

EnviroNote 1136 - April 2024

## PFAS in Cosmetics



### What are PFAS and why are they used in Cosmetics?

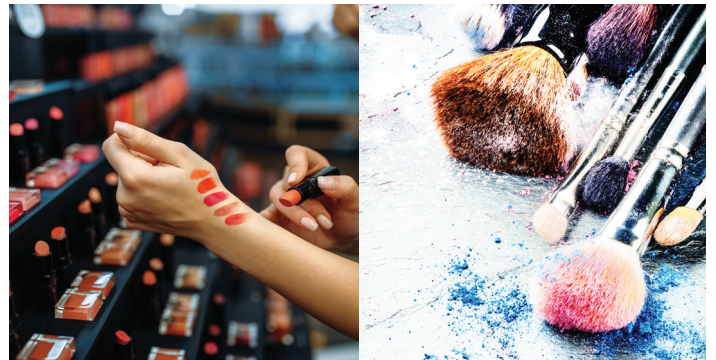
**Per- and polyfluoroalkyl substances (PFAS)** are a diverse group of human-made chemicals used in a wide range of consumer and industrial products. These compounds contain fluorinated carbon chains and are known for their persistence in the environment, earning them the nickname “forever chemicals” and are broadly classified as both polymers and non-polymers. While most interest has been in firefighting foams, certain PFAS are intentionally added as ingredients in cosmetic products. They are used in cosmetics in the following ways:

- 1. Conditioning and Smoothing:** PFAS are used in cosmetics to condition and smooth the skin, giving it a shiny appearance.
- 2. Consistency and Texture:** They also affect **product consistency and texture**, contributing to the overall feel and application of cosmetic items.

Common PFAS used as ingredients in cosmetics include:

- PTFE (polytetrafluoroethylene)
- Perfluorooctyl triethoxysilane
- Perfluorononyl dimethicone
- Perfluorodecalin
- Perfluorohexane

It's important to note that not all PFAS found in cosmetics can be readily measured due to their specific chemical composition. Research on the presence and potential health risks of PFAS in cosmetics is still limited. While some studies have detected PFAS in cosmetics, more research is needed to understand their toxicological profiles, skin absorption levels, and potential health risks. The FDA continues to monitor the literature for toxicity studies and dermal absorption information related to PFAS in cosmetics.



The presence of **per- and polyfluoroalkyl substances (PFAS)** in cosmetics raises important concerns that cover the following:

- 1. Undisclosed PFAS:** Laboratory analyses have detected PFAS in cosmetic products, but many of these compounds are not explicitly disclosed in the listed ingredients. This lack of transparency makes it challenging for consumers to make informed choices about the products they use.
- 2. Direct Contact with Skin, Eyes, and Mouth:** Cosmetics are applied directly to the skin, eyes, and mouth. As a result, any PFAS present in these products can potentially be absorbed or ingested by users. This direct contact increases the risk of exposure.
- 3. Enhanced Absorption and Ingestion:** Enhanced absorption occurs when PFAS molecules penetrate the skin barrier more effectively due to their unique properties. Similarly, ingestion can occur if users accidentally ingest cosmetic products containing PFAS.
- 4. Characterisation and Toxicological Studies:** To mitigate exposure, it is crucial to conduct thorough characterisation and toxicological studies on PFAS compounds present in cosmetic formulations. These studies help identify specific PFAS, assess their toxicity, and determine safe exposure levels.

Further research, and informed regulation are essential to minimise PFAS exposure in cosmetics and protect end users from potential health risks.



## How do we analyse PFAS in Cosmetics?

This lack of transparency regarding the actual chemical constituents present in cosmetic products makes the analysis challenging, especially as there are no published standard methods and reference materials.

At Eurofins Environment Testing we have been testing for PFAS in environmental matrices since 2010. Therefore, to assist ensuring product safety for the end users we developed a variety of analytical approaches for the detection and quantification of PFAS in cosmetics:

### 1. Sum Parameter Total Fluorine (TF) or also referred to as Total Organic Fluorine (TOF)

It is a screening methodology used to assess a product's fluorinated compounds levels. This method utilises Combustion Ion Chromatography (CIC) to detect the total fluorine concentration in the sample, which can serve as a proxy for the total concentration of PFAS in the sample. It is a rapid technique that helps determine if further investigation into the presence of PFAS in the sample is necessary.

### 2. Non-Targeted Analysis (NTA)

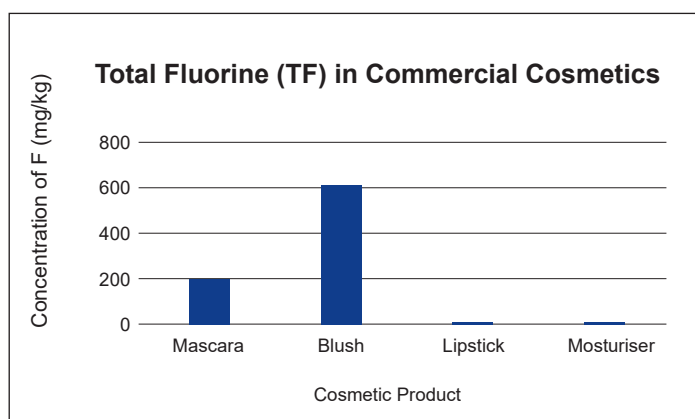
When it comes to many PFAS compounds used in cosmetics, reference materials are often unavailable. In such cases, NTA (non-targeted analysis) can be employed. Accurate mass high-resolution quadrupole time-of-flight mass spectrometers (LC-QToF-MS and GC-QToF-MS) can identify PFAS compounds confidently, even in the absence of reference materials.

### 3. Targeted Analysis of Individual PFAS

Our state-of-the-art LC-MS/MS instrumentation enables targeted analysis for trace-level PFAS contaminants, allowing for quantification where reference materials are available.

## What matrices can we test for?

At Eurofins Environment Testing Australia, we can analyse a wide range of cosmetics. Our methodologies successfully analysed matrices such as creams, conditioners, moisturisers, concealers, blushes, powders, lipsticks, and mascaras for PFAS content. The results of the TF analysis of some representative cosmetics are shown in the graph below.



## Are PFAS in Cosmetics regulated?

Regulatory authorities currently face challenges due to the wide variety of PFAS compounds in cosmetics on the market and the limited availability of comprehensive scientific data. Nevertheless, most countries have regulated the PFAS listed in the Stockholm POPs Convention, such as *Perfluorooctanoic acid (PFOA)*, *Perfluorooctane sulfonic acid (PFOS)*, and *Perfluorohexane sulfonic acid (PFHxS)*, which also applies to cosmetics.

Additionally, some states and countries have initiated bans on intentionally added PFAS:

- **Effective January 1, 2025: California, Colorado, Minnesota, Washington.**
- **Effective December 31, 2026: Aotearoa New Zealand.**

**If you are interested or require further information, contact our Emerging Contaminants Team Today**

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