

Division VII - Chemistry and Human Health

# *Toxicology and Risk Assessment*

*Terminology and Education*

The IUPAC Subcommittee on Toxicology and Risk Assessment

Chair and Presenter: John Duffus



## *IUPAC glossary and textbook*

- ✧ 1989 - IUPAC Commission on Toxicology and Committee on the Teaching of Chemistry starts glossary of terms in toxicology, completed and published in 1993
- ✧ 1993 - textbook "Fundamental Toxicology for Chemists" to support accompanying curriculum; 2nd edition in preparation 2004



## *IUPAC toxicology modules*

- ✧ [http://www.iupac.org/publications/cd/essential\\_toxicology/](http://www.iupac.org/publications/cd/essential_toxicology/)
- ✧ Microsoft Powerpoint format for flexibility in use
- ✧ Main objective to provide material from which teachers and lecturers could select what they wanted in accordance with the needs of their own students, supplementing it with examples relevant to the students' own experience



## *IUPAC toxicology modules*

- ✧ Modules must be amenable to self study since the teachers / lecturers would often have to teach themselves
- ✧ Accordingly, we included self assessment questions and suggested essay titles together with separate guidance as to answers.



## *Educational objectives*

- ✧ To provide educators with a presentation and text on essential toxicology from which they could select material appropriate for local requirements.
- ✧ To explain fundamental ideas in toxicology clearly so that students could understand the hazards and risks associated with the use of chemicals.



# *Unit 1 - general considerations*

✧ Aims:

- ✧ 1. To point out the relationship between dose and effect - threshold and nonthreshold effects
- ✧ 2. To point out that natural substances may be highly poisonous and manmade substances may be of low toxicity



## *Unit 2 - factors affecting risk of poisoning*

✧ Aims:

- ✧ 1. To explain how substances move through our environment
- ✧ 2. To explain how effective exposure depends on the physiological route of exposure
- ✧ 3. To explain how toxic effects depend upon how the body reacts with chemicals (toxicokinetics and toxicodynamics, local and systemic effects)



## *Other units*

- ✧ Unit 3 - environmental toxicology
- ✧ Unit 4 - hazard and risk
- ✧ Unit 5 - management of potentially toxic substances
- ✧ Unit 6 - risk assessment and risk management
- ✧ Unit 7 - common types of chemical that cause health risks (DDT case study)





## *Methods of presentation*

- ✧ The PowerPoint programme permits handouts to be printed, and overhead viewfoils to be prepared
- ✧ In the absence of an overhead projector, individual slides can be printed out on A4 paper and used as a means of presenting the material selected by the teacher



## *Current activities*

✧ IUPAC has added a glossary of terms in toxicokinetics

✧ See

<http://www.iupac.org/publications/pac/2004/pdf/7605x1033.pdf>

✧ The original glossary of terms in toxicology is now being revised

✧ A further explanatory dictionary is being prepared considering at length some of the most important fundamental concepts



## *Related publications - 1*

- ✧ Related publications available through the IUPAC site include:
  - ✧ workplace risk assessment
    - ✧ <http://www.iupac.org/publications/pac/2001/7306/7306x0993.html>
  - ✧ heavy metal - an unacceptable term
    - ✧ <http://www.iupac.org/publications/pac/2002/7405/7405x0793.html>



## *Related publications - 2*

### ✧ risk and hazard terminology

✧ [http://www.iupac.org/publications/ci/2001/march/risk\\_assessment.html](http://www.iupac.org/publications/ci/2001/march/risk_assessment.html)

### ✧ the measurement of volatile organic compounds

✧ <http://www.iupac.org/publications/pac/2000/7203/7203heinrich-ramm.html>

### ✧ chemical speciation

✧ <http://www.iupac.org/publications/pac/2000/7208/7208templeton.html>



## *Related publications - 3*

✧ mechanisms of immunosensitization to metals (IUPAC Technical Report)

✧ <http://www.iupac.org/publications/pac/2004/7606/7606x1255.html>

✧ diagnostic relevance of the lymphocyte transformation test for sensitization to beryllium and other metals (IUPAC Technical Report)

✧ <http://www.iupac.org/publications/pac/2004/7606/7606x1269.html>



## *Acknowledgments 1*

✧ I am deeply indebted to my colleagues on the former IUPAC Commission for Toxicology, the current Subcommittee on Toxicology and Risk Assessment, and the IUPAC Chemistry and Human Health Division Committee for their contributions to the work described and for continuing constructive support



## *Acknowledgments 2*

- ✧ The former IUPAC Committee on the Teaching of Chemistry, and especially its Chair, Professor John Bradley, and Professor Bob Bucat, played a major part in the development of the “Essential Toxicology” presentations

