**Enviropig raises a whole new stink; This genetically modified porker might be more pristine, but the environmental and ethical fight could get down and dirty**.

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**Abstract**: The problem occurs because ordinary pigs can't digest a form of plant phosphorus, an important dietary mineral, so farmers have supplemented feed with phosphorus in another form. The stuff from the plants goes into manure - and, all too often, into streams and lakes. As an alternative, some farmers supplement feed with an enzyme called phytase that helps the pig digest plant phosphorus.

Those first pigs have passed the trait to their offspring, and now more than 100 of the animals have been born, said Prof. John Phillips, a lead scientist on the team. The scientists have given the animals the trademark name Enviropig.

Thus, Enviropig causes jitters in some sectors of an already nervous meat industry, said Prof. Cecil Forsberg, another scientist on the Enviropig team. Many industry investors and one Canadian pork group have refused to get involved in the project, he said.

**Full Text**:

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It seems like an invention straight from hog heaven: pigs with low-phosphorus poop. Less pollution. Lower feed and cleanup costs for farmers. Maybe, eventually, less stink. The pigs, created by genetic scientists in Ontario, could curb a serious pollution problem in Minnesota. But these porkers aren't going to market anytime soon. Instead, they stand at the center of the next fight over genetically modified food. And they represent tough tradeoffs for consumers.

The pigs are one of the first genetically modified livestock creations to be ready for scrutiny by regulators. Behind them in the scientific pipeline is a veritable Old MacDonald's barnyard of animals with genes manipulated to add traits such as leaner meat or disease resistance. Creating the high-tech livestock is only the first hurdle. Next come questions of whether meat from the animals is safe to eat, whether consumers will eat it even if regulators deem it to be safe and whether the animals might pose unexpected environmental problems.

The U.S. Food and Drug Administration is preparing to rule next year on the first round of food safety questions, John Matheson, an FDA senior regulatory review scientist said Thursday at a meeting in Dallas. The FDA co-sponsored the briefing on the technology, along with the Pew Initiative on Food and Biotechnology. A green light from the FDA would shift the decision to farmers and food companies. Consumer groups already are warning them that the impending flare-up over this food will make the dispute over biotech plant crops look tame.

One big issue that hasn't been a factor in the crop debate is whether it is ethical to fiddle with the genes of animals, said Jean Halloran, director of the Consumer Policy Institute, a division of Consumers Union in New York. A farm animal is much closer to a human than is a cornstalk. "We have no society for the prevention of cruelty to plants," she said at the FDA meeting.

Another unknown is what might be called the "yuck factor." Will bacon from a pig that has been given some mouse genes seem too weird to even make it to the breakfast table? We eat to sustain our bodies. But we also get emotional about food, associating it with love, tradition and religion. "There are a lot of irrational buying decisions out there," Halloran said.

Scientists counter that the chemicals that make up genes are the same from mouse to pig to person. We eat them in one combination or another in most foods. What can differ are the proteins that a gene instructs an animal's cells to make. Proteins from different species routinely are mixed at the dinner table. A club sandwich made with bacon, beef and turkey presents proteins from three species, and consumers relish the concoction. However, some proteins introduced by gene splicing might be a problem. Someone who was allergic to eggs, for example, would want to know whether some component of an egg might, because of gene splicing, show up in a hamburger.

**Consumer tradeoffs**

Swapping genes from animal to animal isn't new. It was done in mice more than two decades ago. Since then, genes have been inserted into fish, rats, rabbits, sheep, goats, pigs, cows and chickens. The resulting transgenic animals have been sold for research - but never for food. Companies developing the first line of animals for sale to farmers are betting that consumers will trust that the government would block any unsafe foods. They also predict that consumers will see good reasons to accept foods that win approval.

Those Canadian pigs embody the tradeoffs that consumers face.

With funding from pork producers, scientists at the University of Guelph in Ontario tackled a problem that plagues Minnesota farmers. Runoff of pig manure from fields is a major source of phosphorus that pollutes streams and lakes. It feeds algae that rob the water of oxygen needed to sustain fish and other aquatic life.

The problem occurs because ordinary pigs can't digest a form of plant phosphorus, an important dietary mineral, so farmers have supplemented feed with phosphorus in another form. The stuff from the plants goes into manure - and, all too often, into streams and lakes. As an alternative, some farmers supplement feed with an enzyme called phytase that helps the pig digest plant phosphorus.

The Canadian scientists found a gene in an e-coli bacterium that produces phytase. From mice, they took a gene that directs the salivary glands to make enzymes. They spliced portions of the two genes together and put that package into pig embryos. The result was pigs that produce phytase in saliva and efficiently digest plant phosphorus.

Those first pigs have passed the trait to their offspring, and now more than 100 of the animals have been born, said Prof. John Phillips, a lead scientist on the team. The scientists have given the animals the trademark name Enviropig. Papers the research team has published in peer-reviewed journals show that the genetic modification decreases phosphorus in the pigs' manure by as much as 75 percent. Phillips said the pigs are healthy and normal. The stink of the manure still is there, he said, but phosphorus plays a role in that too, and this research may provide clues to curbing the odor.

The next step will be to convince regulators that the meat is safe and the animals pose no environmental problems. "No molecule in these animals will go unexamined," Phillips said. The scientists are confident the animals will pass regulatory muster in the United States and Canada. What worries them more is the consumer judgment.

The University of Guelph has begun studying consumer reaction to the pigs, and it is finding that deep mistrust of current farm practices taints the attitudes toward new technology, Phillips said. "People are very suspicious because they are concerned about how animals are raised on farms right now," he said. 'I don't think transgenic food production animals are going to be widely embraced until some of those concerns are addressed."

Consumers are so fed up with reports of chickens bred to be so plump they can't walk, and other controversial practices, that burger chains are monitoring the treatment of cattle and chickens they buy, said Joy Mench, an animal science professor at the University of California, Davis.

Thus, Enviropig causes jitters in some sectors of an already nervous meat industry, said Prof. Cecil Forsberg, another scientist on the Enviropig team. Many industry investors and one Canadian pork group have refused to get involved in the project, he said.

Pork producers in the United States have yet to weigh in. "It's going to be a while before the consuming public is ready to get into the nuances of molecular genetics," said Eric Hentges, Vice President of technology and education for the National Pork Board. 'When my pork producers take on a new technology, they can't afford to be wrong. . . . We have as much at stake in this regulatory process as the consumer does." Phillips takes a long view of Enviropig's future: "Twenty-five or 30 years from now, it will be out there, and the world will be a better place for it."