



Network of reference laboratories and related organisations for monitoring and bio-monitoring of emerging environmental pollutants

Conclusions from four NORMAN workshops

Priority research needs identified by NORMAN

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Objectives

- Overview of NORMAN outcomes
 - workshops, meetings, newsletters, and reports
- Priority research needs identified by NORMAN
 - NORMAN, FP7, WFD, Marine Strategy Directive, OSPAR, MEDPOL, HELCOM, and other (monitoring) programmes
 - Deliverable no. I2.4

Workshops

1. Emerging environmental pollutants; key issues and challenges, 2006, Stresa
2. Chemical analysis of emerging pollutants, 2006, Menorca
3. New tools for bio-monitoring of emerging pollutants, 2007, Amsterdam
4. Integrated chemical and biological monitoring strategies for risk assessment of emerging substances, 2008, Lyon



Conclusions

Exposure assessment

- Data occurrence of ES increasing, limited information on fate
- Limited data for soil, air, groundwater
- Indoor air is significant area of concern
- Exposure pathways ES can be different from **“classical” pollutants**
- Point source information difficult to retrieve
- Most transformation products of ES are unknown
 - Identification of ES by models is limited when chemicals are metabolites

Effect assessment

- Strategies for selection of battery of end-points (bioassays/biomarkers)
- Gap in linkage between toxic effects lab and field
 - mode of action, in vitro, in vivo, population level/ecological relevance
- Bioinformatics:
 - omics, population genetics, histopathology and ecology -
> new generation cause-effect relationships of stressors
- Lack of predictive models of ES for exposure and effects
- Integrated bioanalysis links chemical exposure to toxicity characterisation

Environmental and human health risk assessment

- Integrated approach of biological effect testing and chemical analyses is needed (WFD)
 - Integrate effects of substances other than priority chemicals
- TPs not always sufficiently known and/or not fully taken into account in prioritisation methodologies
- Omics can be the linkage between exposure and effects in assessing risks of contaminants
 - Ecotoxicogenomics as tool for more accurate ecological effect and risk assessment
- Site-specific risk assessment research level

Methods and QA/QC

- Methods under development:
 - passive samplers, biological monitoring combined with chemical analysis, and biological indicators for evaluating water quality
- Harmonisation of analysis methods for emerging substances
- Development and harmonisation of techniques/ methods:
 - that combine chemical analysis and biological effects
 - that study transformation products/ metabolites

Research agenda

pan-European screening program for the identification and hazard characterisation of emerging chemicals (I)

Aim:

To identify which emerging substances have the highest risk in the European environment

- Identification, hazard characterisation, and prioritisation of ES
- Hazard characterisation: novel integrated chemical and biological approaches
- Novel sampling and analytical tools to improve water quality assessment

pan-European screening program for the identification and hazard characterisation of emerging chemicals (II)

Necessity of the project

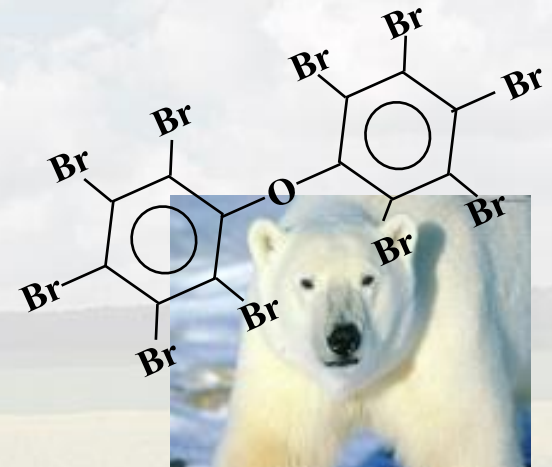
- Develop tools and methodologies to identify and characterise hazard of chemicals in the European environment
- Provide substantial input to e.g. OSPAR and WFD to reduce stress of chemicals in water bodies and ecosystems.

Environmental and human exposure pathways of emerging substances (I)

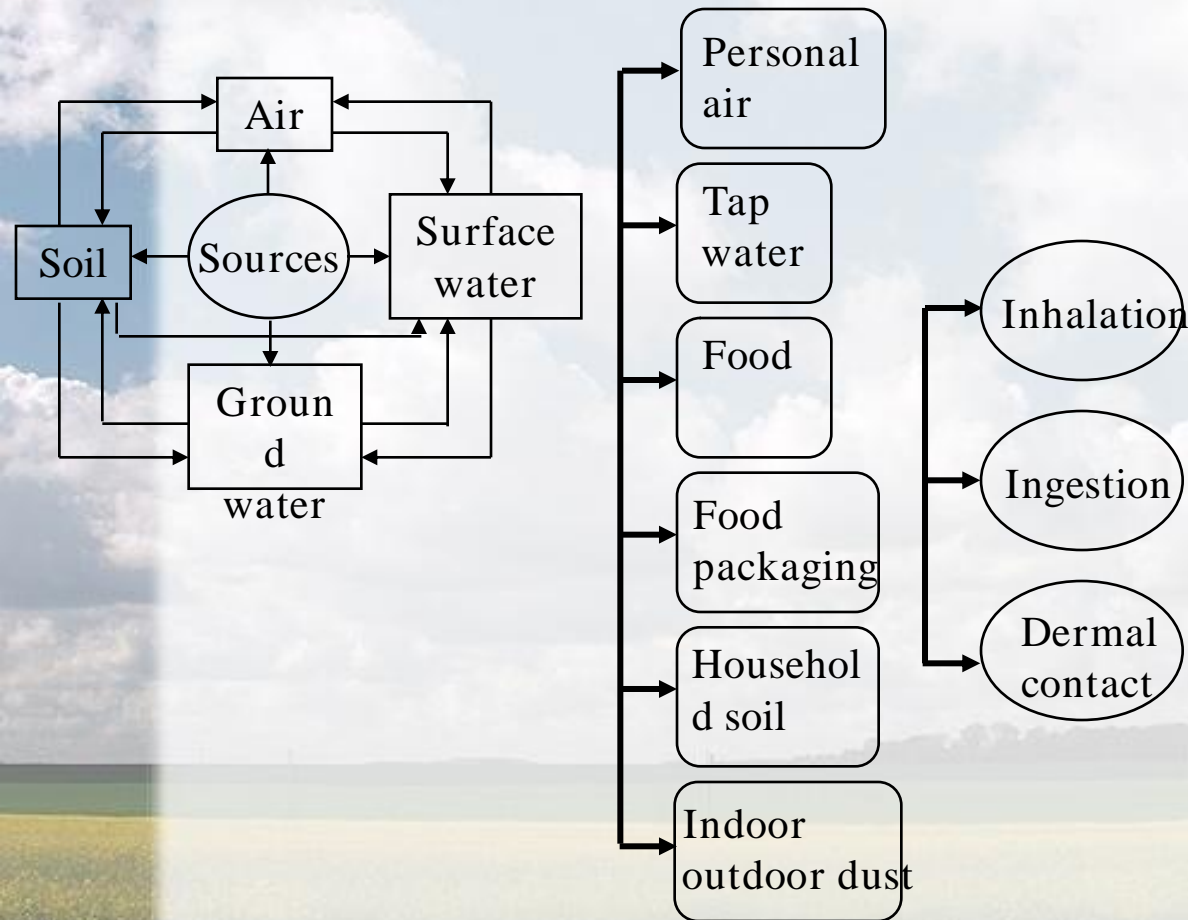
Aim:

Understanding environmental and human exposure pathways of emerging substances (e.g. decabromodiphenyl ether, triclosan, siloxanes, PFCs)

Many emerging substances behave differently in the **environment than the “classical”** contaminants (e.g. DDT, PCBs), and predictive exposure and effects models for risk assessment are lacking



Routes of exposure



Lack of information on the relevance of human exposure sources of emerging substances

Examples:

- Occurrence of decaBDE in terrestrial food chain
- Importance of:
 - Dust (indoor/outdoor)
 - Food packaging

Environmental and human exposure pathways of emerging substances (II)

Necessity of the project:

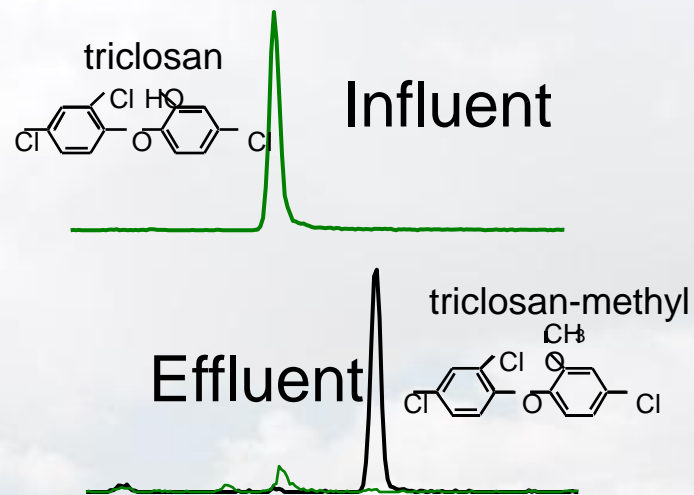
- Substantial input to exposure models used in risk assessment (RA) of new and existing chemicals
- Improvement of RA of ES (e.g. REACH)
- Improve understanding of pathways and sources of exposure to human and wildlife

Development of tools to predict transformation products (TPs) of emerging substances (I)

Aim:

Development of tools to predict the formation of TPs and metabolites for groups of emerging pollutants

- Tools and methodologies to predict formation of TPs
 - *in silico*, *in vitro*, *in vivo*
 - analytical methods
- Validated methods which can be used for regulation (e.g. REACH)



Development of tools to predict transformation products of emerging contaminants (II)

Necessity of the project:

- Provide novel tools and methodologies for identification of TPs during release or formed during the life cycle of a substance or product
- Valuable information for Sustainable Consumption and Production Action Plan, and implementation of REACH