



Biotech



Cooperative Extension Service
Biotechnology Outreach Program
College of Tropical Agriculture and Human Resources
University of Hawai'i at Manoa

In focus

December 2015

Issue 44

Patenting of GM foods: A New Twist on Old Protections



This week's Biotech in Focus came from a paper written by James Green, a University of Hawaii at Manoa student who recently enrolled in TPSS 416 (Introduction to Social, Ethical, and Political Issues Associated with Biotechnology). Designed for non-majors, this class is offered by the Department of Tropical Plant and Soil Sciences in UH Manoa's College of Tropical Agriculture and Human Resources.

An argument sometimes made against genetically modified (GM) crops is that they are subject to patents and therefore give corporations power over the food supply. However, readers may be surprised to learn that GM crops are not the only crops that are patented, and not all crop patents are held by large corporate organizations.



Patents grant legal rights to inventors, and exclude other individuals from making use of the inventor's work without due compensation. In the United States, patents are issued by the United States Patent and Trademark Office (USPTO), which is part of the U.S. Department of Commerce, the federal department within the Executive Branch that is responsible for promoting economic growth.

Patents have a long legal history in the United States. Patent law is authorized in Article I of the U.S. Constitution. The granting of patents is intended to promote progress in science and art by giving creative individuals a period of exclusive rights to their inventions. Currently, patents are issued for a term of 20 years. By rewarding technological advances, patents can contribute to broader economic growth.



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Thank you to Carol Oshiro for web design, Jessica Radovich for graphics and Kathleen Vickers for text editing.

Researchers and scientists expend considerable resources to develop new inventions. Patents are a means by which the costs of discovery can be recouped. Patenting also results in the sharing of information, because the government publishing of patent applications and patents provides public access to descriptions of new processes and products.



Establishing Intellectual Property Rights



The granting of intellectual property rights for developers of crop plants did not originate with GM crops. Since 1930, the U.S. Congress has authorized USPTO plant patents for many new varieties of plants, developed by crop breeders, that are propagated asexually (by cuttings, etc.); plants that reproduce via tubers, such as potatoes, are not covered. The Plant Variety Protection Act of 1970 (PVPA), which is administered through the U.S. Department of Agriculture, established intellectual property rights for breeders of sexually propagated crops and tubers. Under the PVPA, the protected plant can be used by other breeders to develop new varieties. The PVPA also permits farmers to save seed from protected plants for their own use, but this seed cannot be sold.

A stronger form of patent protection for plants is the Utility Patent, granted by USPTO for novel, useful plants that have been created by humans. The first plant seed to receive a utility patent, in 1975, was a new type of male-sterile corn for use in hybrid corn breeding; the patented corn was less susceptible to yellow leaf blight. The patent was awarded to Earl Patterson, a research scientist at the University of Illinois. Utility patents for successful new products or processes can be an important source of funding for academic research. Nine of the ten universities that received the most USPTO utility patents in 2014 are located in the United States, and their combined efforts resulted in almost 1800 new inventions.

Landmark Decision

In 1980, a landmark U.S. Supreme Court decision (*Diamond v. Chakrabarty*) declared that a genetically modified (GM) bacterium could be patented. As a result, utility patents for organisms, including both GM and non-GM crop plants, became more common. Unlike plant variety protection certificates, utility patents prevent farmers from saving harvested seed to plant; this provision has made utility patents controversial, as they effectively ban a long-standing agricultural tradition of seed-saving.



Product Of Nature



Plants collected from nature are not eligible for patenting. In the United States, this is now true for DNA sequences as well. In the 2013 case of *Association for Molecular Pathology v. Myriad Genetics, Inc.*, the U.S. Supreme Court ruled “a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated.” However, engineered genes not found in nature are indeed eligible for patent protection.

New Contributions

The cost of bringing to market novel crops, both GM and non-GM, is significant. Patent protections provide inventors with incentives for this work while placing limits on how those crops can be used for the duration of the patent. Plant patents have contributed to the development of new plant varieties for the past 85 years, and will likely become more prevalent as genetic engineering and conventional crop breeding are used to create more new plant varieties with desirable traits.



Biotech in Focus thanks the UH Manoa student authors who contributed to our recent series of student bulletins. Mahalo!

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