

PFASs IN AIR: CHALLENGING CONTAMINANTS TO CONTROL AND TO MEASURE

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PFASs are considered one of the “contaminants of emerging concern”: substances confirmed as hazardous, but which are not specifically regulated by legislation.

PFASs were used –and in some cases are still used– in many industrial applications thanks to their water- and oil-resistant properties: PFASs manufacturing sites, facilities using PFASs for production, airports and military installations are some of the potential contributors of PFASs release into the environment.

Italian laboratories (in particular, facilities located in the Veneto region), had the possibility to study the issue from a very central point of view. This part of Europe was severely hit by PFASs contamination, which brought local Authorities to carry out deep studies on the topic and to issue guidelines, to propose limits and test methods when there were no references to follow at international level.

The European Commission is promoting an Action Plan to eliminate the non-essential use of PFASs and it is studying a proposal for limits in water. In 2019, in Veneto, the Environmental Protection Agency shared operational guidelines –with analytical methods and limits of quantification– to monitor PFASs in landfill sites in groundwater, leachates and waste entering the site. The requested limits were tight and this required the use of cutting-edge technologies to introduce new testing methods.

Experiences of testing made worldwide, where there was PFASs contamination, helped the comparison of sampling and testing techniques: the Environmental Protection Agency in Veneto took the example of emission measurements made in Japan, Norway, Canada, the United States (where similar issues were documented).

For its physio-chemical characteristics, water is the main route of propagation; however, PFASs can also be present in indoor and outdoor air, as literature states. PFASs pollution was detected in outdoor air in many countries all around the world. In PFASs processing facilities, they were also found in indoor air.

The transport and transformation of these contaminants and the associated human exposure routes depend on the volatility of different types of PFASs: their persistency and high mobility make us suppose that air pollution can easily cause water and soil pollution as well. In a study by the North Carolina Division of Air Quality, the presence of significant levels of PFOA in surface water near the production facility suggests contamination pathway via air deposition.

Monitoring PFASs concentration in air could help us to understand these dynamics: their sampling and testing in the matrix “air” is particularly difficult, also because there are not standardized methods.

Most of the scientific studies on PFASs emissions shared the same difficulties in the lack of a harmonized approach since they generally focus on PFAS targeted by water analysis methods. What about other compounds, precursors or substitutes?

We present two case studies explaining sampling methods, analyses and results of PFASs monitoring campaign in two different productive sites: the first is a PFASs production facility where we monitored the concentration of these pollutants in working indoor air, the latter is a PTFE production site, where we checked PFASs in the emissions after thermal treatment.