Kansas State University

Perspectives

Spring 2011

IN EUROPE AND THE U.S., CONSUMER VIEWS ON CLONED PRODUCTS BREED DIFFERENT RESULTS

Not all consumers share the same attitudes toward animal cloning, but the latest research from Sean Fox, Kansas State University professor of agricultural economics, shows that Americans may be more accepting of consuming cloned animal products than Europeans.

Much of Fox's research focuses on consumer attitudes toward food safety. He worked with Shonda Anderson, master's student in agricultural economics, to recently explore consumer attitudes on cloned animals.

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Biologist's career spent on research to prevent cataracts

When University Distinguished Professor of Biology Larry Takemoto retires from Kansas State University this summer he will leave behind 32 years of research that may eventually see the prevention of cataracts.

Cataracts are the opacification of the human lens, the leading cause of blindness in the world, and the third cause of blindness in the United States.

They occur mostly in people over 60 years of age, although there are some genetic cases in young people. The only treatment is to remove the lens and replace it with a plastic one — a procedure that is common in the U.S. but largely unavailable in the Third World.

Takemoto has spent his career understanding the proteins of the lens and the concentration of those proteins.

"My hypothesis has been that there are changes in the protein that cause the lens to go from transparent to opaque," Takemoto said. "I found a number of different changes in a protein that correlate with cataract opacification."

Takemoto thinks that within the next 50 years scientists will find a way to stop cataracts using molecular biology.

—Rachel Skybetter

In the spotlight: Graphene research receives national recognition

It's already been a research-filled year for Vikas Berry, assistant professor of chemical engineering. He has received national recognition for two of his research projects involving graphene, a form of carbon that is only one atom thick.

First Berry received a five-year $400,000 National Science Foundation CAREER award to study a new process for producing graphene quantum dots, which are ultrasmall sheets of carbon atoms. The research can lead to improved electronics and optoelectronics.

Soon after that Berry and his research team published an article in Nano Letters, the American Chemical Society's monthly scientific journal. The article discusses Berry's method of wrapping graphene around bacteria cells when using electron microscopes. This method protects the cells from shrinking under ultrahigh vacuums and provides more accurate microscopy images.

—Jennifer Torline

Chemist recognized as promising young scientist

Christine Aikens, assistant professor of chemistry, has received a two-year $50,000 Sloan Research Fellowship for her success as a promising young scholar.

The Alfred P. Sloan Foundation awards the fellowship each year to early career scientists. Aikens, one of 23 chemists to receive the award, plans to use it to support her work with gold nanoparticles, particularly how they can be used in cancer research.

Aikens is also a National Science Foundation CAREER award winner. Last year she received the four-year $600,000 award to help her research how plants and inorganic systems can be used for clean, renewable sources of energy.

—Jennifer Torline

The meat of the matter: ready-to-eat products contain few cancerous compounds

Just how safe are ready-to-eat meat products? New research by a Kansas State University team finds that hot dogs, pepperoni and deli meats are relatively free of carcinogenic compounds, while the opposite is true for bacon and rotisserie chicken, especially its skin.

J. Scott Smith, professor of food chemistry, and colleagues have been looking at ready-to-eat meat products to determine their levels of heterocyclic amines, or HCAs. These are carcinogenic compounds found in meat that is fried, grilled or cooked at high temperatures.

The research was a collaboration with Terry Houser, assistant professor of meat science; Melvin Hunt, professor of animal sciences and industry; and two graduate students. The group's research appears in a recent issue of Meat Science, the journal of the American Meat Science Association.

The study focuses on eight types of ready-to-eat meat products: beef hot dogs, beef-pork-turkey hot dogs, deli roast beef, deli ham, deli turkey, fully cooked bacon, pepperoni and rotisserie chicken.

After heating up or baking the products, the researchers tested them for five different types of HCAs. Pepperoni had the least HCA content, followed by hot dogs, deli meats and bacon. The researchers concluded that consuming such ready-to-eat meat products contributes very little to HCA intake.

Rotisserie chicken skin had significantly higher HCA levels because it contains more fat and protein and less moisture, and HCA levels tend to increase as moisture decreases, Smith said.

The research was supported by the Cooperative State Research Education and Extension Service with the USDA, the American Meat Institute Foundation and the National Pork Board Checkoff.

Entomologist finds household pests carry same multi-drug resistant bacterial strains found in swine operations

Extensive use of antibiotics in the livestock industry could lead to unintended consequences, including the spread of resistant bacteria between farms and more importantly, from farms to surrounding urban environments, according to a study by a Kansas State University professor and colleagues.

Antibiotics used as growth promoters in the livestock industry constitute strong selection pressure for evolution and selection of antibiotic resistant bacterial strains. Ludek Zurek, associate professor of microbial ecology, and colleagues studied enterococc, bacteria that are very good at acquiring and donating antibiotic resistance genes to other bacteria.

The bacteria were isolated from the digestive tract of houseflies and the feces of German cockroaches. Using phenotypic and genotypic analysis, the study found houseflies and German cockroaches in confined swine production environments carry the same multi-drug resistant bacterial strains isolated from swine feces.

Consequently, since these insects move freely to and from farms, they likely serve as vectors and/or reservoirs of antibiotic resistant and potentially virulent enterococci and other bacteria.

However, Zurek said it remains to be determined the extent to which these insects actually contaminate surfaces, food, and drinks in residential areas by bacteria originating from farms.

Zurek wrote the study with his two postdoctoral research associates, Aqeel Ahmad in the department of entomology, and Anuradha Ghosh in the department of diagnostic medicine and pathobiology; and Coby Schal, an entomology professor at North Carolina State University.

Biosecurity Research Institute enhancing food safety research

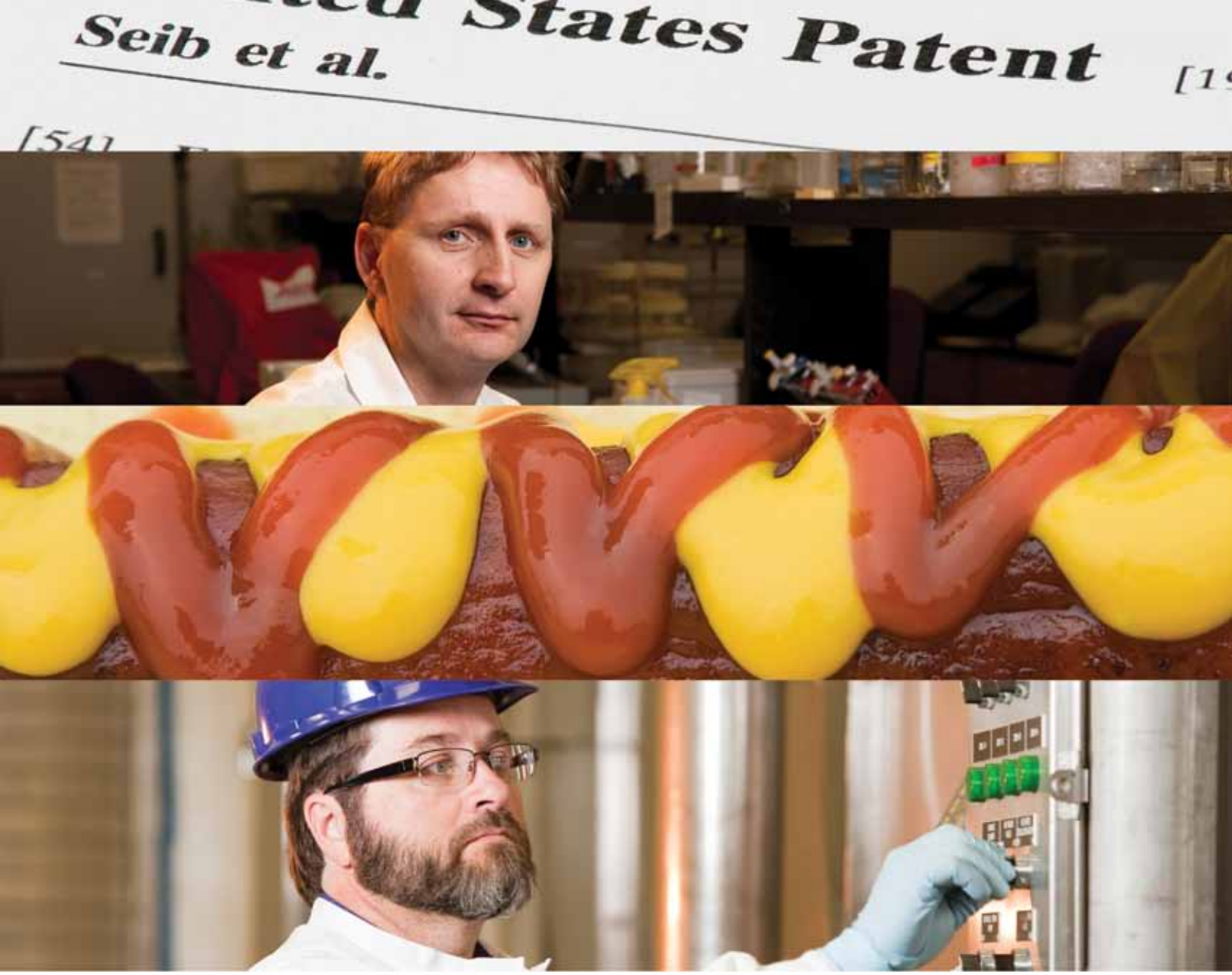
Randy Phebus says the addition of the Biosecurity Research Institute to Kansas State University's research infrastructure has made his work much more productive.

The K-State Research and Extension professor of food safety and defense is now able to conduct key food safety research involving E. coli and other food pathogens in one place. That's because the Biosecurity Research Institute at Pat Robert's Hall is uniquely set up so Phebus can systematically evaluate key components of commercial systems used for food processing, identify risk factors for specific pathogens, and develop appropriate antimicrobial interventions and detection methods — all under one roof.

Phebus' current research focuses on E. coli O157:H7 and a group of emerging, cousin-like group of microorganisms called non-O157 STECS, which is short for Shigatoxin-producing E. coli. These enterohemorrhagic E. coli strains produce toxins that can lead to very serious health problems such as bloody diarrhea and kidney failure, particularly in young children.

In another of the institute's food safety projects, Phebus and Dick Oberst, professor of diagnostic medicine and pathobiology, are working with the U. S. Army Natick Soldier Research Development and Engineering Center in Natick, Mass., to validate ways to ensure that what soldiers eat and drink are free of pathogenic microorganisms or biological toxins. Those substances could range from simple but sickening bacteria found naturally in the food supply to more complicated pathogens such as those on the Centers for Disease Control and Prevention's select agent list.

Phebus said the institute's biosafety level 3 and biosafety level 3-agriculture labs make his work possible. He also said the institute positions K-State as a leader in identifying potential food contamination and developing successful interventions to curb growing concerns about STECS and other potential life-threatening microorganisms.



A patented success

Kansas State University's growing success in patenting research discoveries — including 11 patents in 2010 — begs the question: Which patent has been the most successful to date?

According to Marcia Molina, vice president of the K-State Research Foundation, the answer is U.S. Patent 5,855,946: Food Grade Starch Resistant to Alpha-Amylase and Method of Preparing the Same.

Invented by Paul Seib, now a professor emeritus of grain science and industry, and Kyungsoo Woo, a graduate student of Seib's, this resistant starch technology is used to make low-carbohydrate, high-fiber foods. The technology helps plant-based starches resist digestion by the enzyme amylase, which turns starches into sugar. When the starches are resistant to being broken down, fiber content can be enhanced and carbohydrate levels reduced in many foods.

The resistant starches work in food products that use flour, such as pastas, bread, cookies, crackers, chips and more.

K-State licensed the technology to MGP Ingredients in Atchison.

"This patent has brought in the most money to the university, and it is still in effect for several more years," Molina said. "The technology continues to be widely used by the food industry."

Seib, a highly honored researcher in carbohydrate chemistry, starch science and technology, and cereal science, was responsible for more than 20 patents during his career. Woo, who earned his master's and doctorate from K-State, went on to work for MGP.

More information about university research technologies available for licensing through the Research Foundation is available at www.k-state.edu/tech.transfer/technologies/Technologies.htm.

—Beth Bohn

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"We were interested in finding out how different groups of consumers react to the possibility of consuming products that were derived from cloned animals," Fox said. "We were also interested in how those reactions differed between countries, particularly in the United States and Europe."

Fox and Anderson surveyed K-State undergraduates in agriculture, English and sociology classes. They also surveyed agriculture undergraduates at University College Dublin in Ireland and Ecole Supérieure d'Agriculture in Purpan, France. The survey asked participants about their likelihood of buying and eating meat and other products from cloned animals.

Results showed differences on both an international and local level, most significant being that Americans were more accepting of cloned products than Europeans.

Other findings include:

- Students in Ireland and France were less likely to consume cloned products than K-State students.
- At K-State sociology and English students were less likely to consume cloned products than the agriculture students.
- Participants were more likely to consume cloned products after learning that both the U.S. Food and Drug Administration and the European Food Safety Authority had stated that cloned animal products pose no safety risk.

More of the European students were concerned about cloning from an ethical and moral perspective, while the American students cited food safety concerns. The strength of opposition to cloning was much stronger for those who morally opposed cloning than for those who opposed it for food safety concerns, Fox said.

The survey also found that women were less likely to purchase cloned products, and people familiar with science were more accepting of cloned products.

"It will be interesting to see how big an impact the messages of groups campaigning for or advocating against the concept of cloning will have on consumers, versus how big an impact that scientific information from a university like K-State will have," Fox said. "Or, if people have access to both messages, who they choose to believe."

While the survey results can't be generalized across any large population, Fox said they do offer insight into American and European views toward food technology. Fox and Anderson are working on a similar study in China and Honduras.

"Results suggest that a significant number of people do have concerns about cloning from an ethical and moral perspective," Fox said. "That will be very relevant if these products come to market and are labeled as such, because we would expect to see a significant number of people avoiding them."

—Jennifer Torline

Produced by the Division of Communications and Marketing.