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Selection of Priority Substances in the context of the European Water Framework Directive

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Abstract

Article 16 of the Water Framework Directive[1] (WFD) sets out a "strategy against pollution of water". This strategy requires the Commission to propose priority substances selected on the basis of the significance of risk those substances present to or via the aquatic environment. For the prioritised substances Quality Standards referring to the protection of water, sediment or biota need to be developed. Article 16 further stipulates that the Commission shall review the list of priority substances every four years and to come forward with proposals for new priority substances, if appropriate. In this context, an expert group co-ordinated by the European Chemicals Bureau is currently elaborating a concept for a new optimised prioritisation strategy.

Keywords

Environmental Quality Standards, Priority Setting, Water Framework Directive

Introduction

Article 16 of the Water Framework Directive [1] (WFD) sets out a "strategy against pollution of water" requiring the Commission to propose priority substances (PS) selected amongst those substances which present a significant risk to or via the aquatic environment. Substances shall be prioritised for action on the basis of risk to or via the aquatic environment. This risk-based ranking shall be based on scientific principles taking account of: 1) evidence regarding the intrinsic hazard of the substance concerned, and in particular its aquatic ecotoxicity and human toxicity via aquatic exposure routes, 2) evidence from monitoring of widespread environ-mental contamination, and 3) other proven factors which may indicate the possibility of widespread environmental contamination, such as production or use volume of the substance concerned, and use patterns. A first list of 33 PS, establishing Annex X of the WFD, has been adopted in 2001. The preparation of the list, included a procedure called COMMPS[2], which had been specifically developed to identify the substances of highest concern at Community level.

As the list of priority substances needs periodical reviews, an expert group has been mandated by Working Group E (an advisory group to the European Commission for implementation of the WFD) to elaborate a new concept for an optimised prioritisation strategy for future ranking exercises with the objective to identify new PS for inclusion in Annex X of the WFD. The group is coordinated by the European Chemicals Bureau.

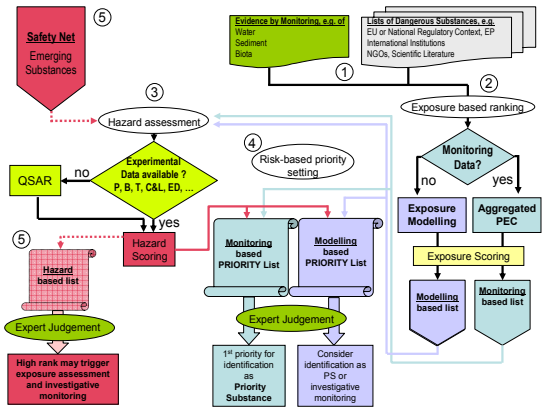

Figure 1: Flow chart of the proposed prioritisation scheme

Approach to Prioritisation

The working group on prioritisation considers new methodologies and ranking schemes for improvement of the prioritisation process, which is seen as a gradual reduction of a wide range of candidate substances in a "funnel-like" approach (**1,** Figure 1). The candidate substances are selected from various lists of dangerous substances that were set up for different regulatory purposes or originate from NGO activities, research projects, monitoring programs, etc. These wide "entry" lists serve to anticipate the demand from the society to reduce the number of "false negative" substances and allow evaluation and ranking of substances even when they are only recently "emerging" in the environment.

For substances for which sufficient (both in terms of quality and representativeness) monitoring data are available, the exposure assessment (**2**, Figure 1) is based on these monitoring data by calculating an aggregated PEC (e.g. by calculating arithmetic means for monitoring stations and using the 90 percentile of these monitoring station means as aggregated PEC).

For substances for which monitoring data are not available at the required quality level, a modelling-based approach to assess potential exposure needs to be implemented. Information such as overall tonnage used, fractions of this tonnage going to particular uses and emissions from these uses may be used as input to a simple (e.g. Mackay Level I) partitioning model reflecting the properties of the environment affected by the emissions. The overall emitted, degradation corrected tonnage partitioning to the aquatic environment is the value used for exposure scoring.

Two exposure driven lists will be established based on the aggregated PECs (for substances for which monitoring information is available) or based on the tonnage partitioning to the aquatic environment (for substances for which monitoring information is not available).

In order to permit priority setting based on risk, it is further necessary to assess and rate the hazard potential of the candidate substances. If it is deemed pertinent to assess the risk posed by a substance on the basis of several properties, e.g. persistence (P), bioaccumulation (B) and toxicity (T), a scoring approach would be ideal. Other criteria such as classification for human health (R-phrases) or endocrine disruption (ED) potential could as well be taken into consideration with a scoring approach. It may however as well be considered to base the hazard rating merely on the critical PNEC or DNEL values for environmental effects and/or human health (**3**, Figure 1) .

Exposure scores (or PECs) and corresponding hazard scores (or PNECs) are combined to result in final priority scores (risk quotients in the case of PEC/PNEC), which are used to set up 2 types of ranked priority lists, one based on monitored exposure data and the other based on modelled exposure data (**4**, Figure 1).

In an expert judgement step the top ranked substances on the monitoring-based and modelling-based priority lists are assed further. If there are no indications that a high rank on the monitoring-based list could be unjustified, the respective substance should be considered for selection as priority substance. A high ranking substance on the modelling-based list should however have a lower priority for selection as priority substance. Depending on the results of the evaluation in the expert judgement step, it may be considered for investigative monitoring if there is no information available that the high rank could be unjustified.

Safety net procedure (**5**, Figure 1)

A substance may have been found in predators preying on aquatic organisms, but monitoring information or information on uses and properties of the substance is not sufficient to subject it to exposure assessment. In this case the hazard potential of the substance may be assessed first. In case the substance is rated with a high hazard score, it should be further considered in a subsequent expert judgement step focussing on a decision regarding possible follow-up activities, e.g. investigative monitoring.

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