

Biotechnology

Evaluating Environmental Impact



What is Biotechnology?

Biotechnology is the use of genetic information and biological techniques to create new products and services, such as better medicines or hardier crops. Organisms like plants, fungi and bacteria are used in this process.

Canada is currently exploring the use of biotechnology in the forestry sector, including its potential impact on the environment.



Biotechnology in Our Forests

Biotechnology-based products and services provide new, innovative tools for improving forest regeneration and protection.

Ultimately, this promotes sustainable forest development and helps Canada to maintain its share of the world market for wood and wood products.



New Tools

Biotechnology research in Canada is focused on creating innovative new products for the forestry sector.

- Trees that have been genetically modified to express superior traits (like denser wood, faster growth, ability to withstand weather extremes) or resistance to pests and disease
- Innovative reproductive methods
- Biocontrol products



Environmental Impact

But what happens when these new biotechnology-derived products are introduced into forest ecosystems?

Possible Impacts

Genetically Modified
Trees



- Gene escape to other organisms
- Invasive, weed-like development
- Adverse effects on other organisms
- Changed interactions within the forest ecosystem
- Impact on genetic diversity and species integrity

Genetically Modified
Biocontrol Products



- Gene escape to other organisms
- Adverse effects on non-target organisms
- Changed interactions within the forest ecosystem
- Pest resistance

Acting Responsibly

Canada is a world leader in the development and use of forest biotechnology products. We are also at the forefront of research on the environmental impacts of these products.

Through extensive testing processes and regulatory scrutiny, we are ensuring that biotechnology products are safe and effective well before they are released into the environment.

Putting Safety First

The Canadian Forest Service (CFS) conducts ongoing research on the environmental impact of biotechnology-derived products to ensure the safety of humans, animals and the environment.

Before any new product is released into the environment, rigorous risk assessment studies are conducted. Testing is first done in a laboratory, Products are subsequently tested in a greenhouse followed by field trials. Field testing are conducted under strict conditions according to research field permit issued by Canadian Food and Inspection Agency and/or Pest Management Regulatory Agency. Confinement conditions are applied in all cases.

CFS Studies



CFS environmental studies are conducted using various methods of assessment.

For trees, CFS Centres are conducting stand management/deployment studies, conservation strategies, monitoring protocols and have recently begun limited use of field trials.

For biological pest control agents, assessments include studies of host range, infectivity and toxicity, monitoring protocols and field trials.

Recent Research

Scientists at the CFS Great Lakes Forestry Centre are studying how insect baculoviruses and their DNA (whether genetically modified or naturally occurring) impact the surrounding environment.

A field microcosm experiment has been conducted to track the fate of these viruses in samples of water, aquatic sediment, litter, mineral soil and leachate.

Regulatory Measures

Canadian forest biotechnology products are regulated by the federal government under several acts. The CFS helps by providing scientific and technical expertise to the regulatory agencies involved.

Canada is also working with the Organization of Economic Cooperation and Development (OECD), assisting with its efforts to harmonize regulatory control of biotechnology-derived products.

Canadian Regulations

Product	Act	Agency
Genetically Modified Trees	<i>Seeds Act</i>	Canadian Food Inspection Agency (CFIA)
Imports	<i>Plant Protection Act</i>	CFIA
Biofertilizers and Mycorrhizae	<i>Fertilizers Act</i>	CFIA
Biopesticides	<i>Pest Control Products Act</i>	Pest Management Regulatory Agency

Fast Facts

- Microcosms are small models of the ecosystem into which a biotechnology-derived product will be released.

Products are first tested in laboratories until their potential impacts can be assessed, then placed in strictly monitored field trials. Microcosms help scientists to assess a product's survival, and its toxicity in soil and leaf litter, water and insect tissue.



Fast Facts

- Canada's first field trial for a genetically modified tree species was approved in 1997.

The trees are transgenic poplars and studies are carried out to document gene expression and impacts on soil and microfauna.



Contact Information

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