

# The Record on the Symposium on Rapid Assays for Dioxins and Related Compounds

**Date:** 15-16 December, 2003

**Venue:** WHO European Centre for Environment and Health, Rome, Italy

**Annex:** List of participants

## **I. The Background:**

The World Health Organization (WHO) and the European Commission (EC) started a joint project on Rapid Assays for Dioxins and Related Compounds in September 2001. At the brainstorm meeting held at EU headquarters in Brussels in September 2001, it was concluded that further development of rapid assay methods were greatly needed for screening dioxins and related compounds in feed, food and environmental samples. It was decided to gather information on current rapid assay methods and to review the current situation and further developmental needs for rapid assays for dioxins and related compounds.

To gather information on the current rapid assay methods a questionnaire was sent to developers of rapid assays for dioxins and related compounds.

In February 2003, a meeting was held at Utrecht, Netherlands to prepare to compile the received information and to prepare a draft report based on the provided data. The draft report was finalised in November 2003 and distributed for review by experts as well as developers of Rapid Assays Methods.

## **II. Objective of the Symposium:**

A Symposium gathering experts and developers of rapid assays was organised by WHO and EC on 15-16 December, 2003 at the WHO European Centre for Environment and Health, Rome, Italy

The objective of the symposium was to gather further information on current rapid assay methods and to review the draft report describing the current situation and to identify (research) needs for further development of rapid assays for dioxins and related compounds.

### **III. Discussion and outcome of the Symposium:**

#### **a) The current situation:**

Analytical chemistry-based screening methods had made great progress in the last few years with respect to automisation and optimization of screening and clean-up methods, as well as with respect to replacing HRMS by cheaper detectors. Some of these developments in extraction and clean-up techniques may also be applicable to bio-analytical methods and HRMS.

Some of these advantages are counteracted by the drawbacks of lack of sensitivity and/or specificity.

Currently, high throughput, cost effective methods suitable for use as screening methods in enforcement monitoring in food and feed (at low levels eg EU limits) are the cell based receptor assays. However, only provided that performance characteristics, including measurement uncertainty and false negative rate have been demonstrated and documented within the laboratory using this method.

Application of bio-analytical assays for PCDD/Fs and PCBs as currently available, especially at low levels requires a certain level of expertise. Bio-analytical methods are only to be used as screening assays and any sample above the level of interest must be re-analysed using a confirmatory method. It has to be noted that depending upon the matrix, response might differ between bioassay and MS, depending on the congener pattern.

#### **b) Recommendations for a correct application of screening methods:**

- Use of reference materials for bioassay evaluation can be considered. Further efforts need to be made to incorporate the use of internal and/or external standards and to improve the consistency and quality of recovery blank response can be greater than relevant limits
- Care should be taken in the choice of extraction solvent, since toxicity of the extraction solvent can kill cells resulting in false blanks
- Dilution series needs to be within a concentration range of 5-50 % of the max of the dose response curve (for dilutions) and at higher concentrations
- Care needs to be taken where there is a difference in the slopes and efficacy of dose-response curves in different sample types.
- Variability observed in results of collaborative trials/proficiency testing seems to be mainly due to extraction, not cell response. Therefore particular attention should be paid to the extraction procedure followed.
- Expanded uncertainty estimates should be calculated for all methods (ref. Eurachem guidelines) before they are used for enforcement screening
- The results of validation studies at low concentrations for analytical chemistry methods are required

### **c) Needs for further development/research**

- There is a continued need for more and better-defined certified reference materials (CRMs) with certified values for all TEF compounds.
- Improvements in clean-up, blanks and recovery for a variety of matrices is needed
- The development of rapid and automated sample extraction and clean-up should be encouraged. The use of high pressure liquid extraction (PLE) may offer the possibility of an efficient extraction combined with preliminary clean-up of solid samples
- Improvements are required with respect to sensitivity of low cost detectors and data processing demands (inc software) of some of the techniques (eg GC x GC ECD and GC x GC TOF MS)
- There is a need for a wider range of stationary phases for GCxGC eg liquid crystalline phases.

Annex

**Symposium on "RAPID ASSAYS" of Dioxins and PCBs  
15-16 December 2003  
Rome, Italy**

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### **Secretariats**

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