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

Opinion on

THE JUSTIFICATION OF A NOTIFICATION BY THE NETHERLANDS TO INTRODUCE NATIONAL MEASURES CONCERNING WOOD TREATED WITH COPPER SUBSTANCES

Opinion expressed at the 33rd CSTEE plenary meeting

Brussels, 24 September 2002

CSTEE OPINION ON:

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Summary

1. We are critical of the use of hazard criteria (i.e. persistence based on maximum acceptable half life) and trigger values (i.e. maximum groundwater concentration), which are developed for xenobiotics, as a sole basis for regulatory controls. We believe that these criteria make little sense when applied to metals (ANSWER TO QUESTION 1).

2. We prefer the use of risk assessment and believe that the methodology used by the Dutch is acceptable in principle. However, we have concerns about how it has been put into practice. Predicted environmental concentrations are based on models that have not been validated and where we were able to compare predictions with field measurements, the predictions did seem to be over-conservative. Also there were uncertainties associated with the physicochemical conditions under which effects were measured (crucial for the bioavailability and toxicity of metals) and we were unable to substantiate the quality of the database. Finally we were concerned that single fixed values were used as background levels of copper in calculating maximum permissible additions, when we know that even within regions these can vary substantially from place to place. (ANSWER TO QUESTION 2).

3. We are therefore of the view that the Dutch have not provided sufficient sound scientific evidence to justify the proposed action. Further, we believe that this could only be done on the basis of a more robust risk assessment that would need to address the uncertainties listed above. (ANSWER TO QUESTION 3).

4. Moreover we are of the view that releases in the useage phase depend crucially on impregnation processes and that if best available technology were used at this stage subsequent losses in use could be minimized. This ought to be explored further as a management response to the Dutch concerns.

Background

The Netherlands have notified their intention to introduce national measures which would have the effect of banning in the Netherlands, the import, use and trade in all timber preserved with copper compounds. According to the Netherlands, the ban is justified by a risk assessment that indicates that copper applied to timber exceeds Dutch environmental standards during the use of the wood. In particular, the element copper exceeds the stipulated Dutch persistence standard of 180 days half-life, and the groundwater standard of 0.1 micrograms per litre of water. These standards are used by the Dutch Board for the Approval of Pesticides in the assessment of the continuing approval of biocidal products, including wood preservatives, containing copper.

This Notification of intent is served in the context of Directive 98/34/EC on the procedure for the provision of information in the field of technical standards and regulations that requires Members States to notify intended national measures and includes a stand-still period to allow assessment of the notification by the Member States and the Commission.

Against this Notification, Ireland, the United Kingdom, Portugal and the Commission issued detailed opinions while Austria and Germany issued observations. The Dutch authorities have replied to the detailed opinions in the framework of this notification. Industry has also sent its position.

As a result of the detailed nature of these comments, the Commission has asked the Netherlands to postpone the adoption of both drafts until the science has been considered by the CSTEE.

Questions to the CSTEE

Because of the detailed and scientific nature of both the supporting information to the Notification and the responses from Member States and Industry, the CSTEE has been consulted on the substance of the Dutch justification.

The Commission has asked the following questions

1. ***Is the CSTEE of the opinion that the environmental quality standards referred to in the notification from the Netherlands (and used by the Dutch Board for the Approval of Pesticides in the assessment of the continuing approval of biocidal products), and in particular, a maximum acceptable half-life of 180 days and a groundwater concentration of 0.1 micrograms, used as the basis for the environmental risk assessment, are justified?***

2. ***Is the CSTEE of the opinion that the methodology followed and the assumptions made by the Netherlands in the context of their environmental risk assessment are consistent and adequate?***

3. ***In the light of the CSTEE's conclusions on points 1 and 2 and all the submitted information, is the CSTEE of the opinion that the Netherlands have provided sufficient sound scientific evidence to show that wood treated with copper compounds presents environmental risk at any stage of its life cycle (impregnation, use and waste)? If so, is it possible to quantify these risks or give an indication if they are a cause for concern?***

Responses

Question 1. Is the CSTEE of the opinion that the environmental quality standards referred to in the notification from the Netherlands (and used by the Dutch Board for the Approval of Pesticides in the assessment of the continuing approval of biocidal products), and in particular, a maximum acceptable half-life of 180 days and a groundwater concentration of 0.1 micrograms, used as the basis for the environmental risk assessment,

are justified?

a. On maximum acceptable half-life

   It is a physical truism that all metals (in stable form) will persist in the environment and hence would fail this criterion. It is our view that persistence *per se* is not a useful criterion. Rather, what matters is if the procedure will
   i. Lead to accumulations, that
   ii. Are bioavailable, and
   iii. Are (un)likely to lead to adverse effects.

   This ought to be addressed by risk assessment. We believe that a similar view is expressed in the technical note for guidance with the Biocides Directive (98/08/EC).

b. On the Maximum groundwater concentration of 0.1 micrograms/l.

   This standard is based on the philosophy that there should be no contamination of groundwater by anthropogenic materials. Originally used in assessing the pesticide contamination of drinking water, the standard was intended as a "limit of detection". But we now know that the EC50 of some organic substances are less than 0.1µg/l and that metals occur naturally in ground waters. If the intent is

"zero contamination" then this standard should be set at background and this is 0.4 µg/l according to the Dutch document, but we are critical of this level and will discuss the variability in background further below. Moreover, the EU directives on groundwater contain an explicit standard for Cu which is 50µg/L.

Question 2. Is the CSTEE of the opinion that the methodology followed and the assumptions made by the Netherlands in the context of their environmental risk assessment are consistent and adequate?

a. General comments on methodology.

The risk assessment is carried out on the basis of the usual risk quotient (RQ) analyses comparing a predicted (or measured) environmental concentration with an "effects" threshold. However, due recognition is given to the fact that metals occur naturally and therefore occur in the environment at "background levels".

The environmental concentration, a = bkgd + b where b is that added as a result of the procedure (application, use, disposal). In the Dutch assessment, b = predicted environmental concentration, due to the application to, use of and disposal of copper-treated wood.

This is to be compared with a threshold concentration, derived from ecotoxicological tests, y = bkgd + x where x = what is described in the report as the maximum permissible quantity that can be added and is designated as MTT.

It is presumed that for any site bkgd is constant so:

$$RQ = \frac{b}{x} \text{ or } \frac{PEC}{MTT}$$

And there is an unacceptable risk if RQ > 1.

We are content with this general approach as following normal agreed procedures.

Copper is an essential element, which implies that organisms will have a minimum requirement for copper that supplies the needs, and a maximum concentration above which copper is toxic. The use of the added risk approach assumes that there is no risk for deficiency at the "Predicted No Effect Concentration", as the $PNEC_{add}$ derived in this approach is defined as the maximum permissible addition to the background concentration. Although it is assumed in the added risk approach that the natural background concentration in the environment does not contribute to the toxic effects, the background concentration in a given ecosystem is partly bioavailable and provides the organisms in that ecosystem with sufficient essential metals. As the latter

assumption has not been verified, the use of the PNECadd approach to protect against possible deficiency effects may not be justified.

We also are concerned that exposure and effect scenario's for metal depend crucially on bioavailability and this, in turn, varies from one environmental situation to another and their physico-chemical characteristics. Due to several physico-chemical processes, copper will exist in different chemical forms, some of which are more bioavailable than others. It should thus realized that the bioavailability of metals in both laboratory tests and in the environment may be affected, to a much larger extent than other metals, by several physico-chemical parameters, such as pH, alkalinity, hardness and the presence of other elements. For copper differences in bioavailability/toxicity may vary up to 3 orders of magnitude due to these factors. This means that it is important that both effects and exposure concentrations used in one risk assessment are from the same physico-chemical, and hence bioavailability scenarios. The bioavailability of copper has apparently not been taken into account in this way for exposure and effects estimates in this report.

We now treat PEC and MTT in turn.

b. Exposure assessment (PEC)

All the environmental concentrations used in the risk assessment in the report are derived from model calculations and we have some concern that these have not been fully validated with field measurements.

The release fluxes from treated wood are modeled using parameters derived from experimental observations that seem to be very limited (i.e. based on one specific type of the Cu-Cr-As solution and red/white deal only). Moreover, from the limited field information that we have available they appear to over-estimate likely environmental concern following exposure at time intervals used by the model (e.g. G. Van Eetvelde 1998)
Releases into the surface water from sheet piling are based on USES 01 and some would argue that in comparison with the later USES 02, 03 or EUSES that this will tend to overestimate environmental concentrations.

Sediment concentrations are estimated using partitioning coefficients.

Turning to the estimation of Cu concentrations in porewater and groundwater, we are concerned that processes such as adsorption and immobilization (i.e. speciation in general) in sediments are insufficiently accounted for in the present calculations. We therefore believe that in making the concentration in ground water equivalent to that in porewater the report takes an unrealistic worse case situation; i.e. the ground concentration should be much less that the porewater concentration.

c. Effects assessment (MTT)

All the threshold effect concentrations used in the report are ultimately from a single publication by Crommentuijn et al. (1997) with background levels taken from Van de Meent et (1990). The derivation of acceptable concentrations is based on sensitivity distribution for surface water and soil with the usual 95% protection. The sensitivities for aquatic organisms are in terms of species loss (based on NOECs) and for soils are in terms of impairment of microbial processes. For sediment threshold were derived from the equilibrium partitioning technique. These approaches are not without their critics but in any event are likely to give conservative effects threshold concentrations. In terms of the risk assessment comparing maximum permissible additions with predicted emission concentrations it is our view that the most critical components are in terms of background concentrations chosen. These were 0.4 µg/l for water and 36 mg/kg for soil and sediment. We believe that even within the Netherlands there is likely to be considerable variations in backgrounds above and below these specified fixed concentrations (Zuurdeeg, 1992 and 1999). We believe that this variability should be taken into account in the risk assessment and this should be done using modern probabilistic techniques.

Question 3. In the light of the CSTEE's conclusions on points 1 and 2 and all the submitted information, is the CSTEE of the opinion that the Netherlands have provided sufficient sound scientific evidence to show that wood treated with copper compounds presents environmental risk at any stage of its life cycle (impregnation, use and waste)? If so, is it possible to quantify these risks or give an indication if they are a cause for concern?

In terms of the environmental quality criteria that the Dutch use to justify a ban of wood treated with Cu we reject the use of persistence threshold for metals and do not accept the logic of using a maximum groundwater concentration (see answer to Question 1). We believe that risk assessment should be the primary basis for risk management decisions. In this context we believe that the general approach used by the Dutch is sound but have concerns about the way it has been applied. In particular we question the PECs and think that these are likely to be unrealistic worst cases. We are content with the approach used for deriving the effects thresholds but have not been able to fully evaluate the quality and relevance of the database. We are concerned with the way a single fixed background figure has been integrated into these. All these concerns would have implications for the risk characterization and, in our view, these would need to be revisited by use of more precise and up-to-date information before any action could be justified. In any event we believe that the critical phase of the life cycle from a management point of view is at application and that use of up-to-date Best Available Technology

(BAT) could alleviate most of the problems for environmental impact in the use phase. We remain unclear, about possible impacts arising from waste and its disposal and are of the view that this should be investigated further. Neither the issue of use of BAT in application nor the question of waste disposal were considered explicitly by the Dutch in their Notification.

References

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