



Information Sheet

GMO's



From the desk of Kelcey Swyers, Ph.D., PAS
Animal Nutrition, Technical Services Manager
Ranch-Way Feeds

What is "GMO?"

The term "GMO" stands for "genetically modified organism," which has been defined by the World Health Organization (WHO) as, 'organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally.' This technology is also often referred to as "modern biotechnology" or "gene technology", sometimes also "recombinant DNA technology" or "genetic engineering." The term "biotech crops" is often used to describe crops raised using GMO technology.

How are GMO crops made?

All biotech crops on the international market are used for 3 things: herbicide tolerance (i.e. "Round-Up Ready"), resistance to viral infections, and resistance to invading insects. This novel use of biotechnology increases yield and productivity of crops. The biotech crops are achieved by selecting and transferring individual genes from one organism (usually from a microorganism) into another. For example, Bt Corn is a type of GMO corn that is resistant to corn borers (a damaging insect pest). The Bt Corn was achieved by transferring a gene from the bacteria, *Bacillus thuringiensis* (Bt), which expresses a protein that eliminates the corn borer, into the DNA of conventional corn. This technology offers practical implications for corn growers around the world by increasing yields and reducing the use of pesticides, which in turn has a positive effect on global food production. For example, the largest rice producing country, China, suffers significant losses from the rice borer. Like Bt corn, Bt rice has the potential to increase yields (by 8 %), decrease pesticide use (by 80 %), and generates \$4 billion (US dollars) to the agricultural sector annually.

How prevalent is the use of GMO grains?

Modern use of genetically engineered crops has increased substantially as shown in Figure 1 (on back). In 2009, 14 million farmers planted 330 million acres of biotech crops in 25 countries, up from 2008. Approximately 90 % of those farmers were small and resource-poor farmers from developing countries. The top countries employing GMO technology are shown in Figure 2 (on back). Interestingly, while European farmers are restricted on what they can grow, the European countries are a heavy consumer (importer) of GMO products, largely animal feeds. Europe consumes about 33 million tons of soybean meal a year in animal feed, with most of it imported from North and South America. Of this, it is estimated that 80-95 % is genetically modified.

Are GMO grains safe?

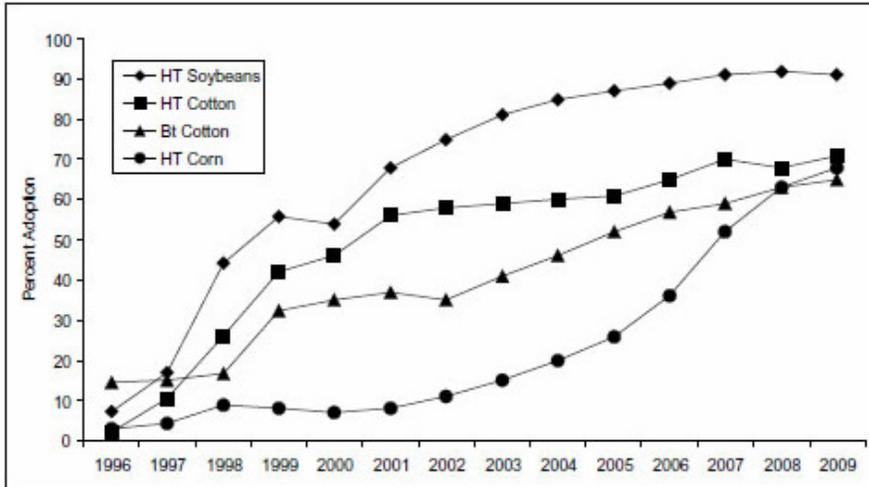
Based on the research published by the references listed below, no effects on human health have been shown as a result of the consumption of genetically modified foods or animal products (meat, milk, or eggs) by the general population in the countries where they have been approved. Research has been conducted showing that GMO corn and soybean meal from GMO soybeans are comparable in chemical composition and nutritional value to their conventional counterparts. Furthermore, to date, no fragments of recombinant DNA have been found in any organ or tissue sample from animals fed GMO feeds.

With a growing world population, we must be able to double food production in a sustainable way by 2050 on approximately the same area of arable land using less resources (fossil fuel, water and nitrogen) at a time when we must also mitigate some of the enormous challenges associated with climate change. Possibly, the most promising strategy at this time for increasing global food, feed and fiber production is to integrate what we know about conventional farming with biotech applications.

References

- Aumaitre, A., K. Aulrich, A. Chesson, G. Flakowsky, and G. Piva. 2002. New feeds from genetically modified plants: Substantial equivalence, nutritional equivalence, digestibility, and safety for animals and the food chain. *Livest. Prod. Sci.* 74:223-238
- Cromwell, G. L., M. D. Lindemann, J. H. Randolph, G. R. Parker, R. D. Coffey, K. M. Laurent, C. L. Armstrong, W. B. Mikel, E. P. Stanisiewski, and G. F. Hartnell. 2002. Soybean meal from Roundup Ready or conventional soybeans in diets for growing-finishing swine. *J. Anim. Sci.* 80:708-715.
- Erickson, G. E., N. D. Robbins, J. J. Simon, L. L. Berger, T. J. Klopfenstein, E. P. Stanisiewski, and G. F. Hartnell. 2003. Effect of feeding glyphosate-tolerant (Roundup-Ready events GA21 or nk603) corn compared with reference hybrids on feedlot steer performance and carcass characteristics. *J. Anim. Sci.* 81:2600-2608.
- Flachowsky, G., K. Aulrich, H. Bohme, and I. Halle. 2007. Studies on feeds from genetically modified plants (GMP)—Contributions to nutritional and safety assessment. *Anim. Feed Sci. Technol.* 133:2-30.
- Henard, M. C., D. Achilles, B. Williams Berry, E. B. Berry, B. Richey. 2008. USDA Foreign Agricultural Service. 2008. Biotechnology Annual Report E48082. <http://www.fas.usda.gov/gainfiles/200810/146296234.pdf>. Accessed Mar. 15, 2010.
- James, C. 2009. Global status of commercialized biotech/GM crops: 2009. ISAAA Briefs 41-2009. Int. Serv. Acquisition Agri-Biotech Applications. <http://www.isaaa.org> Accessed Mar. 15, 2010.
- Stein H.H., D.W. Rice, B. L. Smith, M. A. Hinds, T. E. Sauber, C. Pedersen, D. M. Wulf, and D. N. Peters. 2009. Evaluation of corn grain with the genetically modified input trait DAS-59122-7 fed to growing-finishing pigs. *J. Anim. Sci.* 87: 1254-1260.
- WHO. World Health Organization. 20 questions on genetically modified foods. <http://www.who.int/foodsafety/publications/biotech/20questions>. Accessed Mar. 15, 2010.

Figure 1. Percent Adoption of Biotech Crops in the USA, 1996 to 2009.



WWW.RANCH-WAY.COM
1-800-333-7929

Source: USDA's National Agricultural Statistics Service (NASS), 2009a.

Figure 2. Biotech Crop Countries and Mega-Countries*, 2009

