

Perfluorinated compounds (PFCs) are used in many consumer products today. These chemicals are highly stable, do not degrade in the environment and can accumulate in living organisms. To make a full risk assessment of the environmental impact of PFCs, accurate data on their physico-chemical properties and new tools to assess the movement and distribution of PFCs are needed. PERFORCE brings together expert teams, including industry, to significantly boost our understanding of PFCs.

Assessing chemical toxicity for competitive advantage

Perfluorinated compounds (PFCs) are chemicals that have gained increased scientific and socio-economic interest following their detection in organisms from remote regions – including the polar regions – and in human blood.

PFCs have numerous useful applications in consumer and other products. They can be found in textile, carpet and leather treatments (for water and dirt proofing), surfactants, polymerisation aids, fire-fighting foams and paper additives. However, the primary useful characteristic of PFCs – their stability – means that in the environment they do not readily decompose and are therefore defined as persistent chemicals.

Blood and bile

In organisms, evidence suggests that PFCs accumulate in blood, bile and the liver and it is possible that they may bind to proteins in blood and tissue. Some classes of PFC have been shown to cause cancer in rats. PFCs are, therefore, an emerging group of environmental contaminants with unique physicochemical and toxicological properties. But how they enter and are

transported within the environment is not well known, mainly due to a lack of physicochemical property data and reliable detection methods.

Information on the prevalence of PFCs in Europe is scattered and incomplete. In fact few reliable data on their chemical properties are available in the open literature, and prediction of environmental concentrations is not possible. In particular, the few unique characteristics known prevent the modelling of their properties using existing estimation methods. Clearly this substantial lack of information on the hazardous potential and environmental distribution of PFCs is of concern to policy-makers, producers and consumers.

PERFORCE is bringing together European expertise to introduce and evaluate new chemical and biological techniques and tools to assess the distribution of PFCs in the European ecosystem. This will reveal how PFCs get into the environment, how they move within and between different environmental compartments (i.e. ground, water, sediment, etc.), and determine their key environmental properties.



PERFORCE NEST INSIGHT

By gaining new insights into environmental chemical mechanisms, in particular the source and routes for PFCs detected in remote areas, an ecologically sound chemical replacement policy can be developed.

AT A GLANCE

Official title

Perfluorinated organic compounds in the European environment

Coordinator

The Netherlands: University of Amsterdam

Partners

- *Norway: Norwegian Institute for Air Research, The Polar Environmental Center*
- *The Netherlands: Netherlands Institute for Fisheries Research*
- *Sweden: Institute for Applied Environmental Chemistry, Stockholm University*
- *Belgium: University of Antwerp*
- *Belgium: DuPont Coordination Centre CVA*

Further information

*Dr Pim de Voogt
Environmental and Toxicological Chemistry,
Institute for Biodiversity and Ecosystem
Dynamics, Universiteit van Amsterdam,
Amsterdam, The Netherlands
Fax: +31 (0)20 525 6522
E-mail: pdevoogt@science.uva.nl*

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Scientific leader

The project, led by the University of Amsterdam, brings together researchers from the Netherlands, Norway, Sweden and Belgium (including DuPont, a leading PFC manufacturer) and aims to establish Europe as an international scientific leader in environmental research and exposure assessment for PFCs. Work will be split between developing new chemical analytical methods, bioanalytical tools, physicochemical property and fate modelling, environmental modelling and validation of techniques. An important component of the project will be transfer of know-how from industry to the academic teams. The final exposure assessment will be based on both field data and modelling.

The project will also link with other international initiatives, especially in North America and OECD projects, to provide calibration and comparison/standardisation of techniques to give a global dimension to this global problem.

Competitive advantage

By gaining new insights into environmental chemical mechanisms, in particular the source and routes for PFCs detected in remote areas, and by understanding the behaviour and distribution of PFCs, an ecologically sound chemical replacement policy can be developed which could provide a competitive advantage for the European chemical industry.

An ecologically sound chemical replacement policy can be developed which could provide a competitive advantage for Europe.

The introduction of new validated chemical and biological techniques and tools to assess the occurrence and distribution of PFCs in the European ecosystem that the PERFORCE team will deliver should allow a reliable exposure assessment for PFCs to be made. Together with ongoing hazard assess-

ment and toxicity testing data, this can give the European authorities a proper environmental risk assessment of these chemicals in the near future.

This will be essential information for strategic decision-making and for regulatory action on directing industrial production and sustainable future application of PFCs.



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SIXTH FRAMEWORK PROGRAMME