Kalmar ECO-TECH '05 and
The Second Baltic Symposium on Environmental Chemistry
KALMAR, SWEDEN, November 28-30, 2005

SIMULATION OF PESTICIDE RESIDUE BIOACCUMULATION IN PLANT MATERIAL USING CHROMATOGRAPHIC AND CHEMOMETRIC METHODS

Monika Michel[1]
Bogusław Buszewski[2]
[1]*Plant Protection Institute, Poland*
[2]*Nicholas Copernicus University, Poland*

ABSTRACT

The overall problem is, in essence: how to develop effective procedures for environmental/ecological impact and risk assessment? Research effort and thinking must be interdisciplinary in character, must indeed extend beyond the boundaries of individual scientific disciplines since the key questions mainly involve complex interfacial problems.

There are several crucial challenges for environmental scientists in the next decade: (1) understanding the mechanisms of molecular and subcellular interactions with pollutant chemicals, including genomic and proteomic aspects; (2) the development of predictive simulation models of toxic effects on complex cellular and physiological processes; (3) the progress in an integrative methodology that draws upon the use of biological, physical and chemical environmental data coupled with analytical tools and prognostic bioindicators for the detection of complex pollution impact on whole biological systems (biocomplexity).

The uptake of chemicals (pesticides or environmental contaminants) into plants may lead to residues that could be a hazard to human health and ecosystems. There is a large interest in the prediction of the amount and type of these residues. Plant physiological processes and morphological traits control uptake, migration and sorption of xenobiotics in plants. Using modern analytical methods, which are the most important to describe and understand these processes: sample preparation and separation techniques, especially chromatographic techniques, and mathematical models for the predicting of chemical uptake into plants, we can try to define the best safety strategy in pesticide design, risk assessment, and environmental biotechnology.