



High tier studies: from laboratory to semi-field approach

Registration schemes for plant protection products require registrants to assess the potential ecological risk of their products using a tiered approach.

The aim of the higher-tier research projects is providing data for higher-tier environmental risk assessments in the context of the registration and admission of plant protection products on the EU and/or US market.

Tiered approaches are the basis of risk assessment schemes. The concept of tiered approaches is to start with a simple conservative assessment and to only do additional more complex work if necessary.

The first tier includes triggers that are calculated from the predicted environmental concentration (PEC) and toxicity estimated of the pesticides. If the first-tier triggers indicate that the pesticide shows a potentially unacceptable risk, consideration is given to collecting and evaluating information in the higher-tier tests (semi-field and field tests).





Laboratory tests: a simple tool for Ecological Risk Assessment

ChemService offers a wide range of laboratory tests standardized according to international guidelines:

Terrestrial ecotoxicology:

- Non-target plants (NTPs): seedling emergence and vegetative vigor studies crop and weed species
- Soil organisms: laboratory studies on earthworms, collembola, predatory mites, Non-target arthropods (NTAs) and soil microflora

Aquatic ecotoxicology:

- acute and chronic laboratory studies performed under static and static-renewal test conditions on fish, invertebrates, algae and aquatic macrophytes

Honey bees and other pollinators:

- honey bees and bumble bees: acute and chronic studies on adults and larvae

High tier studies: a more realistic approach

Field and semi-field studies are important tools in the ecotoxicological risk assessment of plant protection products. While these studies represent far more realistic conditions than laboratory tests, they also present a challenge, for our experts, for the analysis and interpretation due to the large and complex datasets.

- Non-target arthropods (NTAs): laboratory, extended laboratory and aged residues studies
- Honey bees: semi-field tunnel studies

Conclusion: laboratory studies versus semi-field approach

	Laboratory tests	High tier approach
Strengths	<ul style="list-style-type: none"> Great control and replication Standardization and transferability Strong evidence of causation 	<ul style="list-style-type: none"> Improved ecological validity Direct connection of endpoints of concern Large spatiotemporal scale
Limitations	<ul style="list-style-type: none"> Lack of ecological realism Small spatiotemporal scale Limited range of endpoints 	<ul style="list-style-type: none"> Less control due to real life setting Often more costly

Despite traditional ecotoxicological tests being an irreplaceable tool, for comparative and screening estimation of the adverse effects of potentially dangerous chemicals, the need is for more ecologically-based approaches which has now been recognized by the scientific community and has been highlighted international regulators. Hence the high tier studies represent the future of ecotoxicology.