U.S. BIOTECHNOLOGY REGULATION

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ABSTRACT

The United States is the world's largest user of agricultural biotechnology. This economic development has been fostered by a regulatory system first designed in the mid-1980s and updated as new technology and scientific issues emerge. This paper will review the core biotechnology regulatory policies of the United States, the structure and processes of regulation, emerging issues in biotechnology and recent developments to update regulatory procedures.

Keywords: Biotechnology approvals, mandatory consultation, biotechnology labeling, adventitious presence, plant-made pharmaceuticals.

Introduction

Since the first biotech food products were commercialized in 1996, American producers have become the world's leading users of food biotechnology. In 2004, eight-six percent of the U.S. soybean crop, seventy-six percent of the cotton crop and forty-six percent of the corn crop will planted to varieties modified by recombinant DNA technology. Of the world's crops planted to biotechnology varieties, over 60% have been planted in the United States – although the predominance of the U.S. is declining as more developing countries adopt biotechnology crops. A key factor in the ability of U.S. farmers to take advantage of this technology has been a well-developed regulatory system that provides technology companies clear guidelines for product introductions, detailed instructions for farmers who buy biotech seeds, and few restrictions on end-uses of biotech crops provided they perform like their conventional counterparts.

Coordinated Regulatory Framework

While the basic understanding of the role of DNA came in the early 1950s, it took until the 1970s for the tools to use recombinant DNA in production of agricultural products to become an imaginable reality. From this point it took until the 1980s for the regulatory processes to determine how to handle the potential commercialization of products using this technology. In the early 1980's a government group directed by Boyden Grey, Counsel to the President, was formed to examine how this new technology should be regulated.

The result of the groups' review was the *Coordinated Framework for Regulation of Biotechnology,* published in 1986. This landmark document continues to be the underpinning for U.S. biotechnology regulation. The *Framework* assigned responsibility

for biotechnology to three agencies, the Department of Agriculture, the Environmental Protection Agency and the Food and Drug Administration. For laboratory research the *Framework* also continued a role for the Biosafety Committee of the National Institutes of Health. Each of these agencies was tasked to approach biotechnology regulation using existing statutory authority.

In the case of the USDA, this authority is the Plant Protection Act, now part of the Agriculture Risk Protection Act of 2000. USDA's responsibility is primarily to determine if open release of a new biotechnology crop variety could have harmful effects on other crops native to the United States. USDA, through the Animal and Plant Health Inspection Service governs lab and greenhouse research, field testing and movement of biotech crops under development. APHIS governs this work through two systems – a permit system and a notification system, depending on the potential risk of the plant to be tested. At the conclusion of testing, the developer can petition APHIS to declare the variety "unregulated" as a plant pest, and therefore approved for general release.

At EPA, new products that may contain pesticidal properties (e.g. Bt corn) are regulated under the Federal Insecticide, Fungicide and Rodenticide Act as if they were new pesticides. EPA also governs experimental field trials for these products, and if necessary establishes pesticide residue tolerances for the new product in food and feed. EPA must also review new organisms produced through genetic under the Toxic Substance Control Act as if they were new chemicals.

Finally, FDA, under its authority in the Federal Food, Drug and Cosmetic Act offers crop developers a voluntary consultation process to help the developer determine that they meet their legal responsibility to ensure that their products are safe for food and feed use and are properly labeled. If the new product is a food additive, under existing law the developer must petition FDA for approval. However, FDA has generally considered that agricultural biotechnology products are Generally Recognized as Safe and not subject to the food additive pre-approval process.

FDA has considered that, under existing food labeling laws, foods derived from genetically enhanced plants require no special labeling, unless key aspects of the food such as nutrition or conditions of use are different from foods made from the same conventional crop.

Results of Regulatory System

The regulatory system introduced by the *Framework* has contributed to the smooth introduction and public acceptance of plant biotechnology in the United States. Under this system, APHIS has processed over ten-thousand permit applications or notifications for experimental release of biotech crops. From these experiments, they have cleared ninety-five crop varieties for unregulated use by U.S. agriculture. The Food and Drug Administration has conducted fifty-five consultations with new crop developers, and the EPA has registered ten genetically engineered bio-pesticides. Not all of these crops have been commercialized in the United States. The one notable failure of the regulatory process was the granting of a feed-only approval by EPA to StarLink corn and the developer's failure to comply with the registration conditions. While most scientists

believe that the possible risk of developing allergic sensitivity to the protein in StarLink corn was extremely remote, EPA's Science Advisory Panel could not rule it out and the resulting recall and continued testing for StarLink corn cost the food and grain industry and the developer many hundreds of million of dollars. While the legal responsibility lay with the company that failed to comply with its registration conditions, EPA was widely criticized for permitting such a split registration in the first place.

Emerging Issues

While U.S. regulatory policy remains based on the *Framework,* the responsible agencies have continued to review their policies and procedures as new types of products and issues emerge and public opinion on regulation evolves. During the past several years the agencies have made, or proposed, a number of adjustments to their regulatory policies.

Mandatory FDA Consultation

The current FDA food safety consultation process is voluntary. Critics of the regulatory system have long held that this voluntary process could allow unsafe food into the market. While all commercial biotechnology products have been through this voluntary process, in early 2001 FDA proposed to require new crop developers to notify them 120 days before a new food derived from biotechnology came to market. This move was widely supported by the food and biotechnology industries, but a new legal review by the Bush Administration questioned whether FDA has the statutory authority to make this change, and the proposal has not been finalized.

Voluntary Labeling Guidance

While FDA has never wavered from its position that biotech foods generally do not require special labels, they also proposed guidance in 2001 for companies that wanted to voluntarily label foods as not being produced with biotechnology. The guidance would help food companies make truthful and non-misleading claims about use of biotechnology. It would not permit such terms as "GMO-Free", but proposed other ways companies could transmit information about the ingredients used in their foods. While the guidance has also never been finalized, it continues to reflect the thinking of the Agency, and there are many foods in the U.S. labeled in compliance with this guidance. FDA has also moved to prevent a number of misleading claims.

Pharmaceutical and Industrial Crops

The ability to produce pharmaceutical and industrial productsthrough expression of new proteins by plants has posed a new challenge to the regulatory system. While most biotech crops are designed to be identical to their conventional counterparts, these crops are intentionally designed to produce proteins that would not be expected to be found in food products. As the first experimental plots of these crops were coming to harvest in 2003, food industry groups and farm producers asked the USDA to tighten its permitting and surveillance procedures for grain harvest for production of pharmaceutical or industrial products. In mid 2003, APHIS announced new policies for these products.

Products that produce non-food proteins no longer can be grown experimentally under the APHIS notification process, but must receive an individual permit. USDA tried to strike a delicate balance between groups calling for an absolute prohibition on the use of food crops for production of non-food products and those that feared increasing regulation would stifle promising new technology. New conditions on isolation zones, production and harvest equipment and APHIS inspections were imposed. These new conditions have caused companies experimenting with pharmaceutical or industrial crop production to move their field trials out of the Midwest.

Adventitous Presence

As plant biotechnology has grown, both in absolute size and in the number of crop varieties, it has become clear that absolute isolation of each crop trait is a biological impossibility. Pollen flow, seed purity and co-mingling of final products in crop handling systems make this impossible. The phenomenon of genetic material from new crops appearing in conventional varieties has come to be known as "adventitious presence" – a term coined to indicate genetic material has moved between plant varieties despite use of best containment practices. Seed companies and grain companies have pushed the regulatory agencies to make allowances for trace amounts of crops in development in the commodity supply.

In August 2002 the White House Office of Science and Technology Policy (OSTP) proposed a framework for regulatory updates by the FDA, EPA and USDA for such a policy. FDA would develop a new, early safety assessment program to make a preliminary determination of toxicity or allergenicity of crops under development. EPA would do the same for crops with a pesticidal property, and USDA would institute new confinement requirements for pharmaceutical or industrial crops.

In response to this framework USDA is seeking comment on a new proposal to establish a broader environmental impact review than is currently conducted prior to deregulation of field crops, in addition to the new field test requirements for pharmaceutical crops instituted last year.

Neither EPA or FDA acted on the OSTP recommendations In late April a broad coalition of farm, food, and technology groups wrote the Administration asking that this policy be finalized as soon as possible in order to protect technology companies, food companies and grain exporters from market disruptions caused by trace levels of experimental crops in the commodity system.

Future Regulatory Challenges

The Combined Regulatory Framework for biotechnology is nearing 30 years old. Under this policy agricultural biotechnology has grown to be a mature, well accepted industry in the United States. When the framework was first issued, its' authors acknowledged that flexibility and change would be necessary over time. As the second wave of biotechnology products nears the marketplace, regulators, industry and the public are re-examining the potential for refinement in regulatory procedures that will adequately serve the introduction of new types of crops and biotechnology in the animal sector.