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A preliminary study for establishing comprehensive exposure scenarios to chemicals

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SAICM (Strategic Approach to International Chemicals Management) issued in June 2006 aimed to minimize risks to human health, including that of workers, and to the environment throughout the life-cycle of chemicals. In the REACH (Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals), the supplier of a substance or a preparation are required to ensure that exposure to these substances including discharges, emissions and losses, throughout the whole life-cycle is below the threshold level beyond which adverse effects may occur, when substances are manufactured, placed on the market and used. Although exposure scenarios to chemicals throughout the life-cycle of chemicals are needed for the risk management, there is no comprehensive database of exposure scenarios available as public information.

In this study, the prototype of comprehensive exposure scenarios throughout the life-cycle of chemicals was created by extracting exposure scenarios from laws and regulations related to emission or exposure of chemicals in Japan, risk assessment documents such as Toxicological Profile by ATSDR (The Agency for Toxic Substances and Disease Registry) in USA and European Union Risk Assessment Report by ECB (European Chemicals Bureau) in EU, and exposure assessment tools such as EUSES, ECETOC-TRA, ChemSTEER, and ConsExpo.

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The relationship among lead exposure, children blood lead level, and the socio-economic factors

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Background: low level lead exposures usually are coming from various environmental sources including air, food and water. This has important implications with respect to its regulation. The socio-economic factors can also affect blood lead level in children. This study was aimed to examine the influence of housing condition, earning and education of children' primary caregivers on children blood lead levels in environmental lead exposure.

Methods: the study involved 54 children with 5-10-year-old, coming from Gebang Sari, Sekaran and Moro Demak, Central Java, Indonesia. Cross-sectional design was adopted in this research. The collected data were analyzed using non parametric Wilcoxon signed rank test to determine the mean differences of lead among the locations. OR prevalence and frequencies as well as cross tabulation of blood lead level and housing condition, earning and education data were also analyzed.

Result: There were significance differences amongst Gebang Sari, Sekaran and Moro Demak children blood lead levels ($p<0.05$). Gebang Sari ambient lead air was the highest compared to those of other two locations. Compared to Sekaran and Moro Demak, Gebang Sari was dominated by higher children's primary caregivers earning and education levels. Conclusion: children blood lead levels were not only influenced by ambient air lead but also influenced by housing condition, earning and education of children' primary caregivers.

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Human toxicity and REACH

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The first step of a chemical safety assessment is the identification of the intrinsic hazardous properties. The information requirements to characterize the toxicological properties are listed in Annexes VII to X of the REACH Regulation. Hazard assessment starts with the evaluation and integration of all available information for each relevant endpoint. Information includes testing data as well as non-testing data. The results of the evaluation are the basis for classification and labelling, the PBT assessment and the derivation of the hazard threshold levels.

The application of assessment factors to the selected dose descriptors (e.g., N(L)OAEL) leads to derived no effect levels (DNEL) for different exposure routes. For non-threshold effects (e.g. carcinogenicity and mutagenicity), a semi-quantitative derived minimal effect level (DMEL) should be calculated. For some intrinsic properties (e.g., sensitizing, irritant, corrosive), dose-response information may not be available so a qualitative assessment should be made. In absence of substance specific information, read across can be used to derive DNELs and DMELs.

The overall assessment factor is obtained by multiplying the individual assessment factors (e.g., interspecies variation, exposure duration). The concept of the relation between external dose and observed toxic effects is widely used in risk assessment. Default assessment factors are applied to the dose descriptors. A more fine-tuned approach to obtain substance specific assessment factors is based on physiologically based pharmacokinetic (PBPK) models. These models use the relation between the target tissue dose and the observed toxic effects.

We will illustrate this with some examples.

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Chemical information in textile supply chains - the case of Swedish producers and importers

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In textile production, a large amount of chemicals is used, mostly in wet treatment processes like dying and washing. It is important that risk information about these chemicals is communicated all the way through the supply chain in order to avoid health and environmental effects on different actors and surroundings. For textile producers in the EU it is also important to make sure that the chemicals they use are registered for the actual usage according to the REACH legislation and for textile importers is it necessary to be aware if any of the substances listed in REACH Annex XIV are present in the products.

Representatives for Swedish textile producing companies have been interviewed and asked what risk related chemical information they achieve from the chemical producers, how they handle the information and what information they communicate to their customers. Swedish textile importing companies have been interviewed about what chemical information they demand from their suppliers, the textile producing companies in for instance Asia. The study highlights the differences between flows of chemical information for textiles produced in Sweden compared to textiles produced outside EU and how legislation affects the information and the chemical usage.

The results show that the textile producers achieve safety data sheets from the chemical producers. These sheets contain the prescribed information, but are often not that detailed and it is not unusual that the textile producers request further information. The Swedish textile importers do not achieve any risk related chemical information from their suppliers; instead they set up demands regarding the chemical content in the final product.

RA11P - Risk assessment of metals

TU 380

Applicability of scales and fin-clips for the monitoring of metal pollution in feral fish

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Non-destructive methods for the analysis of micro-pollutants in wild organisms impose minimal stress to populations and are therefore suitable to investigate pollution in endangered species or threatened populations. Non-destructive sampling has been successfully applied in birds (feathers) and mammals (hair or spines). Sentinel fish species are commonly used to monitor the presence and effects of micro-pollutants in the aquatic environment. Up to present no non-destructive methods for pollutant analysis have been developed for fish.

In this study we evaluated the applicability of fish scales and fin-clips as a predictive tool for metal accumulation in a feral fish species the gudgeon (Gobio gobio). At 8 sites along a metal pollution gradient gudgeon were captured, sacrificed and tissues were dissected. Metals (Cd, Pb, Zn, Cu) were measured in fish tissues (liver; gill, kidney, fin clips and scales) and in the environment (water and sediment). Metal levels in scales and fins were related to levels in internal tissues and to environmental levels.

Although not for all metals significant relationships were found, the use of scales or fins from feral fish proved to be a promising non-destructive monitoring tool, especially for non-essential metals such as Pb and Cd.