

ENVIRONMENTAL SECTOR

Biotechnology Research Institute

INFORMATION

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



"Our expert team can enhance pollutant degradation or organic waste transformation by developing innovative bioprocesses and real-time control tools and by understanding the functionality of microbial consortia, at the level of our laboratory and pilot plant and in the field."

ENVIRONMENTAL BIOENGINEERING

In addition to developing effective treatment solutions for a wide range of contaminants of groundwater or polluted wastewater, BRI's Environmental Bioengineering Group works at improving the effective anaerobic digestion processes to biomass conversion. Our experts are involved in all stages from the design and modeling of the bioprocess up the scale-up of the project at an industrial site.

Our Research Activities

- ▶ Development of coupled anaerobic/aerobic technologies that completely degrade chlorinated solvents such as PCE, TCE, TCA and TCP.
- ▶ Development of permeable biobarriers to treat contaminants (e.g. MTBE, hydrocarbons) directly within the aquifer.
- ▶ Development of remote monitoring systems and real-time control tools for bioprocesses.
- ▶ Microengineering and molecular characterization of multifunctional biofilms (e.g. methanogenic/methanotrophic associations, addition of *de novo* catabolic functions or optimal selective stress) for better contaminant degradation.
- ▶ Optimization of anaerobic digestion, which is today's most promising process for treating agro-food industry effluents and organic solid waste, in investigating factors for improving methane and hydrogen yields under thermophilic and hyperthermophilic conditions.

Our Services

- ▶ Physico-chemical and microbiological characterization of contaminated sites and effluents.
- ▶ Testing the biodegradability of groundwater and wastewater through respirometry, radiorespirometry, dehalorespirometry, specific dissimilation kinetics and catabolic gene probes.

- ▶ Testing the biochemical acid, sulfur, methane and hydrogen-generating potential of organic wastes
- ▶ Construction of specialized microbial consortia to treat targeted contaminants. Monitoring microbial population structures.
- ▶ Immobilization of microorganisms through encapsulation or accretion on microsupports.
- ▶ Design, development, optimization and scale-up of treatment and decontamination bioprocesses.
- ▶ Mathematical modeling: prediction, optimization by simulation, population dynamics.
- ▶ Real-time control tools (software and sensor adaptation).
- ▶ Scientific and technical guidance for full-scale and on-site bioremediation.

Our Patents

Our team holds patent rights for four innovative processes:

- ▶ Coupled anaerobic/aerobic single-step system to treat chlorinated organics.
- ▶ Bacterial immobilization technique.
- ▶ Permeable biobarrier to treat petroleum hydrocarbons in groundwater.
- ▶ Technology for the bioremediation of nitrate-contaminated groundwater.

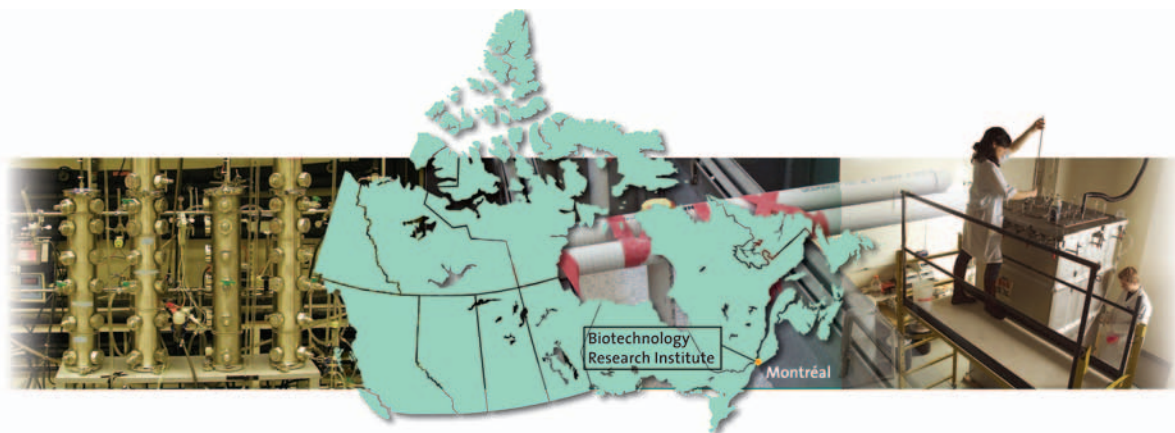
Our Business Approach

Our team is dynamic, flexible and capable of tailoring our collaborations to meet the needs of our partners. We engage in service contracts and license out our technologies. With the BRI's Environmental Bioengineering Group, you have access to an experienced, multidisciplinary team and the most advanced technologies to successfully carry out your project.

Contact us for more details.

Environmental Bioengineering
Serge R. Guiot, D. Sc.
Group Leader
Tel.: (514) 496-6181
Fax: (514) 496-6265
serge.guiot@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



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