

ENVIRONMENT SECTOR

Biotechnology Research Institute

INFORMATION

www.irb-bri.cnrc-nrc.gc.ca



"We are in the business of developing ecotoxicological tools for assessing risk, specifically the risk to humans and ecosystems posed by environmental contaminants. We provide answers to key environmental questions."

Applied Ecotoxicology Geoffrey Sunahara, Ph. D.

Group Leader

Tel.: (514) 496-8030

Fax: (514) 496-6265

geoffrey.sunahara@cnrc-nrc.gc.ca

Biotechnology Research Institute - NRC

6100 Royalmount Avenue

Montréal, Quebec

H4P 2R2 Canada

Tel.: (514) 496-6250

Fax: (514) 496-5007

www.irb-bri.cnrc-nrc.gc.ca

irb-bri@cnrc-nrc.gc.ca

APPLIED ECOTOXICOLOGY

BRI's Applied Ecotoxicology Group develops bioanalytical tools and assessment methods to support activities in the environmental pollution control sector. Our technologies are being used to predict the ecological safety of existing chemicals, as well as the newly emerging products of environmentally sustainable processes. Our methods can improve the accuracy of traditional ecological risk assessment (ERA) strategies and techniques. We use microbes, plants, invertebrates, and cell cultures to evaluate the adverse effects of compounds, and use this data for environmental risk assessment purposes, such as the determination of environmentally acceptable levels in terms of risk to the ecosystem.

Our Research Activities

- ▶ Evaluation of the ecotoxicological impact of different compounds at various trophic levels, in interrelated and dynamic ecosystems
- ▶ Assessment of the bioaccumulation of potentially hazardous chemicals in terrestrial higher plants and invertebrates
- ▶ Development of biochemical-based indicators (e.g., cytotoxicity directed biomarkers) and strategies to measure exposure and toxicity to chemicals of concern including heavy metals, pesticides, endocrine modulating substances, and persistent organic pollutants
- ▶ Development of bioanalytical tools for the evaluation of new products through impact assessment as part of Life Cycle Analysis (LCA)

Our Services

We develop diagnostic aids to assess the toxicity of existing and newly-emerging chemicals, and the potential ecotoxicological impact of these compounds on the environment. These tools have been applied towards:

- ▶ The development of toxicology-based strategies to assess the environmental safety of chemicals (including new therapeutic agents) on ecological receptors
- ▶ The ecotoxicological characterization of sites contaminated with mixed pollutants. This data is valuable to environmental risk assessors and managers of these contaminated sites

- ▶ The toxicological assessment of new environmental decontamination processes that treat soils and sludge containing toxic chemicals such as heavy metals and persistent organic pollutants. We collaborate with the upstream engineers and managers to improve their treatment process
- ▶ Ecotoxicological-based risk assessment of contaminated sites

Research Examples

- ▶ Laboratory and field studies in collaboration with Canada's Department of National Defence to establish environmentally acceptable threshold levels for explosives at Canadian military training sites
- ▶ Collaboration with the United States Department of Defence, US-EPA and the Strategic Environmental Research and Development Program (SERDP), to develop ecological toxicity screening levels for the ERA of explosives-contaminated sites
- ▶ NSERC-funded collaboration with Sanexen Environmental Services Inc., INRS-ETE, Montreal Botanical Garden and Biolix Corporation to validate and optimize a process for the decontamination of municipal wastewater sludge for potential use as an agricultural fertilizer
- ▶ Development of a cytotoxicity-based biosensor to rapidly detect the presence of certain toxic heavy metals in aqueous environmental samples

Reference Book

Publication of a reference book entitled *Environmental Analysis of Contaminated Sites* (John Wiley and Sons, United Kingdom). Focussing on ecotoxicity testing and theoretical approaches in the management of contaminated sites, this book is widely viewed as essential reading in land use reclamation.

Our Business Approach

Our team is dynamic and flexible, tailoring its collaborations to meet the needs of its partners. We engage in service contracts and license out our technologies. With BRI, you have access to advanced technologies and a broad diversity of experts who publish regularly in leading scientific journals.

Contact us for more details



National Research
Council Canada

Conseil national
de recherches Canada

Canada