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Scientific Committee on Toxicity, Ecotoxicity and the Environment

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**SCIENTIFIC COMMITTEE ON TOXICITY, ECOTOXICITY AND
THE ENVIRONMENT (CSTEE)**

Opinion on the results of the Risk Assessment of:

HYDROGEN PEROXIDE

Environmental Effects

CAS No.: 7722-84-1

EINECS No.: 231-765-0

REPORT VERSION: Draft of 24 April 2001

**Carried out in the framework of Council Regulation (EEC) 793/93 on
the evaluation and control of the risks of existing substances¹**

Opinion expressed at the 26th CSTEE plenary meeting

Brussels, 11 September 2001

¹ Regulation 793/93 provides a systematic framework for the evaluation of the risks to human health and the environment of those substances if they are produced or imported into the Community in volumes above 10 tonnes per year. The methods for carrying out an in-depth Risk Assessment at Community level are laid down in Commission Regulation (EC) 1488/94, which is supported by a technical guidance document.

Terms of reference

In the context of Regulation 793/93 (Existing Substances Regulation), and on the basis of the examination of the Risk Assessment Report the CSTEE is invited to examine the following issues:

1. Does the CSTEE agree with the conclusions of the Risk Assessment Report?
2. If the CSTEE disagrees with such conclusions, the CSTEE is invited to elaborate on the reasons for this divergence of opinion.

Introduction

Hydrogen peroxide is produced in the EU by 9 companies in 22 plants (1997) and its total usage in the EU is approx. 670,000 tonnes (1995). Its main uses are in pulp bleaching (48%) and as an intermediate in the synthesis of other substances (38%), textile bleaching (7%), water treatment (3%) and miscellaneous uses (5%). Environmental exposure may occur through emissions in all major environmental compartments, air, surface water, and soil.

GENERAL COMMENTS

The report is in general of good quality and the assessment follows properly TGD procedures. The CSTEE agrees with conclusions on risk characterisation for the aquatic environment.

For the terrestrial environment, the information is not enough to support conclusion (ii) on the basis of a quantitative PEC/PNEC ratio, mainly due to a lack of information for effects on terrestrial plants and on microorganisms. Nevertheless the CSTEE can agree with conclusion ii) on the basis of the overall information on exposure and effects.

SPECIFIC COMMENTS

Exposure assessment

The environmental exposure assessment is well performed and follows the TGD. Hydrogen peroxide is miscible with water, with a half-life of a few days. Water concentrations at local level in the order of some $\mu\text{g/L}$ are likely to occur, with possible maximum levels higher than $100 \mu\text{g/L}$. Calculated PEC are consistent with experimentally measured data.

$\text{PEC}_{\text{regional}}$ in air is much lower than concentrations measured in background areas, probably due to natural formation of hydrogen peroxide. This is verified by the higher concentrations observed at higher altitudes. It is also interesting to observe the high levels in 20000-year old ice cores, at levels of the same magnitude as has been measured today in rainwater.

No data on bioaccumulation are available, but physical chemical data indicate that no bioaccumulation is expected.

Effects assessment

Aquatic organisms

There are many toxicity data, mainly short term, on aquatic organisms. The derivation of a PNEC_{water} of 10µg/L seems consistent with some field data on phytoplankton and bacterioplankton, apparently the most sensitive organisms.

Terrestrial organisms

The derivation of PNEC_{soil} from the PNEC_{aquatic organisms} is not acceptable. The TGD recommends the use of the PNEC on aquatic organisms and equilibrium partitioning when the lack of data on soil organisms does not allow a direct calculation. However, the CSTEE has discussed previously that this approach is not acceptable in all cases. Several conditions must be fulfilled before accepting the use of the equilibrium partitioning method.

These conditions include the lack of specific mechanisms or specific sensitivity for certain taxonomic groups.

The CSTEE has carefully reviewed these conditions in all RARs using the equilibrium partitioning method for deriving the PNEC_{soil} organisms. Both conclusions, acceptable and non-acceptable depending on the substance under evaluation have been agreed, and included in our opinions.

It is clear then, for Hydrogen Peroxide, different taxonomic groups have different sensitivities. In fact, the RAR describes algae as the most sensitive group (from the three standard aquatic taxa). In addition, the field experiment indicates that bacterial populations are much more sensitive than algae. Inhibition of bacterial populations was observed even at the lowest dose (0.12 µg/l) while the activity of phytoplankton was not inhibited at 34 µg/l.

Under these circumstances, the use of the equilibrium partitioning method is unacceptable. It must be remembered that soil micro-organisms, including bacteria, are a key element for the derivation of PNEC soil.

Atmospheric deposition and concentrations in rainwater are recognised as the only exposure pathway. Therefore, the suitability of the tests conducted with water exposures, mentioned but not described in the RAR, should be considered.

Risk characterisation

For the aquatic environment, local PEC/PNEC are generally lower than 1 in most site specific assessments, nevertheless in four cases of production sites the trigger of 1 was overcome. Therefore the CSTEE agrees with conclusion (ii) as a general rule and with conclusion (iii) to be applied in some specific emission sites.

The RAR indicates that the risk for plants cannot be totally excluded, but concludes with conclusion (ii).

The CSTEE recognises the lack of data for a quantitative risk assessment. The need for additional data must be related to the expected exposure potential. Comparisons of background air concentrations *versus* PEC_{air} suggest a significant contribution, at least for production. A monitoring programme should be implemented to confirm these estimations and to set the need for a quantitative risk assessment.

Although the derivation of the PNEC_{soil} is not supported, the RAR indicates that anthropogenic sources are not expected to contribute significantly to the overall soil exposure. The anthropogenic exposure should be limited to very localised areas and the microbial populations are expected to be the only ecological receptor at risk.

The available information suggests a very rapid degradation of the chemical in the soil, and a rapid recovery of any potential adverse effects. Considering that for soil microbial populations functional parameters are the only ecologically relevant endpoints, the likelihood for significant effects at exposure levels indicated in the RAR is very low.

Therefore, the CSTEE supports the conclusion of low risk for soil dwelling organisms, but based on the overall available information, not on the PEC/PNEC estimations.