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Food Technologies Require Consumer Acceptance

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FOOD TECHNOLOGIES REQUIRE CONSUMER ACCEPTANCE

RESEARCHERS STUDY RNA INTERFERENCE IN PLANTS AND ANIMALS TO IMPROVE FOOD EFFICIENCY WHILE UNLOCKING PUBLIC PERCEPTION

The unpredictability of Mother Nature often requires crops to deal with changing weather patterns, such as excessive moisture one month and drought the next. Scientists develop new varieties that can adapt well to a particular weather extreme, but creating a variety that acclimates to all becomes a greater challenge.

Consider the numerous metabolic disorders or even viruses that plague living things. Because antibiotics only help combat bacterial infections, livestock and humans typically rely on a strong immune system to feel better.

A technology developed in the last two decades called ribonucleic acid interference, or RNAi, could help overcome these and many other challenges. Scientists from multiple disciplines at Kansas State University are working together to determine how to use RNAi to more efficiently produce food from plants and livestock.

Barry Bradford is an associate professor of animal sciences and industry and primary investigator on the project. He said as an example in animals, the complex process would first require identifying a protein encoded by a gene that is causing a problem, with the goal to suppress that protein in a certain organ, such as the liver.

Fatty liver syndrome in cattle could be one such problem addressed by RNAi. It occurs when a cow breaks down too much fat for the liver to process and the leftover fat in the liver becomes toxic.

Computer software determines what RNA molecule to build that will bind to the problem protein and eventually silence it. Bradford said the computer algorithms are precise and provide a sequence that will only knock down one of the 25,000 or more proteins produced in an organism.

A nanoparticle is formed when a protective shell is built around and bound to the double-stranded RNA. Scientists would then place the nanoparticle in the animal's bloodstream, where it would go to the targeted organ and complete its task of silencing the protein.

Bradford, who has been working on RNAi as a Fulbright senior scholar in Australia, said the process is not any more invasive than giving the animal a traditional drug and is more targeted. It also does not involve genetic modification.

"A benefit would be you don't have to worry about a drug their body has to get rid of," Bradford said. "You have a nanoparticle, but RNA is always in the body in billions of copies. You are introducing a different code to a natural compound already in the body."

Because the technology is new and is still being developed, consumers might have questions and concerns. Scientific feasibility alone does not mean the technology will work, which is why Glynn Tonsor, associate professor of agricultural economics at Kansas State University, is on the study to analyze the consumer aspect.

"There is benchmark science at the front of this, but we also have to understand if the public is going to accept this technology," Tonsor said.

Tonsor plans to analyze consumer perceptions of RNAi in the form of meat products that might come from it. For example, he wants to know if a consumer would purchase a steak or ground beef from an animal that experienced RNAi.

The RNAi project was funded through the university's Global Food Systems initiative and includes nine faculty from the College of Agriculture, College of Veterinary Medicine and College of Arts & Sciences.

By Katie Allen, K-State Research and Extension