

**WRITTEN STATEMENT OF DR. NINA FEDOROFF**

**BEFORE THE**

**HOUSE COMMITTEE ON AGRICULTURE**

**RE: THE COSTS AND IMPACTS OF MANDATORY BIOTECHNOLOGY LABELING LAWS**

**24 MARCH 2015**

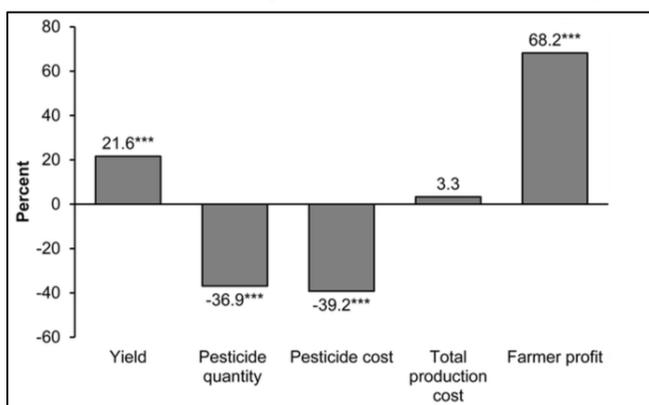
Chairman Conway, Representative Peterson, Members of the Committee, thank you very much for the opportunity to testify before you today. My name is Nina Fedoroff and I am a professor of plant molecular biology and genetics. My laboratory pioneered in the adaptation of genetic modification of GM techniques to plants more than 35 years ago. I am a member of the US National Academy of Sciences and a National Medal of Science laureate. I served as the Science and Technology Adviser to Secretaries of State Condoleezza Rice and Hillary Clinton. I co-authored a book titled *Mendel in the Kitchen: A Scientist's View of Genetically Modified Foods*<sup>1</sup>.

I am here to tell you why mandatory labeling of foods containing GM ingredients is counterproductive to Americans' ability to make healthful food choices. More than that, I will tell you why such labels could well undermine humanity's efforts to achieve food security.

A recent poll of scientists and the public on GMOs gave startling results: only 37% of the public believes GMOs are safe, compared with almost 90% of scientists<sup>2</sup>.

So what's the evidence? GM crops have been in commercial production for almost 20 years<sup>3</sup>. They have an impeccable safety record and multiple environmental benefits<sup>4</sup>. Despite anecdotal reports, often never published or subsequently retracted, no allergies, illnesses or deaths have been reproducibly linked to the consumption of GM food or feed<sup>5,6,7</sup>.

GM crops have boosted yields and farmers' incomes<sup>4,8</sup>. The figure on the right illustrates these impacts graphically (from the cited Klümper and Qaim reference). Environmental impacts for the period 1996-2012 include the application of 503,000 tons **less** pesticide (active ingredient), greenhouse gas reductions of 16 million tons CO<sub>2</sub> and increased soil carbon sequestration from no till farming estimated at more than 200 million tons CO<sub>2</sub><sup>4</sup>.



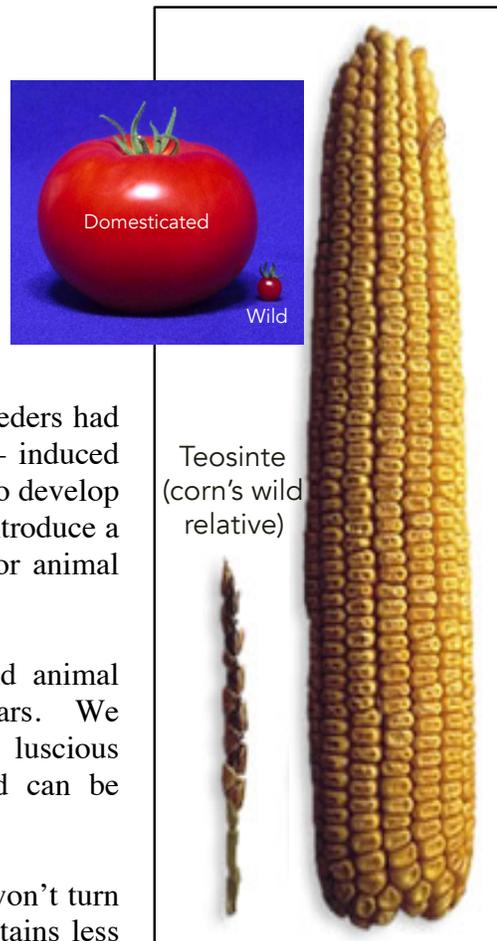


Consumers have benefitted not only through continuing low food prices, but also directly from decreased mycotoxin contamination of corn<sup>9</sup>. GM Bt corn contains a bacterial gene that encodes a protein that is toxic to certain boring insect pests, but not to animals or people. Such insects bore holes in developing corn plants, allowing fungi to enter and grow, as illustrated on the left. The fungi, in turn, produce mycotoxins, which are compounds that are toxic and can be carcinogens for people and farm animals. Bt corn is protected from insect attack,

so no insect holes, no fungi, no mycotoxins.

Scientific academies and scientific societies around the world concur that modern methods of genetic modification are as safe as those used by previous generations of plant and animal breeders, arguably safer<sup>6</sup>. Appendix I shows quotations from the GM statements of scientific organizations. Decades of research on GMO biosafety have simply failed to identify hazards unique to the use of GM technology for crop improvement. Quoting from a recent EU report on GMO research<sup>10</sup>:

“The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not *per se* more risky than e.g. conventional plant breeding technologies.”



Until the development of modern GM techniques, breeders had to depend on either rare natural – or more recently – induced mutations (another name for genetic modifications) – to develop better crops. Today we know enough about genes to introduce a desired trait into an already highly productive plant or animal without the undesirable downsides of older methods<sup>11</sup>.

It's worth pointing out that the history of plant and animal genetic modification extends back some 10,000 years. We created corn, not Mother Nature<sup>12</sup>; we created big, luscious heirloom tomatoes – Mother Nature's are tiny and can be deadly<sup>13</sup>.

The FDA just approved Simplot's Innate potato that won't turn brown after it's peeled and – more importantly – contains less

asparagine, a natural amino acid that turns into the toxic compound acrylamide when the potatoes are French fried in hot oil. These genetically modified potatoes will be more healthful and less wasteful. But today, more than 60% of Americans believe that GMOs are unsafe – and probably wouldn't choose to buy them.



Why? The reasons lie in the increasingly strident efforts of determined anti-GMO activists to convince the public that GMOs are bad. Most prominent among these are NGOs, such as Greenpeace, and the organic food industry. A recent, meticulously researched “Organic Marketing Report” documents how the organic food industry has progressively demonized GMOs, while advancing organically grown food as more healthful than conventionally grown food<sup>14</sup>.

The facts are these. Organic produce is no more nutritious than conventionally grown produce<sup>15</sup>. Quoting the conclusion of the cited 2009 analysis of more than 50,000 publications spanning a 50 year period:

“On the basis of a systematic review of studies of satisfactory quality, there is no evidence of a difference in nutrient quality between organically and conventionally produced food-stuffs. The small differences in nutrient content detected are biologically plausible and mostly relate to differences in production methods.”

Organic produce is more expensive because organic farming is land-inefficient and labor-intensive. Organic marketers – and many other kinds of anti-GMO activists – have openly stated that GMO labeling will help them drive GMOs out of the market. Appendix II shows representative quotations from both anti-GMO activists and organic food proponents. The anti-GMO activities of vocal NGOs, particularly Greenpeace, and the organic industry's false and misleading marketing are the primary reasons that consumers believe GMOs are bad and organic food is good.

It is often claimed that consumers have a “right to know” what they are eating. However, adding a “GM” label to food containing an ingredient from a GMO will not help the consumer make meaningful distinctions about either the food's safety or its health benefits. The GM foods on the market today are as safe as and nutritionally equivalent to their non-GM counterparts. So the fact that they are GM is irrelevant information to the consumer. Research on consumer-decision making reveals paradoxically that more information, particularly irrelevant information, actually decreases the accuracy of a consumer's choice, even though it increases the consumer's confidence in the choice<sup>16,17</sup>.

Labeling would drive up the cost of food<sup>18</sup> while sending the false message that there's something to worry about, because current FDA policy requires that labels contain information on food ingredients that have health (or environmental) implications (<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Biotechnology/ucm096095.htm>).

My final point is that there are serious humanitarian implications should the GMO vilification efforts succeed in driving GM technology out of agriculture. Global agricultural productivity increases are even now lagging behind population growth<sup>19</sup> – and that’s without figuring in the growing impact of climate warming<sup>20</sup>.

The future lies in “agricultural intensification”<sup>21</sup>. We will need to produce more crop per drop of water and square meter of land. The next big breakthrough will be in the efficiency of photosynthesis, the almost magical process by which crops turn thin air and water into food powered by sunlight<sup>22</sup>. Genetic modification of plants, in which the U.S. currently leads, will be the key to feeding the 9 or 10 billion people we expect for dinner in coming decades. Neither Americans nor the rest of the world can afford to lose the best methods we’ve ever invented to keep growing the food supply sustainably.

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<sup>1</sup> Nina V Fedoroff and Nancy Marie Brown, *Mendel in the Kitchen: A Scientist's View of Genetically Modified Food*. (Joseph Henry Press, 2004).

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<sup>3</sup> C. James, Global status of commercialized biotech/GM crops: 2014, (<http://www.isaaa.org/resources/publications/briefs/49/executivesummary/default.asp>), 2015.

<sup>4</sup> G. Brookes and P. Barfoot, GM crops: global socio-economic and environmental impacts 1996-2012, ([www.pgeconomics.co.uk/pdf/2014globalimpactstudyfinalreport.pdf](http://www.pgeconomics.co.uk/pdf/2014globalimpactstudyfinalreport.pdf)), 2014.

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<sup>6</sup> A. E. Richroch, Assessment of GE food safety using ‘-omics’ techniques and long-term animal feeding studies, *New Biotechnol* **30**, 351-54 (2013).

<sup>7</sup> AL Van Eenennaam and AE Young, Prevalence and impacts of genetically engineered feedstuffs on livestock populations, *J Animal Sci* **92** (10), 4255-78 (2014).

<sup>8</sup> Wilhelm Klümper and Matin Qaim, A meta-analysis of the impacts of genetically modified crops, *PloS one* **9** (11), e111629 (2014).

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<sup>10</sup> European Commission, A decade of EU-funded GMO research, 2010.

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<sup>13</sup> Véronique Bergougnoux, The history of tomato: From domestication to biopharming, *Biotechnology advances* **32** (1), 170-89 (2014).

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## Appendix I: Safety of GM techniques and GM foods

version 2

# Is GM food safe?

if an overwhelming majority of experts say something is true,  
then any sensible non-expert should assume that they are probably right



The American Association for the Advancement of Science is an international non-profit organization. AAAS serves some 261 affiliated societies and academies of science.

"The science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe."



The premier body of physicians in the United States

"There is no scientific justification for special labeling of genetically modified foods.

Bioengineered foods have been consumed for close to 20 years, and during that time, no overt consequences on human health have been reported and/or substantiated in the peer-reviewed literature."



The World Health Organization (WHO) is the directing and coordinating authority for health within the United Nations system.

"No effects on human health have been shown as a result of the consumption of GM foods by the general population in the countries where they have been approved."



The National Academy of Sciences is a non-profit organization in the United States. It is the premier scientific body in the United States

"To date more than 98 million acres of genetically modified crops have been grown worldwide. No evidence of human health problems associated with the ingestion of these crops or resulting food products have been identified"



England's top medical society, the Royal Society of Medicine is an independent educational organisation for doctors, dentists, scientists and others involved in medicine and health care

"Foods derived from GM crops have been consumed by hundreds of millions of people across the world for more than 15 years, with no reported ill effects (or legal cases related to human health), despite many of the consumers coming from that most litigious of countries, the USA."



The European Commission (EC) is the executive body of the European Union

"The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are no more risky than e.g. conventional plant breeding technologies."



The American Council on Science and Health is a non-profit group of scientists dedicated to ensuring that important public policies related to health and the environment have a sound scientific basis.

"with the continuing accumulation of evidence of safety and efficiency, and the complete absence of any evidence of harm to the public or the environment, more and more consumers are becoming as comfortable with agricultural biotechnology as they are with medical biotechnology"



American Society of Plant Sciences is a professional society devoted to the advancement of the plant sciences.

"The risks of unintended consequences of this type of gene transfer are comparable to the random mixing of genes that occurs during classical breeding. The ASPB believes strongly that, with continued responsible regulation and oversight, GE will bring many significant health and environmental benefits to the world and its people."



The American Society for Cell Biology is an international community of biologists dedicated to advancing scientific discovery, advocating sound research policies and improving education

"Far from presenting a threat to the public health, GM crops in many cases improve it. The ASCB vigorously supports research and development in the area of genetically engineered organisms, including the development of genetically modified (GM) crop plants."



The ASM represents over 42,000 microbiologists worldwide.

"The ASM is not aware of any acceptable evidence that food produced with biotechnology and subject to FDA oversight constitutes high risk or is unsafe. We are sufficiently convinced to assure the public that plant varieties and products created with biotechnology have the potential of improved nutrition, better taste and longer shelf-life."



The Crop Science Society of America (CSSA) is a prominent international scientific society dedicated to the conservation and wise use of natural resources to produce food, feed, and fiber crops while maintaining and improving the environment.

"The Crop Science Society of America supports education and research in all aspects of crop production, including the judicious application of biotechnology."



The International Seed Foundation facilitate the international movement of seed, related know-how and technology;

"The safety of genetically modified plant varieties is ensured through a most rigorous and comprehensive set of regulatory and quality assurance systems."



The Science Source for Food, Agricultural, and Environmental Issues

CAST is a nonprofit organization



CAST is a nonprofit organization composed of scientific societies and many individual, student, company, nonprofit, and associate society

“over the last decade, 8.5 million farmers have grown transgenic varieties of crops on more than 1 billion acres of farmland in 17 countries. These crops have been consumed by humans and animals in most countries.

Transgenic crops on the market today are as safe to eat as their conventional counterparts, and likely more so given the greater regulatory scrutiny to which they are exposed”



The SIVB has one the largest groups of crop geneticists and biotechnologists in the world among its membership.

“All crop and animal products that result from biotechnology are demonstrated to be safe as non-engineered versions of that plant or animal product, prior to their use by the public”



Representing the American Dairy Science Association, the American Society of Animal Science, and the Poultry Science Association members.

“Meat, milk and eggs from livestock and poultry consuming biotech feeds are safe for human consumption”



Prepared by the Royal Society of London, the US National Academy of Sciences, the Brazilian Academy of Sciences, the Chinese Academy of Sciences, the Indian National Science Academy, the Mexican Academy of Sciences and the Third World Academy of Sciences

“Foods can be produced through the use of GM technology that are more nutritious, stable in storage, and in principle health promoting —bringing benefits to consumers in both industrialized and developing nations.”



The french academy of science is resolutely committed to the advancement of science and has advised government authorities in those matters and issues deemed within its remit.

“All criticisms against GMOs can be largely rejected on strictly scientific criteria.”



The International Council for Science (ICSU) is an international non-governmental organization devoted to international cooperation in the advancement of science. Its members are national scientific bodies and international scientific unions

“Currently available genetically modified crops – and foods derived from them – have been judged safe to eat, and the methods used to test them have been deemed appropriate”



The Union of German Academies of Sciences and Humanities is an umbrella organisation for eight German academies of sciences and humanities.

“In consuming food derived from GM plants approved in the EU and in the USA, the risk is in no way higher than in the consumption of food from conventionally grown plants. On the contrary, in some cases food from GM plants appears to be superior in respect to health.”

The scientific consensus around the safety of genetically modified foods is as strong as the scientific consensus around climate change. These foods are subjected to more testing than any other, and everything tells us that they're safe.

[www.axismundionline.com](http://www.axismundionline.com)

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<http://www.axismundionline.com/blog/the-new-is-gm-food-safe-meme/>

## Appendix II: Anti-GMO activists and proponents of organic food on labeling

# IS LABELING REALLY ABOUT OUR "RIGHT TO KNOW" ?

"We are going to force them to label this food. If we have it labeled, then we can organize people not to buy it."

—*Andrew Kimbrell, Executive Director, Center for Food Safety*

"Personally, I believe GM foods must be banned entirely, but labeling is the most efficient way to achieve this. Since 85% of the public will refuse to buy foods they know to be genetically modified, this will effectively eliminate them from the market just the way it was done in Europe."

—*Dr. Joseph Mercola, Mercola.com*

"By avoiding GMOs, you contribute to the tipping point of consumer rejection, forcing them out of our food supply."

—*Jeffrey Smith, Founder, Institute for Responsible Technology*

"With labeling it (GMOs) will become 0%... For you the label issues is vital, if you get labeling then GMOs are dead-end."

—*Vandana Shiva, environmental activist*

"The burning question for us all then becomes how—and how quickly—can we move healthy, organic products from a 4.2% market niche, to the dominant force in American food and farming? The first step is to change our labeling laws."

—*Ronnie Cummins, Director, Organic Consumers Association*



[www.geneticliteracyproject.org](http://www.geneticliteracyproject.org)

#### SOURCES:

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