PFAS

THE PROBLEM

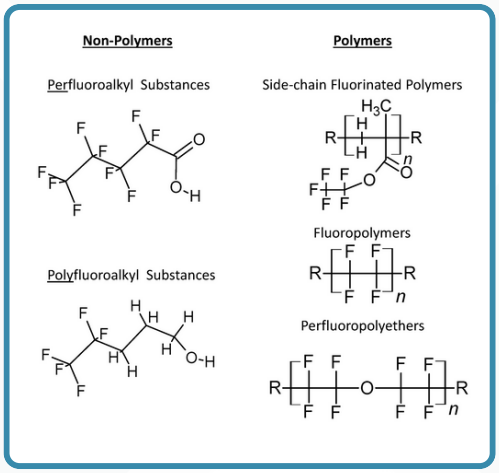
SAFE SUSTAINABLE SOLUTIONS

Analytical Approach to Manage PFAS-Related Regulatory Requirements

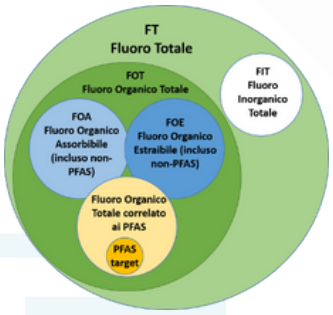
Perfluoroalkyl substances (PFAS) are a group of several thousand synthetic organic substances characterized by a fully fluorinated hydrophobic alkyl chain of variable length (4-16 carbon atoms) and a hydrophilic end. It is a family containing a very large number of substances.

Official classifications:

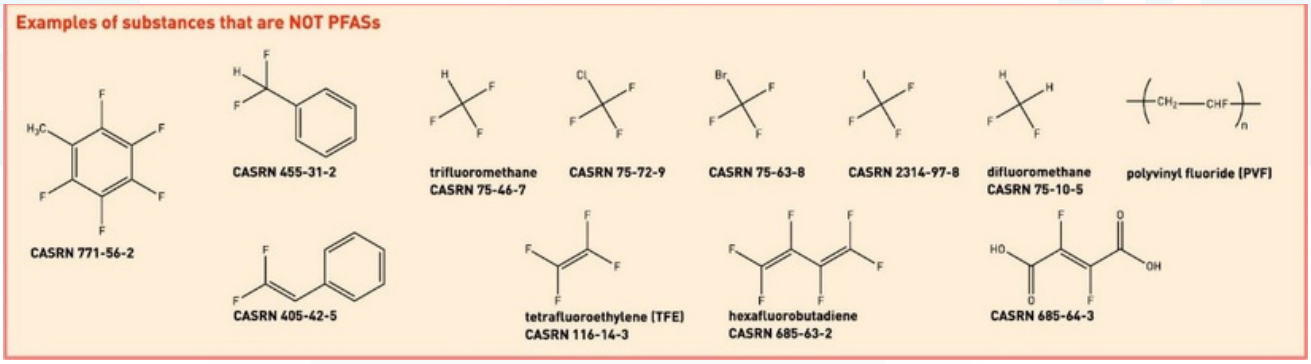
~**4700** PFAS with at least 3 perfluorinated Cs [OECD]
~**10700** PFAS Listate for EPA [DSSTox DB]
PFAS are under global scrutiny and content limits in food, water, and consumer goods have currently been published. ECHA is considering bans on use. To date, many companies on the FCM market have to counter analytical results related to TOF values, which is the reference limit in some legislations such as the Danish and Californian ones.



Why Total Fluoride Is Not Enough?



- Also includes inorganic fluorine that may be present in the sample.
- It is misleading because high total fluorine values do not always correspond to elevated PFAS concentrations in the sample, there are numerous fluorine-containing organic compounds that do not fall within the definition of PFAS, **as illustrated for example in the work Environ. Sci. Technol. 2021, 55, 23, 15575-15578, which reports the presence of several fluorine-containing organic substances that do not belong to the PFAS class (see image)**



FOOD CONTACT CENTER
FOOD CONTACT SERVICES

HEADQUARTERS
VIA DEL REDOLONE 65, 51034 SERRAVALLE PISTOIESE
LEGAL AND ADMINISTRATIVE HEADQUARTERS
VIA ALDO MORO 16 - 25124 BRESCIA

+39 0573 245244
+39 030 3457131

SALES@FOODCONTACTCENTER.COM
FCS@FOODCONTACTSERVICES.COM

WWW.FOODCONTACTCENTER.COM
WWW.FOODCONTACTSERVICES.COM

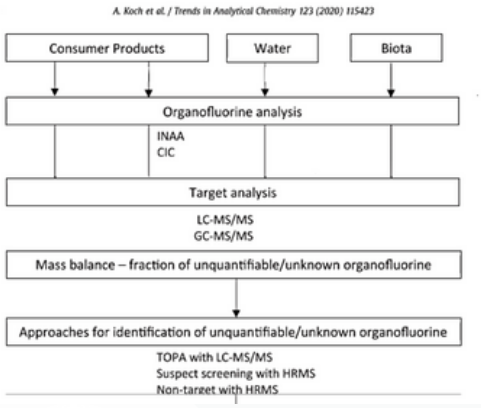
THE PFAS PROBLEM

SAFE SUSTAINABLE SOLUTIONS

Poponents of the total fluoride test's thesis

Some theories, now outdated, argued that it was impossible to quantify all PFAS with techniques other than total fluoride analysis; in Italy, the results of analyses carried out by the European body BEUC and Italian universities were published by the magazines Altroconsumo and Il Salvagente in spring-summer 2021. The analytical approaches stated that "target analyses were only able to determine the substances for which analytical standards are available, yet thousands of PFAS exist." (*)

Correct analitycal approach directed by ECHA



ANNEX XV RESTRICTION REPORT – Per - and polyfluoroalkyl substances (PFASs) – Version: 2 – Date of publishing 22.03.2023

TOTAL FLUORIDE ANALYSIS IS NOT SUFFICIENT BECAUSE IT IS NON-SPECIFIC AND HAS LOW SENSITIVITY **TO LIMITS FOR SPECIFIC PFAS SUBSTANCES IN FOOD SAFETY-RELATED LEGISLATION.**

OUR SOLUTION TO THE PROBLEM

Since 2010, Food Contact Center has invested in the study and research of useful solutions to perform the recognition of unknown molecules in screening analysis. Several instrumental libraries have been built, also thanks to the partnership with SCIEX, and university/CNR centers. The analyses, with a screening approach, accredited by the laboratory, are a unique solution on the market and able to solve the criticality highlighted above in the studies published in 2021. (*)

- **Targeted-untargeted approach**, which combines the target search for the most well-known compounds with untargeted screening by searching for the characteristic marker fragments of PFAS.
- Use of **three different analytical techniques** to detect the presence of perfluorinated compounds with different chemical-physical characteristics: HS-GC-MS, GC-MS and LC-HRMS.
- Use of an **in-house developed spectra database and library** to perform screening analysis in LC-MS/MS with a high-resolution mass spectrometer (AB SCIEX QTOF 4600).
- Determination of the presence of polymeric PFAS by **TOP Assay**: it consists of subjecting the sample to a pre-treatment with an oxidizing agent capable of breaking the polymers into smaller PFAS, which are subsequently identified by chromatographic techniques.

The Laboratory Management

FOOD CONTACT CENTER
FOOD CONTACT SERVICES
HEADQUARTER
VIA DEL REDOLONE 65, 51034 SERRAVALLE PISTOIESE
LEGAL AND ADMINISTRATIVE HEADQUARTER
VIA ALDO MORO 16 - 25124 BRESCIA
+39 0573 245244
+39 030 3457131
SALES@FOODCONTACTCENTER.COM
FCS@FOODCONTACTSERVICES.COM
WWW.FOODCONTACTCENTER.COM
WWW.FOODCONTACTSERVICES.COM