Environmental Hazard and Risk Assessment Approaches for Endocrine-Active Substances (EHRA): Developing Technical Guidance Based on Case Studies to Support Decision-Making

A SETAC Pellston Workshop® Summary Report

The SETAC Pellston Workshop "Environmental Hazard and Risk Assessment Approaches for Endocrine-Active Substances" (EHRA) was held from 31 January to 5 February 2016 in Pensacola, Florida, USA.

Forty-eight international experts participated: 27% from government, 27% from academia, 21% from industry and 25% independent consultants[1].

The primary aim of the workshop was to provide objective advice, based on the current level of scientific understanding, to enable regulators and policy makers to make considered, informed decisions on whether to select a hazard- or a risk-based approach for a given endocrine-disrupting substance (EDS) under review. The workshop additionally considered recent developments in the identification of EDSs (see attached appendix for the glossary of terms).

Participants conducted case studies on six endocrine-active substances, which were selected because they represented a range of modes of action and were considered to be data-rich in relevant information at all levels of biological organization. Data were assessed for reliability and weighted accordingly. The substances selected were ethinylestradiol, perchlorate, propiconazole, trenbolone, tributyltin and vinclozolin. The case studies were not comprehensive safety evaluations, but they provided the foundations for clarifying the key issues and procedures required to meet the workshop's aims.

Workshop participants also highlighted areas of scientific uncertainty, and they made specific recommendations for research and methods development to resolve some of these issues.

A collection of papers will result from the workshop and will be submitted to peer-reviewed journals in 2016. The first of these papers is an overall synthesis document "Recommended approaches to the scientific evaluation of environmental hazards and risks of endocrine-active substances," which provides guidance for scientists working in regulatory authorities and industry on the problems most likely to occur in environmental hazard and risk assessment.

Four additional papers address cross-cutting issues identified in the case studies, titled:

- Challenges in assigning endocrine-specific modes of action: Recommendations for researchers and regulators
- Uncertainties in biological responses that influence hazard and risk approaches to the regulation of endocrine active substances
- Current limitations and a path forward to improve the assessment of endocrine active substances
- Population level adverse effects of endocrine-active substances

The overall conclusion of the EHRA SETAC Pellston Workshop was that if environmental exposure, effects on relevant taxa and life-stages, delayed effects, and dose- and concentration-response relationships are adequately characterized, then conducting environmental risk assessment of EDSs is scientifically sound.

[1]Funding came from all of these sectors and no undue influence was allowed from any group.

Appendix

Glossary of Terms	
TERM	DEFINITION
Dose	The amount of a substance in the body of an organism.
Endocrine-Active Substance	A substance that can interact with an endocrine system to cause responses that may or may not give rise to adverse effects.
Endocrine-Disrupting Substance	An exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub) populations.
Exposure	The concurrent presence of a substance and an organism in the same matrix (soil, air, water etc.).
Hazard	Inherent property of an agent or situation having the potential to cause adverse effects when an organism, system, or (sub)population is exposed to that agent.
Hazard Assessment	A process designed to determine the possible adverse effects of an agent or situation to which an organism, system, or (sub)population could be exposed.
Relevance	The extent to which data or tests are appropriate for a particular hazard identification or risk characterization.
Reliability	The inherent quality of a test report or publication relating to a clearly described experimental design (reproducibility) and the way that the experimental procedure and results are reported to provide evidence of the clarity and plausibility of the findings.
Risk	The probability of an adverse effect in an organism, system, or (sub)population caused under specified circumstances by exposure to an agent.
Risk Assessment	A process intended to calculate or estimate the risk to a given target organism, system, or (sub)population, including the identification of attendant uncertainties, following exposure to a particular agent, taking into account the inherent characteristics of the agent of concern as well as the characteristics of the specific target system.

Adapted from the International Program on Chemical Safety (IPCS) 2004 Risk Assessment Terminology. World Health Organization, Geneva.