HAZBREF

Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

HAZBREF WP2: Pre-selection / Shortlisting of Relevant Substances into IED BREF

SYKE: Emmi Vähä, Jukka Mehtonen, Pia Högmander

UBA: Johann F. Moltmann, Stefan Kacan, Jürgen Fischer, Nannett Aust
SWE EPA: Annika Månsson, Henrik Appelgren, Emil Jansson, Claes Debourg

Selection of target substances in BREF industrial sectors (sector-approach)

Objective: Better use of available data to prevent and reduce releases

EU STRATEGY FOR THE BALTIC SEA REGION FLAGSHIP

The aim

- The activity will identify the hazardous substances relevant for each IED industrial sector and which should be considered in the review process of the IED BREFs.
- The identification of the relevant substances will be done by utilizing existing information.
- To develop a tool for identifying relevant substances

Three strategies to derive lists of relevant substances for BREFs:

A. Identify chemicals used in the industrial sector by use categories or other descriptors, and prioritize them according to hazard and environmental release and fate criteria (**substance-based approach**).

B. Identify chemicals or chemical groups and link them to applications or technical functions (e.g. surfactants, bleaching agents etc.); to characterize this chemical group with regard to hazard and environmental release and fate criteria (**group-based approach**).

C. Identify chemicals that are already prioritized (or process is on-going) within different forums (e.g. REACH, WFD) and link these chemicals to IED sectors-(**hazard-based approach**).

Strategy A

- An example: Chemicals from the textile sector in use at industrial sites

- The starting point: roughly 21 000 substances in the ECHA CHEM database.
- From these 13 907 substances are used at industrial sites.
  - those which contain the string "textile" in the "Sector of Use“: 1 798 substances remain.
  - when the string "textile" is also filtered from the “widespread use by professional workers”: 937 substances remain.
- → 937 substances are used at industrial sites and by professional workers, which may also be used within textile industry.

- Not recommended to use the list of 937 substances directly for inclusion into BREFs for the textile finishing industry.

→This list needs to be filtered accoriding to substance properties (hazard criteria).

Strategy B
Outcome of consulting with the textile industry

- Consider '**performance chemicals**', which give textiles the desired appearance (are fixed to the fabric) …
- and '**process chemicals**', which support the production of polymers and the application of performance chemicals (go to waste water in the end);
- Textile processing industry does not use individual chemicals, but **mixtures and formulations** – they don't know the chemical composition!
- Textile chemicals producers will **not disclose their recipes**!
- Besides that, basic chemicals may contain **impurities of toxicological concern**;

Strategy C: hazard-based approach

Water Framework Directive Priority Substances

- Industrial production and use of chemicals considered; e.g. applying Plant Protection Products in agriculture not considered,
- Use information was gathered from ECHA website and from Nordic chemical product register (SPIN)
  - Substances grouped according to the branch of industry (NACE category)
  - Data from years 2016-2017 was used from SPIN register

Strategy C: hazard-based approach

REACH: SVHC candidate, Authorisation and Restriction List Substances

- The lists were downloaded from ECHA website
  - SVHC list updated last time Feb 2020
- Use information of chemicals were compiled from ECHA website and from SPIN (Substances in Preparation in Nordic countries) register
- Substances grouped to IED industrial sectors
  - Grouped to 3 case study industrial sectors where HAZBREF is focusing
    - Textiles, surface treatment of metals & chemical industry
    - Textiles is ready, others in progress
  - SYKE will try to to group substances to all IED sectors

Strategy C: textiles

- The list of SVHC substances downloaded from ECHA webpage.
- The information on substance uses in EU compiled from the ECHA webpage and in Nordic countries from SPIN register.
- If the substance had statement ‘manufacture of textiles’ in the section ‘uses at industrial sites’ of the ECHA info card, the substance was deemed to be used at textile industry.
- The use volumes (= total use) in Europe were derived from these info cards as well.
  - **Industrial sector specific use volumes not available!**
- The procedure to identify WFD Priority substances used in textile industry similar as to SVHCs.

Substance	CAS	WFD PS/ SVHC/ use banned	Use in textile sector (ECHA/SPIN)	Already addressed in existing BREF / addressed in frontloading of the TXT BREF review	Total imported or manufactured in EU (ECHA) / Nordic countries (SPIN) tons/a	Textile use, emission factor to wastewater (%)	"Fate" in wastewater treatment plant	Other info
dichloromethane	75-09-2	WFD PS	ECHA: washing & cleaning products, manufacture of textile, leather or fur. EU Source screening (WFD 2010): textiles not mentioned SPIN: no info on textile use		100 000 – 1 000 000 tons/a (ECHA) SPIN: 26 tons/a	not possible to estimate based on insufficient use information	4,9% to surface water 0,1% to sludge 65,8% biodegradation 29,2% volatilization	
Bis(pentabromophenyl) ether (decabromodiphenyl ether) (DecaBDE)	1163-19-5	use banned	ECHA: inks and toners and washing & cleaning products and manufacture of textile, leather or fur. SPIN: no use after 2012.	RS, BREF questionnaire addressed the brominated flame retardants as a group.	ECHA: 1 000 – 10 000 tons/a SPIN: no use	-	Not evaluated in HAZBREF 2.2	use banned, should not be used anymore
1-Methyl-2-pyrrolidone (NMP)	872-50-4	SVHC	ECHA: washing & cleaning products SPIN: manufacture of textiles, manufacture of furniture		ECHA: 10 000 – 100 000 tons/a SPIN: 0.1 ton (textile use in 2017)	not possible to estimate based on insufficient use information	8,0% to surface water 0% to sludge 92% biodegradation 0% volatilization	based on SPIN database it is possible that used in textile sector

Findings & conclusions

- There are shortages on quality of the data from ECHA website.
  - the use information at ECHA websites is provided by the manufacturers or importers of a substance in the registration dossiers.
  - It is possible that the manufacturer/importer has indicated uses even though the substance might not be used in that sector (e.g. textile sector).

  →**This results in false positives in the chemical lists** and therefore it should be checked if a textile manufacturer actually uses SVHCs (laborious!!!).
  - the use volumes in the ECHA info cards cover all possible uses
    - Industrial sector specific use volumes not available!
  - Information on the industrial uses may be outdated (the year information is originating unknown)

  → **the results include substances, which are banned for use in textiles**

  → Expert judgment is needed to assess the information prior its use!

Recommendations:

- More detailed data on substance use (where used and how much used) is absolutely needed!
- Better Safety data sheets of chemical prodcuts
- Information flow from the supplier of chemical product to the down-stream user and vice versa
- Easier access to available data in ECHA webpages

Act. 2.2 - Modelling of the fate of industrial chemicals in waste water treatment plants (WWTPs)

- The fate of 25 industrial chemicals in WWTP assessed with SimpleTreat 4.0 model
  - established and commonly used method
- The modelling gives an *indication* if a substance may be problematic or not problematic
- Modelled substances have been selected based on
  - their use volume (mostly >10 000 tons annually),
  - used in chemical, textile or STM sector and
  - with respect to intrinsic properties

Act. 2.2 - Modelling of the fate of industrial chemicals in WWTPs

example 4,4'-methylenedianiline

REACH: Candidate list, Carcinogenic (Article 57a)

Used in EU: 10 000 - 100 000 tonnes per year;

Uses: manufacture of chemicals

Output Elimination percentages	Value	Unit
Elimination in the primary settler		
Volatilization	0,00	%
Via primary sludge	32,65	%
Total	32,65	%
Elimination in the aerator		
Stripping	0,00	%
Biodegradation	0,00	%
Total	0,00	%
Elimination in the solids liquid separator		
Volatilization	0,00	%
Via surplus sludge	16,63	%
Total	16,63	%
Total elimination from waste water	**49,28**	%
Total emission via effluent	**50,72**	%
Balance	**100,00**	%

Act. 2.2 - Modelling of the fate of industrial chemicals in WWTPs

- When is a substance relevant in the context of HAZBREF?
  - A trigger value of >10 % release in the effluent may be used. Has to be coupled to intrinsic properties of the substance and the use volumes
- Modelling data may indicate when substance may be or may not be problematic
- However, it may be recommended that, ideally, any industrial sector should model *all their substances (or at least hazardous substances?)* that they use with SimpleTreat model

- Results presented in HAZBREF Activity 2.2 Report (2019): www.syke.fi/en-US/Research__Development/Research_and_development_projects/Projects/Hazardous_industrial_chemicals_in_the_IED_BREFs_HAZBREF/Publications

- Input to Decision tree to be prepared within Activity 2.1, but also be utilized in the WP4 sectoral reports

Desicion Trees – WP2, WP3 & WP4

- Several decision trees under preparation:
  - for the industrial actor to check the used chemicals
  - for the industrial actor if hazardous substance could be eliminated in the WWTP to avoid a release into the environment
  - to pre-select substances to the IED BREF revision process already at the frontloading stage

Kiitos!

Lisätietoja:
Emmi Vähä ja Jukka Mehtonen
Etunimi.sukunimi@ymparisto.fi