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BIOTECHNOLOGY  
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Good ideas are growing

BIOTECHNOLOGY BIOFUELS

# BIOTECHNOLOGY AND BIOFUELS

Sustaining Growth for Today  
and Tomorrow



## Did You Know?

*“Currently, biofuels account for less than two percent of liquid transport fuels globally and take up less than one percent of the world’s agricultural land”*

—World Business Council for Sustainable Development <sup>1</sup>

- Canada’s House of Commons passed legislation in May 2008 mandating five percent ethanol in all gasoline fuels by 2010 and two percent biodiesel by 2012. <sup>2</sup>
- Canada has the world’s first cellulose ethanol demonstration facility—operated by Iogen Corporation—in Ottawa. This technology converts non-food wastes such as corn stover, wheat straw, wood biomass and switchgrass into fuel. <sup>3</sup>
- Canada has 16 ethanol plants built or under construction using wheat or corn as feedstocks and three biodiesel plants using canola oil or animal fats as feedstocks. <sup>4</sup>
- Built in rural communities, these plants offer farmers alternate markets for their crops and diversify employment opportunities.
- Producing ethanol results in a by-product called distillers grains, a high-protein feed for livestock. One bushel of corn equals 11 litres ethanol and 18 lb. distillers grains. Biodiesel production results in a similar byproduct—oilseed cake—that is also highly nutritious for livestock feed. <sup>5</sup>
- Sustainability is an ongoing process of adapting to new conditions. Diverting a small portion of Canada’s grain-based crops to biofuels offers market options to farmers for different grades and varieties of crops, while producing premium grades for food.
- Biotech corn, soybeans and canola, grown in Canada since 1996, offer more sustainable production by increasing yields, requiring fewer applications for weeds and insects and requiring less fuel in field applications.





***“Even when Canada reaches its biofuel goals, 95 percent of Canadian cropland will continue to produce food.”***

***—James Bezan, MP  
Selkirk-Interlake and Chair of  
House of Commons Standing  
Committee on Agriculture  
and Agri-Food.***



***“Recent research indicates that biofuels could result in net savings of 65 percent in energy resource depletion.”<sup>6</sup>***

***—International Service  
for the Acquisition  
of Agri-Biotech  
Applications***

## **Agricultural Biotechnology: Helping Today and Poised to Grow for Tomorrow**

### **🌱 Making a contribution to decreasing greenhouse gases –**

By planting genetically modified seed, farmers are gaining permanent savings in carbon dioxide emissions through reduced use of fossil-based fuels, as fewer passes of the tractor over the field are needed to apply insecticide and herbicide sprays. Secondly, conservation tillage leads to increased soil carbon sequestration.

**Ethanol** – derived from corn, wheat straw or cellulose – is blended with petroleum to fuel cars. Canadian capacity, currently at 1.6 million litres per year, must increase to 2 billion litres to meet federal targets.<sup>7</sup>

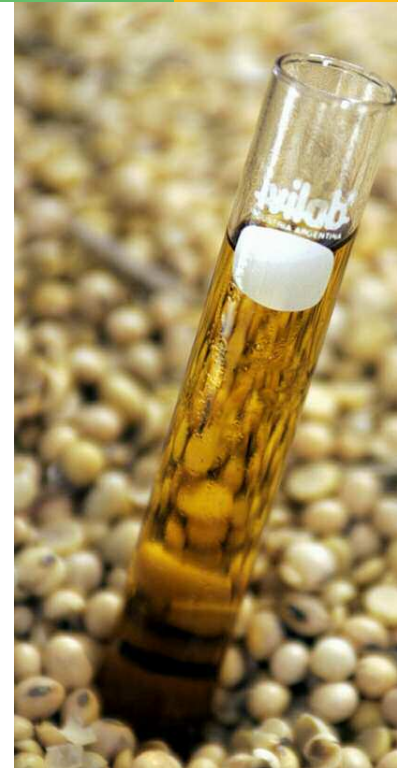
**Biodiesel** – made from canola oil or animal fats – is used in farm equipment, trucks and buses. Canadian bus fleets, ranging from Saskatoon to Toronto to Montreal, are on the BioBus program, using a B5 biodiesel blend to reduce greenhouse gases.<sup>8</sup> Biodiesel production is expected to increase to 600 million litres per year to fulfill the federal government’s mandate.

**🌱 Boosting crop yields** – Biotechnology has increased crop yields significantly. Since new varieties were introduced in 1996, Canadian corn yields, for example, have increased 33 percent from 112.4 bushels per acre to 150.5 bushels per acre in 2007.<sup>9</sup> Yield increases have also been noted in soybeans and canola.

**🌱 Higher yields mean more grain for food and fuel** – Biotechnology has boosted the amount of grain produced per acre which presents two clear benefits: first, in producing bigger volumes for food and feed to sustain a resource-hungry world, and secondly, in improved crop varieties for biofuel production in both industrial and developing countries.

## Biotechnology: What's in Store for the Future?

- 🌿 **The next generation of biotech crops promises efficiencies** – New crop varieties are being developed for more efficient processing into biofuels, lowering costs and boosting yields.
  - Monsanto, for example, has developed corn hybrids which contain higher levels of fermentable starch that allow ethanol plants to obtain higher ethanol yields.<sup>10</sup>
  - Syngenta has developed dent corn with high levels of amylase, a naturally occurring enzyme which is typically supplemented in the ethanol production process, leading to environmental benefits and costs savings of 10 percent.<sup>11</sup>
- 🌿 **Researchers are developing biocatalysts** – Enzymes, yeasts and bacteria are used to convert any organic matter into cellulosic ethanol – an attractive option since feedstocks such as agricultural byproducts, grasses and wood chips are cheap and abundant. Converting these feedstocks into ethanol requires less fossil fuel and uses the whole plant, rather than just the grain.
- 🌿 **Companies are developing improved biofuels** – DuPont and BP, for example, have partnered to develop a biofuel that performs more like gasoline than ethanol.<sup>12</sup> Biobutanol will be blended at higher rates, transported through existing infrastructure and provide better fuel economy.<sup>13</sup>



*“The stone age didn’t end because we ran out of stone, nor will the oil age end because we ran out of oil.”*

—Geoffrey Ballard





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The Council for Biotechnology Information is a NAFTA-aligned, non-profit association whose mandate is to communicate science-based information about the benefits and safety of agricultural and food biotechnology. CBI members are the leading agricultural biotechnology companies.

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4 Canadian Ethanol Production List/Canadian Biodiesel Production List  
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