

Economic assessment of exposure protocols for PAHs and PCBs

Preface

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This study is one task of a project ENVIRISK (Assessing the Risks of Environmental Stressors: Contribution to Development of Integrating Methodology). ENVIRISK is a 2,5-year (10/2006 - 3/2009) specific targeted research or innovation project under the EU 6th Framework Programme for R & D Priority 8.1 Policy-oriented research, Contract No. SSPE-CT-2005 - 044232. The aim of ENVIRISK is to develop an integrated methodological framework for identification of health risks caused by exposure to environmental factors, with a view to provide useful information for prevention and targeted policy measures. The framework include the development and piloting of protocols and methodologies for exposure assessment and health impact assessment in specified areas relevant to the implementation of the European Environment & Health Action Plan (EHAP).

Abstract

The aim of this study is to provide the relevant information for assessing the available options for exposure protocols in the view of providing a cost-benefit recommendation for exposure and health impact assessment. It includes: (i) define the exposure scenarios, methods and protocols for PAHs and PCBs; (ii) summarize the data needs and describe the available data; (iii) analyze the cost for data and information gathering relevant for methods and protocols.

Exposure scenario for PAHs and PCBs

Agent	PAHs (all relevant compounds)	PCBs (all relevant compounds)
Source /Activity	Traffic, residential heating, long-range transport, industrial, agricultural, natural, environmental tobacco smoke	Electrical equipment (capacitors and transformers), waste incineration, metal smelting (open-health, converter, electric), coal combustion
Time Scale	Long term, short Term	Long term, short term
Place /Area	Any (home, outside, workplace)	Any
Geographical scale	Any local, urban and rural	Any local, urban and rural
Population	All, occupational exposure (e.g. police men), pregnant women, children	All, children, fishermen, groups using home grown foods
Release Media	Air, water, soil	Soil, sediment, water, air
Route of Exposure	Inhalation (breathing), ingestion (drinking and eating), dermal contact (skin contact)	Ingestion, dermal routes, inhalation
Contact Media	Air, water, soil, food	Food, air, water, soil, equipment
Contact Duration Frequency	Time activity data (in different microenvironments)	Exposure frequency: days/year, exposure duration: years
Associated health effects	Cancer, genotoxicity, bronchitis, enhance of Allergic inflammation, increase risk of cardiopulmonary mortality, intrauterine growth retardation, short term exposure symptoms: irritation, nausea, vomiting, diarrhea and confusion	Increased thyroid volume, hearing problems, dental problems, cancer

Data needs and description of available data

Data needs	Available databases name and source
Data for general exposure factors	Time activity data: ExpoFacts, http://cem.jrc.it ; HETUS, https://www.testh2.scb.se ; Exposure Factors Handbook, http://www.epa.gov ; CHAD, http://www.epa.gov ; MTUS, http://www.timeuse.org ; AHTUS, http://www.timeuse.org ; Time use studies, http://www.timeuse.org ; UK time use survey 2000 and 2005, http://www.statistics.gov.uk ; Dutch Time Use Survey (TBO), http://www.scp.nl ; Finnish time use survey, http://www.stat.fi .
	Ingestion data: ExpoFacts, http://cem.jrc.it ; Eurostat, http://epp.eurostat.ec.europa.eu ; FAOSTAT, http://faostat.fao.org ; Food Consumption and Other Exposure Data, http://www.foodrisk.org .
	Physiological data: ExpoFacts, http://cem.jrc.it .
	Housing data: ExpoFacts, http://cem.jrc.it .
	Land use data: CORINE Land Cover (CLC2000)-Version 8/2005, http://dataservice.eea.europa.eu ; CORINE Land Cover (CLC90)-Version 12/2000, http://www.eea.europa.eu ; Global Land Cover 2000 (GLC2000), http://dataservice.eea.europa.eu ; PELCOM grid, http://www.geo-informatie.nl ; FAOSTAT, http://faostat.fao.org ; EUROSTAT, http://epp.eurostat.ec.europa.eu .
	Population data: Eurostat, http://epp.eurostat.ec.europa.eu ; xpoFacts, http://cem.jrc.it ; Gridded Population of the World (GPV), http://sedac.ciesin.columbia.edu .
Emission data	Air: WebDab, http://webdab.emep.int ; EPER, http://www.eper.cec.eu.int ; RAINS emissions, http://www.iiasa.ac.at ; CEPMEIP Database – Emissions, http://www.air.sk ; EDGAR, http://www.mnp.nl ; Greenhouse Gas Inventory Data, http://ghg.unfccc.int ; National emission statistics, http://www.naei.org.uk ; REZZO, http://www.chmi.cz .
	Water: EPER, http://www.eper.cec.eu.int .
	Soil and sediment: EMEP-MSCE, http://www.msceast.org .
	Emission factors: RAINS emissions, http://www.iiasa.ac.at ; CEPMEIP Database – Emissions, http://www.air.sk ; WebFIRE, http://cfpub.epa.gov ; Emission Factors Database, http://www.naei.org.uk ; Material Emission Database for 90 Target VOCs, http://irc.nrc-cnrc.gc.ca ; AP42, http://www.epa.gov .
	Emission profiles: SPECIATE, http://www.epa.gov .
Data for media concentrations	Outdoor air: AirBase, http://air-climate.eionet.europa.eu ; EMEP measurement data, http://www.nilu.no .
	Indoor air: EXPOLIS measurement data, http://www.ktl.fi .
	Water: GEMStat database, http://www.gemstat.org ; Waterbase, http://dataservice.eea.europa.eu .
	Soil and sediment: EMEP-MSCE, http://www.msceast.org .
	Food: GEMSfood, http://sight.who.int ; National Food Residue Database (NFRD), http://nfrd.teagasc.ie ; Annual EU-wide Pesticide Residues Monitoring Report, http://ec.europa.eu .

Cost on data gathering and data analysis for PAHs and PCBs exposure assessment

Country name	Total cost for analysis of exposure assessment (Euro)	
	PAHs exposure assessment	PCBs exposure assessment
Czech Republic	150190	528118
Slovakia	126995	446555
Norway	343871	1209165
Fenland	213977	752415
United Kingdom	211658	744258
Israel	164107	577055

Conclusions

- There is no available information for the price for the PAHs measurement and its relevant data gathering.
- The cost of sampling and analysis is a function of the number of monitoring stations, the sampling method used, the frequency and analytical methodology adopted.
- Cost for analysis of PAHs and PCBs exposure assessment is different between different countries.
- In average, the cost for analysis of PHAs and PCBs exposure assessment is about 201800 and 709594 Euro, respectively.

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