Canada & US vs. Mexico's Ban on GM Corn

The CUSMA trade dispute champions the biotech industry over food sovereignty

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Summary

Canada and the US are using the Canada-US-Mexico trade agreement (CUSMA) to challenge Mexico's new ban on genetically engineered (genetically modified or GM) corn. Canada does not export any corn to Mexico, but the Government of Canada is participating in a trade dispute to force open the Mexican market. This trade challenge is consistent with Canada's policies that support the profit-making of the biotechnology industry at the expense of democracy, transparency, choice in the marketplace and independent science, and despite risks to the environment and ongoing scientific uncertainty about harm to human health.

Mexico has the right to ban GM corn, and is justified in doing so. Corn is a staple of the Mexican diet and is central to Mexican culture and agriculture, history and national identity. Corn is sacred to Indigenous peoples and essential to their cultural and spiritual practices. Mexico's ban seeks to safeguard the integrity of native corn from GM contamination and to protect human health. Mexico's actions are supported by the science which continues to find indicators of potential harm to humans from eating GM insect-resistant corn, and continues to warn of health impacts from exposure to the herbicide glyphosate which is used in GM corn production.

Background

The Government of the United States is challenging the Government of Mexico's new ban on genetically engineered (genetically modified or GM) corn, under the Canada-US-Mexico Trade Agreement (CUSMA) [Dispute MX-USA-2023-31-01]. The Government of Canada has joined this dispute as a third Party.

The US and Canada are challenging the measures in Mexico's Presidential Decree of February 13, 2023 that pertain to the use of genetically modified maize (corn)[1]:

- an immediate ban on the use of GM corn for human consumption (white corn intended for use in dough and tortillas);
- the revocation of existing GM corn authorizations and a halt to future approvals; and
- a phase-out of the use of GM corn for animal feed and processed food ingredients.

Mexico's decree also phases out the use of the herbicide glyphosate but this measure is not being challenged by the US and Canada.

Mexico already bans the cultivation of GM corn.

The governments of US and Canada are key global actors in supporting the use of genetic engineering in food and farming. Over 90% of all corn grown in the United States, and 88% of the corn grown in Canada, is genetically engineered. The US accounts for almost 40% of global GM acres (37.5%), and Canada accounts for 6.6%.[2] (91% of global GM acres are planted in five countries: the US, Brazil, Argentina, Canada and India.)

Canada does not export corn to Mexico.

Mexico has the right to ban GM corn, and is justified in doing so

Mexico has the right to ban GM corn. The Canada-US-Mexico trade agreement (CUSMA) explicitly states that countries are not required to authorize genetically modified organisms (GMOs): "This Section does not require a Party to mandate an authorization for a product of agricultural biotechnology to be on the market" (Article 3.14.2).

CUSMA recognizes "the sovereign right of each Party to establish its own levels of domestic environmental protection and its own environmental priorities, and to establish, adopt, or modify its environmental laws and policies accordingly" (Article 24.3.1), and "each Party shall promote and encourage the conservation and sustainable use of biological diversity, in accordance with its law or policy" (Article 24.15.2).

"The main purpose of these measures is to protect the rights to health and a healthy environment, native corn, the milpa, biocultural wealth, peasant communities and gastronomic heritage, as well as to ensure a nutritious, sufficient and quality diet."

—– Decree establishing various actions regarding glyphosate and genetically modified corn, President of the United Mexican States, February 13, 2023.

Mexico is justified in establishing their ban. CUSMA does not prevent a country from establishing a level of safety for human and plant life that "it determines to be appropriate" (Article 9.6.4).

– **A ban on GM corn is necessary** to protect Mexico's corn diversity and related cultural heritage. Mexico is the centre of origin of corn and the centre of genetic diversity and, as such, protecting corn in Mexico is a matter of unique global significance: GM contamination would be a serious threat to food security nationally and globally. Corn is also a staple of the Mexican diet and is central to Mexican culture and agriculture, history and national identity, and to Indigenous cultures and spiritual practices.

– **Mexico's ban on GM corn is also justified** to ensure the health of Mexican consumers. Mexican's have the highest corn consumption of anyone in the world, largely through the consumption of minimally processed white corn flour used to make traditional foods such as tortilla. Studies continue to indicate potential harm from ingestion of Bt toxins in GM corn (see below), as well as from exposure to herbicide residues.

Mexico's ban is consistent with national policies to protect corn

Mexico's decree responds to the threat of GM contamination and is consistent with Mexico's existing **suspension of GM corn cultivation**, hard-fought by Mexican civil society[3] and upheld by the courts.

In 1998, the Mexican government issued a moratorium on the cultivation of GM crops for experimental and commercial purposes. The ban was lifted in 2009 but successfully challenged in 2013 by the Mexican network *Demanda Colectiva Maíz* (Collective Corn Lawsuit)[4] which cited a need for precautionary measures given the threat GM corn poses to the right to conservation, sustainable use, and just and equitable sharing in this biological diversity of native corn varieties.[5] In 2021, the Supreme Court Justices unanimously agreed, and rejected appeals from the biggest pesticide and seed companies in the world: Bayer/Monsanto, Syngenta, Corteva-DuPont and Dow.[6] The courts upheld the restriction on growing GM corn because of the credible threat that GM contamination poses to Mexico's native corn biodiversity.

Mexico's decree aligns with international commitments to rights of Indigenous peoples

CUSMA is explicit that, "…this Agreement does not preclude a Party from adopting or maintaining a measure it deems necessary to fulfill its legal obligations to indigenous peoples" (Article 32.5).

"The planting of transgenic maize in Mexico is a historic crime against the peoples of maize, against biodiversity and food sovereignty, against ten thousand years of indigenous and peasant agriculture that bequeathed this seed for the wellbeing of all the peoples of the world."

– From the Manifesto in Defense of Maize, October 2009[7]

The stated purpose of Mexico's GM corn ban is to protect the right to health and a healthy environment, and to protect native corn, the ancient farming and biocultural practice called ***the milpa***,[8] biocultural wealth, peasant communities and gastronomic heritage; as well as to ensure a nutritious, sufficient and quality diet.

Indigenous farmers in Mexico have, over millennia, developed and safeguarded corn biodiversity by keeping thousands of traditional landraces (varieties) under cultivation, all uniquely adapted to their local growing conditions and communities. In particular, many cultural and religious traditions are structured around the *milpa*.[9] Both Canada and Mexico are Parties to the UN Convention on Biological Diversity which recognizes "the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources."[10]

Mexico has legal obligations to protect the rights of Indigenous peoples under its own constitution and as a signatory to the International Labour Organization's Indigenous and Tribal Peoples Convention, 1989 (ILO 169).[11]

Because the purposes of Mexico's ban include protecting the rights of Indigenous peoples, Canada's trade challenge is inconsistent with Canada's reconciliation goals and legislated commitment to implement the **UN Declaration on the Rights of Indigenous Peoples** (UNDRIP).[12] UNDRIP includes recognizing the right of Indigenous peoples to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions as well as the manifestations of their sciences, technologies and cultures including seeds (Article 31).[13] Canada, Mexico, and the US all support UNDRIP. Though not legally binding nor a statement of current international law, the United States government says that UNDRIP "has both moral and political force."[14]

Mexico's decree aligns with international recommendations and obligations for safeguarding biodiversity

Despite Mexico's 1998 **moratorium on GM corn cultivation**, significant levels of transgenic DNA in native corn varieties were found in the remote mountains of Oaxaca in 2001,[15] with further contamination found in nine states in 2003.[16]

The new Mexican measures would implement one of the **recommendations of the 2004 report from The Commission for Environmental Cooperation** (CEC), established under the North American Agreement on Environmental Cooperation (NAAEC) in parallel to the North American Free Trade Agreement (NAFTA) that, "...the Mexican government should strengthen the moratorium on commercial planting of transgenic maize by minimizing the import of living transgenic maize grain from countries that grow transgenic maize commercially."[17]

Mexico and Canada are both Parties to the **United Nations Convention on Biological Diversity** which reaffirms that States have sovereign rights over their own biological resources and are responsible for conserving their biological diversity. Article 8(g) obliges Parties to establish or maintain means to regulate, manage or control the risks associated with the use and release of GMOs (living modified organisms resulting from biotechnology or LMOs) which are likely to have adverse environmental impacts, taking also into account risks to human health. The US is not a Party to this Convention.

Mexico has also ratified the **United Nations Cartagena Protocol on Biosafety** (Canada and the US have not) which governs the movement of GMOs (LMOs). Under the Protocol, Mexico has obligations to comply with the provisions through its national laws in accordance with the precautionary approach: "Lack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, shall not prevent that Party from taking a decision, as appropriate, with regard to the import of that living modified organism intended for direct use as food or feed, or for processing, in order to avoid or minimize such potential adverse effects." (Article 11. 8).

Mexico's ban does not impact trade with Canada

Canada does not export corn to Mexico. In its notice of intent to join the challenge as a third party, the Government of Canada states that, "Canada is concerned with the rejections of certain biotechnology product applications covering GE corn, canola, cotton, and soybean. There is considerable agricultural trade within the three CUSMA Parties - Canada is a major producer and exporter of agricultural products, including those that are products of biotechnology, to the United States and Mexico."[18] However, Mexico's decree is specific to GM corn and Canada does not export any corn to Mexico (whether GM or non-GM).[19]

There are currently five GM crops grown in Canada: soy, corn, canola, white sugar beet, and alfalfa. The GM commodities currently grown in Canada and exported to Mexico are limited to canola seed and oil[20] and some soybean (exported in 2013 and 2021[21]). These commodities are not subject to Mexico's decree.

The Government of Canada argues that all countries should approve the same GMOs as Canada because, "When a key trading partner such as Mexico does not authorize biotechnology applications for Canadian agricultural exports, this creates an asymmetry in North American regulatory conditions that can lead to trade disruptions."[22] This argument is a reference to **the impacts of GM contamination** on trade when not all trading partners have approved the same GM foods, i.e. when a GM food that is contaminating imports is not authorized (is illegal) in the importing country. However, CUSMA already addresses the problem of this GM contamination by requiring each country to develop a strategy to manage "Low Level Presence" (LLP) (Article 3.15). The LLP text of CUSMA implicitly recognizes that countries might not authorize all the same GM foods as safe.

Canada argues that the Mexican ban is a problem for the biotechnology industry

The Government of Canada makes the argument that Mexico needs to approve all the same GMOs that Canada approves in order **to create more ideal economic conditions for product developers** to introduce their GMOs (in this case, the largest seed and pesticide companies in the world[23]): "Product developers also tend to refrain from commercializing innovative agricultural tools until they receive approvals in all major markets. Thus, the approach taken by Mexico in its decisions to reject biotechnology product applications may have a significant economic impact on Canadian producers, developers of innovative agricultural technologies, as well as consequences for trade flows into and out of Canada."[24]

Mexico's ban is based on scientific principles

CUSMA sets out that each Party has the right to adopt measures necessary to protect human, animal or plant life or health, called Sanitary and Phytosanitary (SPS) measures, and is clear that such measures should be "based on scientific principles."

The Government of Mexico has established a scientific basis for its decision. The government hosts a database of study citations on the risks of glyphosate and GM corn, including those relating to GM corn contamination, insects developing resistance to GM insect-resistant corn, the impacts of GM corn on non-target insects, the impacts on the monarch butterfly, the impacts on animals fed GM corn, and negative human health effects of glyphosate.[25] On March 29, 2023, the government laid out the science behind its decree in a conference organized by CONACYT, the government's highest science body,[26] and it subsequently held five weeks of public forums.

In contrast, **Canadian regulation of GMOs has long been critiqued as lacking a scientific basis** due to a lack of transparency among other reasons.[27] For example, the 2001 Royal Society of Canada's Expert Panel on the Future of Food Biotechnology challenged the government's claim that Canadian regulation was "science based",[28] and the foundations for this critique remain unchanged.[29]

There are indications of potential harm from eating Bt corn

Corn is a staple food in Mexico. On average, Mexicans eat one pound of corn a day, one of the highest consumption levels in the world.[30] Unlike corn consumption in Canada and the US which is dominated by processed corn ingredients and products from animals fed diets including GM corn, in Mexico, corn is commonly consumed directly, largely through the use of minimally processed white corn flour in making tortilla and other traditional foods. This consumption pattern requires an "acceptable level of protection" from eating Bt corn for Mexicans which may differ from that for people in Canada and the US.

Insect resistant corn plants are genetically engineered to express a toxin from the soil bacteria *Bacillus thuringiensis* (Bt) which is known to harm the guts of particular types (orders) of insects. The Bt (Cry) proteins bind to specific receptors on the membranes of mid-gut cells in certain pests, resulting in their rupture. Other insects, animals, and humans do not have those receptors and it is assumed that the Bt proteins are degraded in the gut and are not harmful to them.

GM Bt crops are also promoted as safe to non-target organisms on the basis that organic and conventional farmers have long used Bt as an insecticide spray that it is benign to organisms other than the target pests. However, the Bt toxins in GM crops are different from natural Bt in structure, function, and biological effects.[31]

Bt toxin proteins in GM plants have been shown **to impact insects that are not the intended targets**. For example, spiders, wasps, ladybugs, and lacewings, which are predators that eat Bt-targeted insects, were negatively affected by ingesting prey that had consumed GM Bt toxins.[32] Additionally, a study published in 2023, funded by the French government, found that Bt Cry1A toxins disrupt normal growth and functioning of gut cells in fruit flies.[33] According to the editor's evaluation

published with the study, these findings raise the possibility of Bt toxins altering the intestinal lining of non-targeted animal species.

In their 2023 submission to the trade dispute panel, the US government states that there is no credible scientific evidence establishing any health risks to humans posed by consumption of GE corn (para 37).[34] However, GM Bt toxins and GM Bt crops have also been found to have toxic **effects on mammals in controlled animal feeding studies**. Toxic effects and indications of toxicity have variously been observed in the blood, stomach, small intestine, liver, kidney, spleen, and pancreas, as well as immune responses, though the mechanism is not clear from these studies.[35]

Furthermore, companies are free to "stack" any number of approved GM traits together in one plant **without a government safety assessment**. Most GM corn is stacked: 24 of the 26 varieties of Bt corn on the market in Canada in 2023 had more than one Bt protein (and all of them also had one or more herbicide-tolerant traits).[36]

There is a lack of monitoring and study to track potential harm

In their submission to the trade dispute panel, the US government argues (para 34) that, "In the decades since the first GE foods reached the market, no adverse health effects among consumers have been found."[37] However, without monitoring of GM foods, **there is no scientific basis for making such statements**.[38]

There have been no post-market studies on human populations to determine if there have been adverse health effects and, without tracing or labelling of GM foods, such studies are not possible. In 2003, the US Society of Toxicology stated that, "verified records of adverse health effects are absent, although the current passive reporting system would probably not detect minor or rare adverse effects, nor can it detect a moderate increase in common effects such as diarrhea."[39]

The US and Canadian governments have not set up mechanisms to track and trace GMOs, nor to monitor possible health impacts. The US government has only recently (2019) implemented a disclosure standard that requires a form of labelling for some GM foods. In Canada, there is no mandatory labelling of GM foods and the Canadian government does not monitor which GM foods are on the market. **The government does not have information about the dietary exposure of Canadians to GM foods** beyond knowing that 88% of the GM corn grown for grain in Canada is GM and 81% of soy grown is GM.[40] The government does not know, for example, how much GM sweet corn is grown, sold, and eaten in Canada.

Tracking GM foods is necessary because **unintended and unpredicted changes in GMOs can remain undetected for years**. For example, in 2003, the structure of the transgene in Monsanto's GM corn MON810 was found to be different from the description provided to regulators by Monsanto.[41] The discovery suggests a genomic rearrangement involving the transgene insertion site. In 2013, European regulators discovered a "hidden" gene that is present in many commercialized GM crops,[42] and, in 2019, foreign DNA was unexpectedly found in genome-edited hornless cows that were claimed to be free of foreign DNA.[43] A patent granted to Syngenta in 2022 exposed that a GM corn expressing a Bt Vip3A protein, approved in Canada in 2011, can have unexpected side effects in the plant.[44] Additionally, the high level of unintended traits found, even in highly-selected commercialized genetically engineered plants, further suggests that product developers and government regulators are not fully controlling for unintended effects.[45]

GM corn increases herbicide use and exposure

GM herbicide tolerant seeds are designed to be used with specific herbicides. The use of GM herbicide-tolerant crops is clearly associated with increased herbicide use.[46] Data from the UN Food and Agriculture Organization and Health Canada shows that **herbicide sales in Canada increased by 244%** between 1994 and 2021 (the first GM plant – a glyphosate-tolerant canola - was approved in Canada in 1995).

Most GM herbicide-tolerant crops are tolerant to the herbicide glyphosate, the most widely used herbicide in Canada and the world. The use of glyphosate with GM glyphosate-tolerant corn,

canola, soy, cotton and sugar beet has led to the emergence and spread of glyphosate-resistant weeds.[47] Seed companies have responded to the challenge of glyphosate-resistant weeds by genetically engineering seeds to tolerate older herbicides such as 2,4-D and by **"stacking" multiple GM herbicide-tolerant traits together in the one seed**, further increasing the use of herbicides. For example, all of the GM corn seeds sold in Canada are herbicide-tolerant (most are also insect-resistant) and more than half are now genetically engineered to be tolerant to more than one herbicide.[48] For example, in 2023, three GM corn brands were marketed in Canada that had tolerance to three herbicides together: glyphosate, glufosinate, and 2-4,D.

Research links glyphosate to health problems including cancer,[49] neurodevelopment problems,[50] neurological diseases,[51] endocrine disruption and birth defects.[52] Research has shown 2,4-D to be an endocrine disruptor and that 2,4-D can be persuasively linked [to] cancers, neurological impairment and reproductive problems, and may affect the immune system.[53] The International Agency for Cancer Research of the World Health Organization classifies glyphosate is a "probable human carcinogen" and 2,4-D as a "possible human carcinogen". Health risks relating to exposure from herbicide residues in corn may be increased in Mexico due to high corn consumption.[54]

Resources

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cban Canadian Biotechnology Action Network

The Canadian Biotechnology Action Network (CBAN) brings together 15 groups to research, monitor and raise awareness about issues relating to genetic engineering in food and farming. CBAN members include farmer associations, environmental and social justice organizations, and regional coalitions of grassroots groups. CBAN is a project of MakeWay's shared platform.

www.cban.ca/corn

Endnotes

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