# The Precautionary Principle in the Regulation of Genetically Modified Organisms

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## *Introduction*

The purpose of this paper is to provide a brief explanation of the Precautionary Principle and its impact on the international GMO (Genetically Modified Organisms) regime. The Principle will be defined, and its background and current status in international protocols and law will be examined. It will be compared to competing paradigms, and its different characteristics will be explained.

## *What is the Precautionary Principle?*

The Precautionary Principle is a legal mechanism for managing environmental risk in situations where incomplete scientific knowledge of a proposed activity or technology's impact exists. The Principle states that if a proposed activity carries with it the possibility of environmental harm, but that harm is not completely proven, then that activity may not be allowed. It is one of the principal tenets of international environmental law.[1]

The Precautionary Principle is essentially a "better safe than sorry" policy approach to new technologies that may be environmentally harmful. The basic premise of this Principle is that science cannot sufficiently predict all possible outcomes of our actions, and that society cannot afford to wait through a series of attempts to find out if the activity carries the potential for harm.[2]

## *Background*

The Precautionary Principle traces its roots back to the German government policy of *vorsoge*, which was first implemented in the 1970s. It entailed the following elements: 1) socialized planning and heavy state influence; 2) forward-looking, active, and participatory measures to avoid harm; 3) measures to stimulate the economy through replacement of polluting technologies with "green" alternatives; 4) decisions based on a number of criteria including, but not limited to, "sound science" with the aim of pursuing "complementary goals without becoming subject to the accusation of irrationality" and including social and political as well as environmental harms; and 5) a strong moral requirement to avoid damage.[3]

## *The Principle in International Law*

The Precautionary Principle first made its way into international law at the insistence of the Federal German Republic.[4] Today, it exists in over twenty international laws, treaties, protocols, and declarations.[5] These include the 1987 Protocol on Substances that Deplete the Ozone Layer ("the Montreal Protocol"), the 1984 Conference on the Protection of the North Sea which declares that "…a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence",[6] the Framework Convention on Climate Change, 9 May 1992, 31 *Int. Leg. Mat.* 848, the UN Agreement on Straddling and Highly Migratory Fish Stocks, 4 August 1995, 34 *Int. Leg. Mat.* 142, the 1990 Bergen Ministerial Declaration on Sustainable Development in the Economic Commission for Europe Region, the 1992 Convention on Biological Diversity, the 1990 Bangkok Declaration on Environmentally Sound and Sustainable Development in Asia and the Pacific, and the 1992 Rio Declaration on Environment and Development, 1992, 31 *Int. Leg. Mat.* 874.[7] Canada is among the 180 countries that ratified the Convention on Biological Diversity, UN Doc. UNEP/Bio Div/N7INC.5/4,[8] and is also one of the 100 plus states that signed the Fish Stocks Agreement (which is not yet in force).[9]

Based on the number of states that signed the Convention on Biological Diversity and the Montreal Protocol, the Precautionary Principle is clearly a significant international

mechanism. Furthermore, Canada is a party to these agreements, and therefore cannot act in a manner contrary to them. This highlights the need for policymakers to understand the characteristics and significance of the Principle.

## The Principle in Legal Cases

The Precautionary Principle is also used in litigation. Several states have relied on the Principle when stating their case before the International Court of Justice. Hungary has made use of the Principle in a dispute with the former Czech and Slovak Republic over the Gabcikovo-Nagymaros project ("the *Danube Dams*" Case).[10] Representatives for the Hungarian state submitted that the Czech and Slovak Republic were bound by different sections of the Law of Non-Navigational Uses of International Watercourses, the Stockholm Declaration, and the Rio Declaration, which all mention the Precautionary approach. New Zealand also relied on the Principle in its application regarding French nuclear tests. New Zealand contended that France was under an obligation before carrying out its nuclear tests, "to provide evidence that they will not result in the introduction of such material to that environment, in accordance with the 'precautionary principle' very widely accepted in international law".[11] The Precautionary Principle was also referred to in the "NIREX case", in which Ireland questioned the possibility of radioactive material entering the marine environment from the United Kingdom. The Irish government argued that the burden of proof was on the U.K. to prove absence of risk, while the Irish need only point out the "mere possibility of risk".[12] In invoking the Principle, Hungary, New Zealand and Ireland were trying to raise the possibility of potential dangers of certain activities while at the same time placing the onus to prove the safety of such activities on the states wishing to carry them out.

While the Principle has not been widely adopted by American policymakers, it has been affirmed in the courts. In the case of *Cellular Telephone Co.* v. *Town of Oyster Bay*[13] the court upheld the government's responsibility to base regulatory decisions on substantial evidence, that is, "less than a preponderance, but more than a scintilla".[14]

## The Precautionary Principle in Biotechnology

Various forms of international regulation of biotechnology exist. The General Agreement on Trades and Tariffs, with Annexes and Schedules of Tariffs Concessions (GATT), 30 October 1947, U.N.T.S. 187, for example, limits the extent to which nations can regulate GMOs or GMO-derived products. Such regulations cannot be "a disguised restriction on international trade" or "applied in a matter which would constitute a means of arbitrary or unjustifiable discrimination".[15]

*A nation that is a party to the Protocol can reject GMOs unilaterally in the absence of scientific certainty. This applies to products even if they only "may" contain GMOs.*

Application of the Precautionary Principle to GMOs can be first seen in the Convention on Biological Diversity of 1992. Parties to this convention under Article 19 (3), are to "consider the need for and modalities of a protocol setting out procedures… in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that may have an adverse effect on the conservation and sustainable use of biological diversity".[16] The United States, incidentally, is a signatory but not a party to the Convention. This is significant in that America is a major exporter of GMO products.

The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, September 2000, 39 *Int. Leg. Mat.* 1027 (also known as the Biosafety Protocol), which was agreed to in January 2000 in Montreal, is the first international agreement that regulates biotechnology exclusively. It will become binding law after over 50 countries ratify it. This process is expected to take two years.[17] As of February 2001, Canada was not one of the countries to sign the Protocol.[18] The United States is not a party to the Protocol, as the U.S. Senate did not ratify the enabling Rio Convention of 1992. Nevertheless, the United States will be governed by the Protocol if it trades with states that ratify the new law.[19]

The Cartagena Protocol mandates that GMO products traded between these countries must be stored in packages bearing the label "may contain GMOs".[20] It also states that:

> 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 the risks to human health, shall not prevent that Party from taking a decision, as

> appropriate, with regard to the import of the LMO (Living Modified Organisms) in question… in order to avoid or minimize such potential adverse effects.[21]

In other words, a nation that is a party to the Protocol can reject GMOs unilaterally in the absence of scientific certainty. This applies to products even if they only "may" contain GMOs. This is the application of the Precautionary Principle to the trade of genetically modified organisms.

## Related Paradigms

### Risk Analysis Model

The Precautionary Principle is a form of risk analysis. That is, it is a way to determine if an activity/technology is safe. The classic method of risk analysis involves two stages. The first stage is risk assessment: a supposedly pure mathematical and empirical evaluation of evidence demonstrating hazards and consequences of a proposed activity. For example, an evaluation of a new GMO food product at this stage would determine if there is any solid evidence that the product in question presents a danger. The second step, risk management, addresses whether or not the risk is acceptable. Political and social factors that are supposed to be absent in the first stage are present here. The evaluation in this second stage, to return to the example, asks if the dangers present in the use of the new GMO product are acceptable to the public. Or, alternatively, are the uncertainties of the potential dangers present in the new product too great to be accepted by the public? In this analysis, science is seen as a neutral arbiter.[22]

Several different traditional forms of risk analysis exist. They share the common features of reliance on expert evidence and the making of estimations of risk through probability assessments. The Precautionary Principle differs from these traditional forms of analysis in that it recognizes the limitations of science to accurately predict the safety of new activities/technologies. However, science still plays a vital role in evaluating these new activities.[23] The Principle also differs in that it puts more emphasis on the uncertainty of the danger of an activity. That is, the Principle will not accept that an activity is safe just because science cannot prove conclusively that it is dangerous. The Principle is therefore, according to Shipworth and Kenley, more proactive in its approach to danger rather than reactive to the damage that results from an unforeseen danger.[24]

Can the Precautionary Principle be reconciled with science-based risk assessment? Some observers believe so. The Principle is triggered by the identification of a potentially hazardous effect in an activity. All effort is made in traditional risk assessment to evaluate the potential danger using available scientific information. The conclusion of this assessment expresses the possibility of the occurrence of danger and its severity. The Principle then plays the role in this traditional evaluation of the uncertainties in the data.[25]

Another way to reconcile the difference between the Principle and traditional forms of risk assessment is to distinguish between those technologies in which the probability and seriousness of a given environmental outcome are known, and those technologies in which these factors cannot be calculated precisely. Those technologies for which the risk can be calculated can be designated to fall within the realm of preventative strategies, while those whose risk and probability are characterized by uncertainty will be subject to precautionary strategies.[26]

*Five core elements of the Principle can be identified. These are the threshold for application, the shifting of the burden of proof to the proponents of the activity, the ethic of protection, the proactive and anticipatory approach, and the recognition of the inadequacy of existing science.*

### Assimilative Capacity Model

The Precautionary Principle's main rival in environmental policy is the Assimilative Capacity Model. This model determines an ecological system's environmental capacity and ability to withstand a particular activity's impact.[27] It assumes that science can accurately predict threats to the environment, and that science can provide solutions to these threats.[28]

The problem with this particular model, according to Gullett, is that it assumes that environmental capacity can be accurately determined and quantified. However, many discharges in the past were predicted to be safe, but were later shown to have unanticipated long-term consequences. Examples of such discharges include the use of the insecticide DDT and the use of chlorofluorocarbons (CFCs) that were later shown to deplete the ozone in the earth's atmosphere.[29]

How does the Assimilative Capacity Model differ from the Precautionary Principle? The former focuses on ecological capacity. It places the burden of calculating this capacity on scientists and environmental managers. The latter, on the other hand, focuses on the nature of scientific uncertainty. If an activity's impact is significant and uncertain, the activity's proponents must demonstrate its safety. Because of the Assimilative Capacity Model's reactive approach, its critics sometimes label it the "permissive principle" or the "dump monitor" act.[30]

## Aspects of the Precautionary Principle

Those who wish to implement the Precautionary Principle in public policy need to understand its different aspects. Often, the Principle is criticized as being too vague and not a practical policy choice. Five core elements of the Principle can be identified. These are the threshold for application, the shifting of the burden of proof to the proponents of the activity, the ethic of protection, the proactive and anticipatory approach, and the recognition of the inadequacy of existing science.

The general threshold for application of the Precautionary Principle is a lack of knowledge concerning possible harm from a proposed activity/technology. However, different interpretations of the Principle have different thresholds. Some interpretations do not require proof of significant harm.[31] Yet one evidentiary standard need not be applied to all situations. Gullett suggests that as the risk caused by an activity increases, a greater level of uncertainty (that is, a lower burden) can be used to engage the Precautionary Principle. Thus, the greater the level of anticipated harm, the more rigorous the Principle should be.[32]

The Precautionary Principle shifts the burden of proof to the proponent of the new technology to prove it safe. The law traditionally assigns the burden of proof to the one making the accusation (in this case, to the one who asserts that the activity is environmentally harmful). The activity would be approved unless proof of specific harm existed. Often, proof of such harm is only available after the harm has occurred. This happened in the case of drift-net fishing, where tens of thousands of seabirds and porpoises died before regulators were convinced that this kind of fishing damaged marine life needlessly.[33]

The Precautionary Principle, in comparison, suggests that it is not fair to place the burden of proving an activity's safety on the public. The proponent, according to the Principle, must demonstrate that the activity does not pose unreasonable harm, that no less damaging alternatives exist, and that there is a need for the proposed activity/technology.[34] In addition to the burden of proof being shifted to the proponent, the standard of proof is also lower. Conclusive proof of harmful effects is no longer necessary to justify the imposition of a regulatory regime. Environmental harm need only be plausible.[35]

The third core element of the Precautionary Principle, the ethic of protection from environmental and anthropogenic harm, is to "safeguard ecological space".[36] This can mean a number of different things, depending on the version of the Principle that is followed. Stronger versions of the Principle recognize the intrinsic value of non-humans and ecosystems, and protect them with a duty of care. Weaker versions, such as that seen in a variety of international documents, stipulate "cost effectiveness" as a quantifying condition and thus retain an essentially utilitarian foundation.[37]

The Precautionary Principle seeks to prevent potential harm before it occurs. This is unlike a traditional risk analysis model that reacts to or aims to eliminate harm once it has occurred. The inadequacy of such regulatory regimes is acute in cases where environmental harm resulted from the cumulative effects of activities over a long period of time (acid rain, for example). The Principle recognizes the inadequacy of existing science to accurately predict the risks and costs of new technologies. Those following the Principle do not wait for conclusive evidence of cause and effect in the face of potentially serious harm.[38]

## Aspects Present in the Principle

Three aspects are present in various policy measures that invoke the Precautionary Principle. These are:

1) Clear production methods, the Best Available Technology (BAT), and the best environmental practices should be used in applying the new technology/activity. Older technologies that are less environmentally friendly should be replaced.[39] An example of this aspect can be seen in the Climate Change Convention, which calls for the need to cooperate in the "the development, application, and diffusion, including transfer, of technologies, practices, and processes to control, reduce or prevent" climate change.[40]

2) Comprehensive methods of environmental and economic assessment, most frequently in the form of Environmental Impact Assessments (EIA), are required by many national/international regulations in deciding on measures to enhance the quality of the environment and to protect the environment from potential threats. Such assessments were advocated in the aforementioned international cases initiated by Hungary, New Zealand, and

Ireland. These nations claimed that the burden of proving the safety of the activity was on the other party. Such assessments also exist in weak forms in Climate Change and Biodiversity Conventions.[41]

3) Research into the causes and effects of environmental harm must be stimulated. Particular attention must be devoted to long-term planning and continuous vigilant monitoring to observe, learn about and stop unexpected adverse effects.[42] The inclusion of the Principle in an international treaty is almost always accompanied by an agreement to share information. The Fish Stocks Agreement, for example, places a high priority on the collection and sharing of data between member states.[43] Member states of the Biodiversity Convention, in another example, agree to

> "…establish and maintain programmes for scientific and technical education in training in measures for the identification, conservation, and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries…" and to "promote and cooperate in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources".[44]

## *Criticisms of the Precautionary Principle*

Critics have targeted the Precautionary Principle for a number of reasons. The first critique is that the Principle lacks uniform interpretation. Some say that the Principle is more a manifesto than a consistent and applicable principle.[45] One study found fourteen different interpretations of the Principle. Some treaties, such as that of the European Union, refer to the Principle but do not actually define it.[46] This can lead to problems when applying the Principle to a practical situation. If a conflict arises, each side will try to define the Principle in such a way as to favour their own case.

A second criticism is that the Principle is used as a veiled form of trade protectionism. Both Adler and Foster *et al.* cite the example of the 1989 European Community decision to ban American and Canadian beef treated with the bovine growth hormone despite the lack of any credible evidence that the use of such hormones in beef had any negative impacts.[47] Adler argues that as GMOs boost agricultural productivity, farmers in some countries will pressure domestic politicians to raise barriers against foreign competition. Such restrictions would impose a toll on consumers and producers by decreasing choices and raising prices for consumers while diminishing markets for producers.[48] Former Undersecretary of State for the United States Stuart Eizenstat alleged that the European Union's insistence on a mandate for labelling GMO-derived products was simply a false pretence to "justify keeping its trade restrictions in place".[49]

The Precautionary Principle is also seen by some to marginalize the role of science. The enforcement of the Principle, according to Chapman *et al.*, is often due to a misunderstanding of science. For example, many jurisdictions conclude that any substance that is persistent, toxic, and liable to bioaccumulate should be eliminated or minimized. However, all substances are toxic at some concentration, all elements are by nature persistent, and some substances need to be bioaccumulated to sustain the health of organisms.[50]

One concern is that over-regulation using the Precautionary Principle could lead to a loss of potential benefits. That is, by focussing on one set of risks caused by a proposed activity/technology, the Principle turns a blind eye to harm that can occur or be made worse by not applying the technology in question. For example, the over-regulation of GM crops may limit the production of high-yield crops, nutritionally enhanced foods and new vaccines. Such over-awareness of biosafety may lead to global food shortages and habitat destruction. The reasoning here is that to increase food production, crop yield per acre must be expanded. Without the use of genetically modified crops, farmers will have to expand cropland using traditional farming techniques.[51]

The Precautionary Principle, it is pointed out, asks the impossible of science. It asks science to show that a technology is without risk. The best science can do, in reality, is to reduce the uncertainties regarding a new technology, not eliminate all of the risks.[52]

## *The Precautionary Principle in Biotechnology*

Genetically modified crops, as mentioned above, are now subject to the Cartagena Protocol. Certain nations now have the right to reject such products without conclusive scientific proof.

Is this level of regulation necessary? Some feel that GM products require a high level of regulation due to the potential environmental problems that they bring. While scientists may feel that a product is not dangerous simply because empirical evidence shows no such danger, others

are wary of past mistakes made with the introduction of "safe" technologies. Society, relying on the expertise of scientists, paid a great cost for mistakes such as the use of DDT and Thalidomide.

Others argue that the dangers of GMOs are greatly exaggerated. Often, they say, the potential dangers that are supposedly brought on by GMOs are also present in traditional products. For example, Pioneer Hi-Bred, a company that produces GM plants, raised controversy when it was discovered that its new modified soybean contains a Brazil nut gene. Those allergic to Brazil nuts would also be allergic to the new soya product. Pioneer Hi-Bred discontinued the development of the bean. Allergies, however, can be transferred by traditional cross-breeding techniques as well. Such transfers are not unique to DNA modification,[53] yet the genetically modified plants are the ones that raise society's alarm, the defenders of GMOs point out.

A second argument to further the point is that GMOs are thought to cause ecological disruptions. For example, certain crops modified to produce natural pesticides to protect themselves from crop-destroying insect species were also found to threaten butterfly populations. Proponents of GMOs argue that such threats are not serious. Besides, they claim that the introduction of non-indigenous unmodified organisms into a new environment can also be ecologically disruptive. The introduction of perch and tilapia into Lake Victoria in Africa serves as an example. These two fish are not native to the lake. Their introduction has produced a large export market. However, these fish have crowded out 350 species of native cichild fish that support the local fishermen, most of whom cannot afford the necessary equipment to fish the perch.[54]

The fact is that GMOs raise concerns among the general public, whether or not they are safe. Market chains in Europe and food companies such as Gerber said they would not use them. Prince Charles says he will not eat them. This may be mere hype, but the public has reason to be wary of new technologies considering the aforementioned past experiences with biologically and ecologically harmful substances. Therefore, the application of the Precautionary Principle is a way to address the public concerns about biotechnology while showing the benefits of these new products.

## Biotechnology and the Advantages of the Precautionary Principle

Society's concerns about GM products help to highlight the advantages of applying the Precautionary Principle. First, the Principle calls for more–not less–science. Research is required to better understand the concern that is raised about the new technology in question. The Principle calls for a more "civic science" that increases the participation of non-traditional groups to provide advice. It calls for measures to ensure public access to information. Some versions call for public participation in decision-making.[55]

All forms of the Principle require some indication that harm may result before the burden of proof shifts to the proponent.[56] International agreements such as the Cartagena Protocol will require the scientific community to play an enlarged mediation role. The burden shifts to GMO companies and scientists to make the case for GMOs using solid data, reliable safeguards, and compelling benefits.[57]

A second advantage of using the Precautionary Principle is that the public is increasingly demanding the use of such measures. That is, the Principle is a "democracy friendly" environmental policy. It is a policy that addresses the concerns of the public (that is, the ultimate stakeholders and receivers of the impact of new technologies such as GMOs). Traditionally, government policy regarding GMOs has focussed on additional testing and regulatory requirements. Such has been the case in the EU, Brazil and Japan. These measures fail to account for the broader concerns of the people. In other words, such policy measures do not consider the moral and cultural unease regarding the unknown (in this case, those effects of GMOs that science cannot predict). The public demands such "social precautionary" principles, whereas governments examine uncertainty in a traditional risk framework via testing and existing regulatory procedures.[58]

The main point here is that the issue of accountable representation is central to the biotechnology debate. Policymakers must give priority to stakeholders' interests, as their approval is required to develop biotechnology. This requires the integration of stakeholder (public) interests into science, policy research, and implementation.[59] The Precautionary Principle is a way to make science more accountable to the public.

## Conclusion

In the field of biotechnology, the Precautionary Principle is significant in that scientists, lawmakers and policymakers cannot ignore it. It provides its supporters with the opportunity to make the biotechnology industry more accountable to the public. Clearly, the scientific community is not unanimous in its opinion on GMOs. While some scientists praise the potential of GMOs, others such as Arpad Pusztai and David Suzuki caution against

their use.[60] Science cannot provide all the answers or certainties. This leaves the public, the ultimate stakeholders, insecure about the effects of GMOs. The Precautionary Principle compels those in the GMO industry to be more accountable for their technology. This can be seen in public policy elsewhere, and in the previously mentioned international court cases.

Even if the Principle is rejected in the domestic law of this country, the Canadian government must contend with the application of the Principle elsewhere. Canada is a major exporter of GM crops such as canola. Farmers here may find diminishing markets for their crops in Europe and Japan if they do not respond to the precautionary policies implemented in these markets. Canada already is a signatory to several international agreements that contain the Principle. Thus, policy and lawmakers must understand it.

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6. McIntyre, *supra* note 4 at 224.
7. Barrett, *supra* note 2 at 51, and McIntyre, *supra* note 4 at 228-229.
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11. *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's judgement of 20 December 1974* in Nuclear Tests [New Zealand v France], Order 22 IX 95, ICJ Rep [1995] 288 at 290. Mentioned in McIntyre, *supra* note 4 at 234.
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31. Barrett, *supra* note 2, at 54. Gullett, *supra* note 29.
32. Gullett, *supra* note 29 at 56.
33. *Ibid.* at 55.
34. Barrett, *supra* note 2 at 57.
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36. Barrett, *supra* note 2, at 52.
37. Barrett, *supra* note 2, at 52. Foster, *supra* note 14 at 980.
38. Barrett, *supra* note 2, at 55.
39. Barrett, *supra* note 2. McIntyre, *supra* note 4.
40. McIntyre, *supra* note 4 at 236-237.
41. McIntyre, *supra* note 4, at 238.
42. Barrett, *supra* note 2. McIntyre, *supra* note 4
43. "UN Agreement on Straddling and Highly Migratory Fish Stocks, New York 1995 – FAO Code of Conduct for Responsible Fisheries, Rome 1995", online: <http://benthos.cox.miami.edu/mexico/icri/text/2117b.htm>.
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45. Barrett, *supra* note 2 at 60.
46. Foster, *supra* note 14 at 980.
47. Foster, *supra* note 14 at 980, and Adler, *supra* note 15.
48. Adler, *supra* note 15 at 203.
49. E. Masood, "Europe and US in Confrontation Over GM Food Labelling Criteria" (1999) 398 Nature 641.

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51. Adler, *supra* note 15 at 198.
52. *Ibid.* at 205.
53. *Ibid.* at 179.
54. E. Linden, "Condition Critical" *Time*155 (2000) 17 at 18.
55. Barrett, *supra* note 2 at 63.
56. Gullet, *supra* note 29 at 59.
57. Mahoney, *supra* note 17 at 615.
58. A. Sagar, A. Daemmrich & M. Ashiya, "The Tragedy of the Commoners: Biotechnology and its Publics" (2000) 18 Nature Biotech. 2 at 3.
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60. Arpad Pusztai, a scientist working for the Rowett Institute in Aberdeen, Scotland, claimed that his research showed that rats fed genetically modified potatoes experienced stunted organ growth and depressed functioning of the immune system. He was suspended from his work at the institute, causing a great controversy. See N. Mark, "The Frankenstein Food Scare that killed UK biotech"*National Post* (7 May 1999) C7. Canada's pre-eminent pop scientist, David Suzuki said, "Any politician or scientist who tells you these products (GMOs) are safe is either very stupid or lying". This statement brought a strong reaction from other scientists who felt that GM products were safe and thoroughly tested. See S. Lambert, "Genetically Modified Foods No Monsters, Supporters Say" *Canadian Press Newswire* (1 November 1999), online: QL (CPN).