

## **Modelling the fate of contaminants in the ecosystem to evaluate the ecotoxicological risk with the software program TerraSys**

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### *Topics:*

The modelling of pathways and exposure is a critical step in the ecotoxicological risk assessment of contaminated sites. The remarkable analytical power of the new software program TerraSys permits the calculation of concentrations and receptor exposure levels in complex ecosystems composed of multiple trophic levels.

### *Abstract:*

Ecotoxicological risk assessment is a complex process, particularly because of the various types of receptors it is aimed at (animals, microorganisms, vegetation, etc...). These biological receptors interact together in a complex food chain of multiple trophic levels, as well as with the abiotic components of the supporting habitat (air, soil, rivers, lakes, etc...). The transfer of contaminants from one component to another is dependant on the types of interactions between the two components (adsorption, volatilisation, dilution, ingestion, inhalation, etc...), but also on the indirect transfer through other components. For example, a small mammal can be exposed to a volatile substance present in soil through direct contact with the soil, but also through inhalation of the air above the soil or consumption of the vegetation growing in it. Although there are many publications designed to facilitate the modelling of multi-media concentrations, the complexity of the required analyses demands the elaboration of an algorithm and the automated execution of computations.

The recently developed software program TerraSys allows the definition of complex conceptual models which include the various types of biotic and abiotic elements of the ecosystem and their interactions. TerraSys is made up of a number of well-researched and recognised mathematical models that characterise these interactions. These models, along with an elaborate algorithm, estimate the concentration levels of contaminants in different areas of the site, as well as evaluate the degree to which the fauna and flora have been exposed.

Based on existing data, a case study will be presented to illustrate the definition of a conceptual model with TerraSys and the estimation of multi-media concentrations for the assessment of ecotoxicological risk.