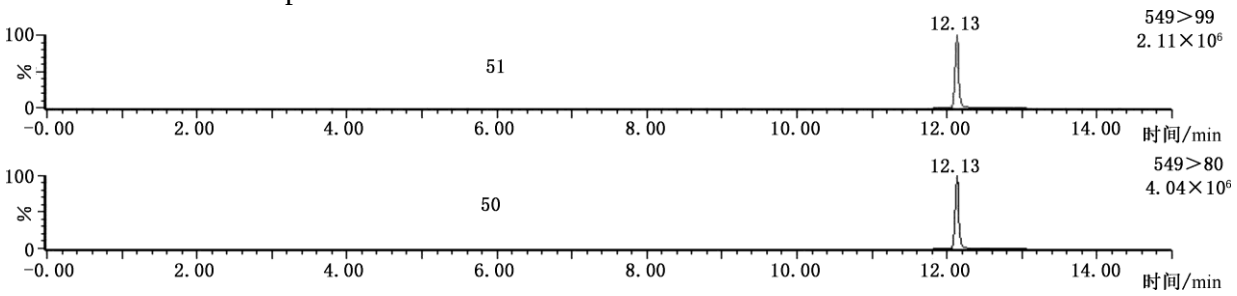
n) Extracted ion chromatograms of PFHxS and its isotopic internal standard



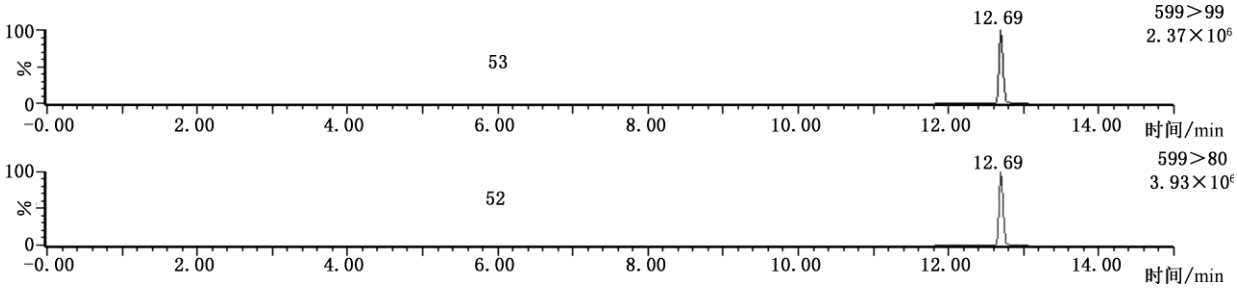
o) Extracted ion chromatograms of PFHpS



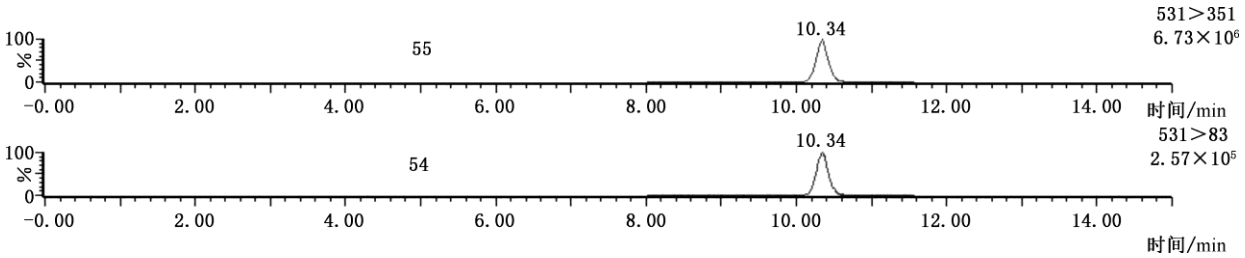
p) Extracted ion chromatograms of 1m-PFOS, 3m+4m-PFOS, 5m-PFOS, iso-PFOS, PFOS, and their isotopic internal standard



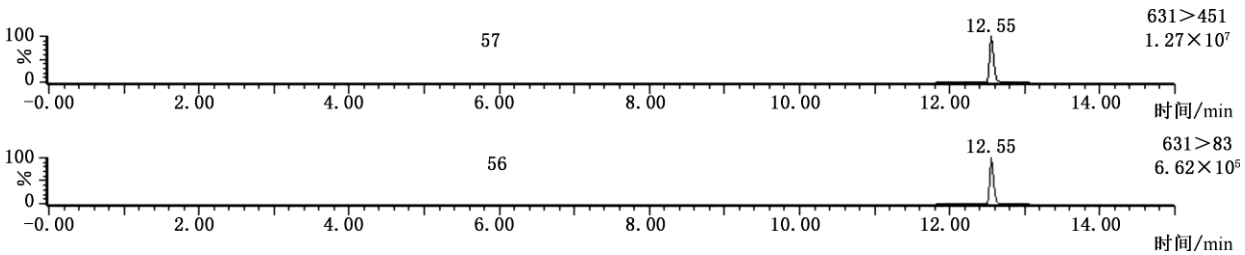
q) Extracted ion chromatograms of PFNS



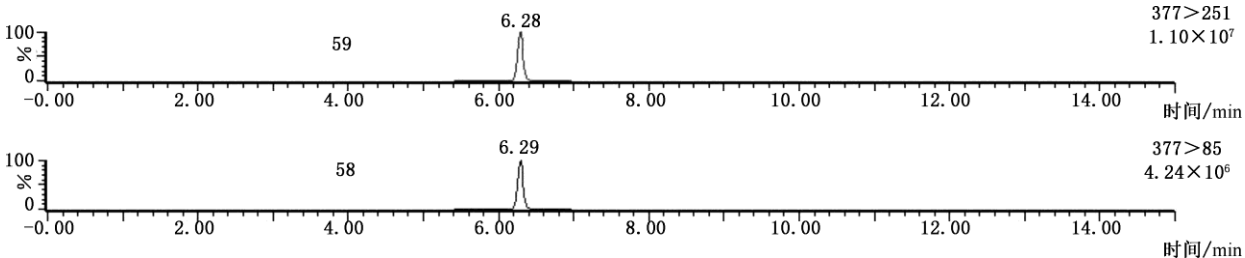
r) Extracted ion chromatograms of PFDS



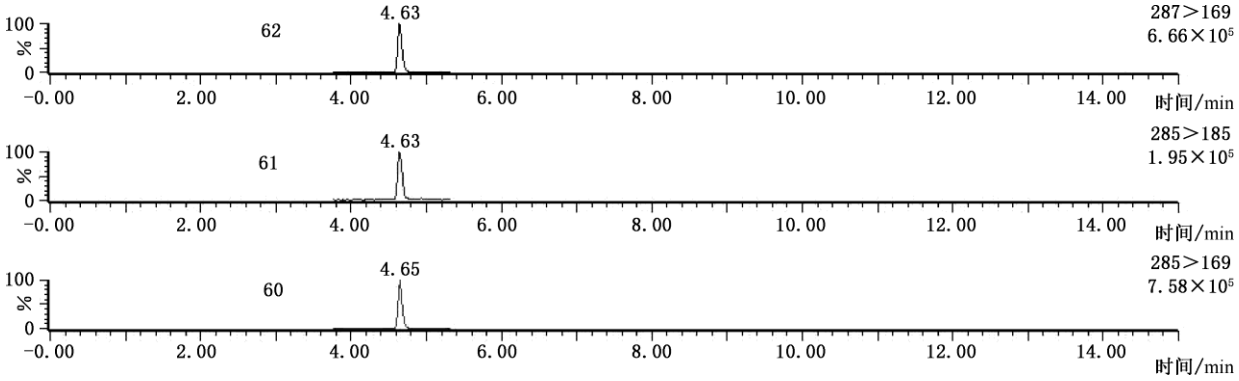
s) Extracted ion chromatograms of6:2 Cl-PFESA



t) Extracted ion chromatograms of8:2 Cl-PFESA



u) Extracted ion chromatograms of ADONA



v) Extracted ion chromatograms of HFPO-DA and its isotopic internal standard

Description of index numbers

1——— PFBA 213>169;

2———13 C4 -PFBA 217>172;

3——— PFPeA263>219;

4———13 C5 -PFPeA268>223;

5——— PFH xA313>119;

6——— PFH xA313>269;

7———13 C5 -PFH xA318>273;

8——— PFH pA363>169;

9——— PFH pA363>319;

10———13 C4 -PFH pA367>322;

11———4 m-PFO A413>119;

12———5 m-PFO A413>219;

13———iso-PFO A413>369;

14——— PFO A413>369;

15———13 C8 -PFO A421>376;

16——— PFN A463>219;

17——— PFN A463>419;

18———13 C9 -PFN A472>427;

19——— PFDA513>269;

20——— PFDA513>469;

21———13 C6 -PFDA519>474;

22——— PFUdA5 63>519;

23——— PFUdA5 63>269;

24———13 C7 -PFUdA570>525;

25——— PFDoA613>319;

26——— PFDoA613>5 69;

27———13 C2 -PFDoA615>570;

28——— PFTrDA6 63>169;

29——— PFTrDA6 63> 619;

30——— PFTeDA713>319;

31——— PFTeDA713> 669;

32———13 C2 -PFTeDA715> 670;

33——— PFBS299>80;

34——— PFBS299> 99;

35———13 C3 -PFBS302>80;

36——— PFPeS349>80;

37——— PFPeS349> 99;

38——— PFH xS399>80;

39——— PFH xS399> 99;

40———13 C3 -PFH xS402>80;

41——— PFH pS449>80;

42——— PFH pS449> 99;

43———1m-PFOS499>419;

44———3 m +4 m-PFOS499>80;

45———5 m-PFOS499>80;

46———iso-PFOS499>80;

47——— PFOS499>80;

48——— PFOS499> 99;

49———13 C8 -PFOS507>80;

50——— PFNS549>80;

51——— PFNS549> 99;

52——— PFDS5 99>80;

53——— PFDS5 99> 99;

54——— 6：2Cl-PFESA531>83;

55——— 6：2Cl-PFESA531>351;

56———8：2Cl-PFESA631>83;

57———8：2Cl-PFESA631>451;

58——— ADO N A377>85;

59——— ADO N A377>251;

60——— H FPO -DA285>169;

61——— H FPO -DA285>185;

62———13 C3 -H FPO -DA287>169

END UNOFFICIAL TRANSLATION

Attachments:

No Attachments.