

Can Genetically Modified feeds for animals improve food for humans?

Alejandro R. Castillo PhD, Dairy Farm Advisor
University of California, Cooperative Extension

The human race has previously utilized biotechnology (such as bacteria, biological substances, and enzymes) to perform specific industrial or manufacturing processes for thousands of years producing foods such beer, wine, cheese, and yogurt. Classical plant breeding has led to improved agricultural crops used either directly for consumption by humans or used as animal feed for the production of meat, milk, and eggs. This global effort has made major progress especially over the last century. In the last 20 years the ability to insert target genes to confer specific traits has been achieved, and this provides opportunities for more rapid developments in animal and plant genetic improvements.

Currently, most genetically enhanced plants in the marketplace provide insect protection or herbicide tolerance, and are being used as feed for livestock. Utilization of these crops offers producers an alternative strategy for managing weed pressure and insect pests. Some crops used to produce animal feeds have been modified by the introduction of specific DNA sequences containing genes to provide protection against insect pests. For example, this insect protection can be conferred to the plant by proteins derived from one bacteria called *Bacillus thuringiensis* (Bt), for that reason some of these crops are called “Bt crops”. The Bt protein binds to specific receptors in the mid-gut of certain susceptible insects (i.e., specific group of lepidopteron insects) and form ion-selective channels in the membrane. They do not affect mammals or insects that lack those receptors. The insect cells swell due to an influx of water which leads to cell lysis and death. *Bacillus thuringiensis* is a naturally occurring bacterial disease of insects, and is considered safe to people and non-target species, such as wildlife. Other crops have also been modified to gain tolerance to agricultural herbicide products. This herbicide tolerance is conferred to the plant by inclusion of some specific proteins and provides the tolerance to glyphosate, which is one of most important herbicides used nowadays in the world agriculture.

The main effects of insect protection or herbicide tolerance to produce feeds for animals are on human food quality, reducing mycotoxins, herbicides and insecticides residues, and decreasing the use of herbicides and insecticides in the world. For that reason, food and feeds will be more abundant, more nutritious, more stable in storage, safe, and healthier than current foodstuffs. With the adoption of biotechnology it will be possible to improve animal efficiency and feed digestibility resulting in less animal wastes. Biotechnology is the key technology for sustainable agriculture, and to meet the demands of the world’s rapidly increasing population. (*Note Merced Sun-Star, Agriculture, California, Monday June 21, 2004*).