Summer 2011

Center for Food Safety, Summer 2011

University of Arkansas (System). Division of Agriculture. Center for Food Safety

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

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INSIDE:

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Center Faculty Edit Book on Sequencing Methods

Two Center for Food Safety faculty have served as co-editors of *High-Throughput Next Generation Sequencing - Methods and Applications*, published recently by Humana Press. Steven C. Ricke, director of the Center who also holds the Donald "Buddy" Wray Chair in Food Safety, and Young Min Kwon, associate professor of poultry science, edited the 308-page book. The book is available for purchase online for $119 from the publisher at http://www.springer.com/biomed/human+genetics/book/978-1-61779-088-1

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Pohlman Brings Beef Expertise to Center

Fred Pohlman

Fred Pohlman delves into a particularly challenging area of food safety research: ground beef, which is mingled together inside and outside with potential areas of contamination, unlike intact carcass cuts that are primarily targets of surface contamination.

"Years ago, when safety came to the forefront, the initial work in the academic community and industry was predominantly carcass work," said Pohlman, a UA

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C Center Faculty Edit Book on Sequencing Methods

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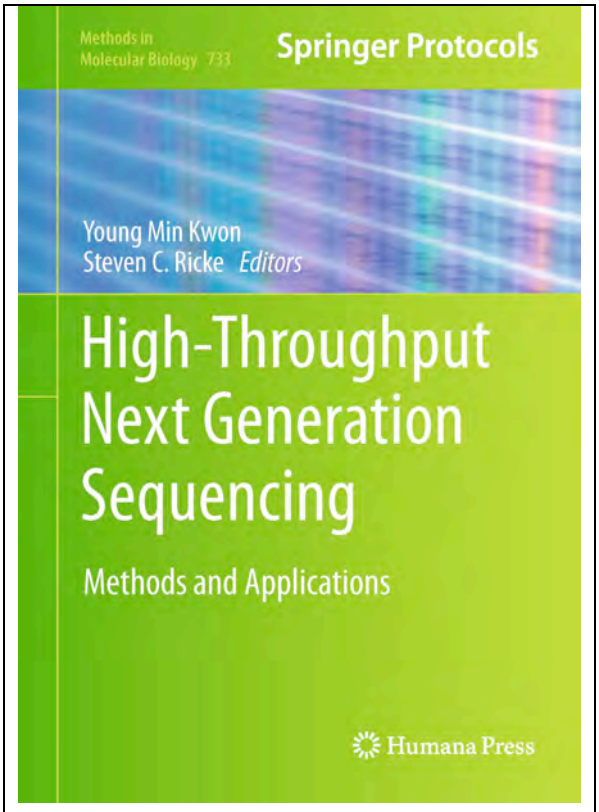

The book edited by Steven Ricke and Young Min Kwon is available for ordering online.

The publisher offered this summary of the book:

"Due to their novel concepts and extraordinary high-throughput sequencing capacity, the 'next generation sequencing' methods allow scientists to grasp system-wide landscapes of the complex molecular events taking place in various biological systems, including microorganisms and microbial communities. These methods are now being recognized as essential tools for a more comprehensive and deeper understanding of the mechanisms underlying many biological processes. In *High-Throughput Next Generation Sequencing: Methods and Applications*, experts in the field explore the most recent advances in the applications of next generation sequencing technologies with an emphasis on microorganisms and their communities; however, the methods described in this book will also offer general applications relevant to the study of any living organisms. Written in the highly successful *Methods in Molecular Biology*™ series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and key tips on troubleshooting and avoiding known pitfalls.

"Comprehensive and cutting-edge, *High-Throughput Next Generation Sequencing: Methods and Applications* is an excellent collection of chapters to aid all scientists who wish to apply these innovative research tools to enhance their own pursuits in microbiology and also biology in general."

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Pohlman Brings Beef Expertise to Center for Food Safety

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Center for Food Safety researcher and professor of animal science who has been at the university since 1997. "One of the big issues was always with ground beef. We were interested in ground beef safety because we saw that as really fundamental on the safety contingent."

Pohlman and research team members have also worked on ground beef's quality attributes in coordination with measures to improve safety. In some cases, reducing microbial contamination can leave the beef with a darker color, an off odor or an off flavor, all of which can discourage sales.

"We've done a lot of development of technologies of antimicrobials to see which ones are going to have an effect on quality attributes," Pohlman said. "Then we'd do some retail case display evaluations to see if we maintained the quality because color is a big issue."

Pohlman's projects have also involved working with intact cuts of meat to decontaminate a primal or subprimal piece. "The carcass through the finished product needs multiple interventions," he said. "The more steps or interventions you can put in microorganisms' way, the better chance you have for control."

Pohlman's professional background also includes cooperative food safety and processing projects with poultry science and food science personnel. His research interests include the development of new antimicrobials and new technologies that can be used in interventions.

"How can we make them (antimicrobials) perform better and use less of them?" he asked. "If you can do that, it helps the industry because they're using less of an ingredient that they have to buy to impart safety."

Pohlman also maintains an active teaching schedule of two undergraduate courses each fall in Meat Science and Career Preparation and Development. In the spring he is part of a teaching team that offers a graduate course in Advanced Meat Technology.

The careers course is required for all animal science majors, who are urged to take it as sophomores so the students can be exposed to job possibilities long before graduation. Pohlman invites guest speakers such as veterinarians in private practice and corporate industry executives.

"It's meant to prepare them academically for a career in the agricultural industries," he said.

"We do resumes, cover letters and how to prepare them. Many students use them for applications. This gives them three years to secure and complete internships and work study programs and to build experiences that will be beneficial to them before actually looking for a position."

Scene from the 2010 Arkansas Association for Food Protection conference at Tyson Foods in Springdale.

AAFP Educational Conference Planned for September

The Arkansas Association for Food Protection will present its annual educational conference Sept. 13-14 at the Tyson Foods Discovery Center in Springdale. AAFP is an affiliate of the International Association for Food Protection.

The meeting is slated to run from 1-5 p.m. Sept. 13 and from 8 a.m. to 3 p.m. Sept. 14. The breakfast and lunch will be included on Sept. 14. The meeting registration fee is only $30 per person including a continental breakfast and lunch. Registration will be possible on site but those attending are encouraged to register early so AAFP can have accurate head counts for the meals. A slate of speakers for the conference will be announced on the AAFP website at http://arkafp.org.

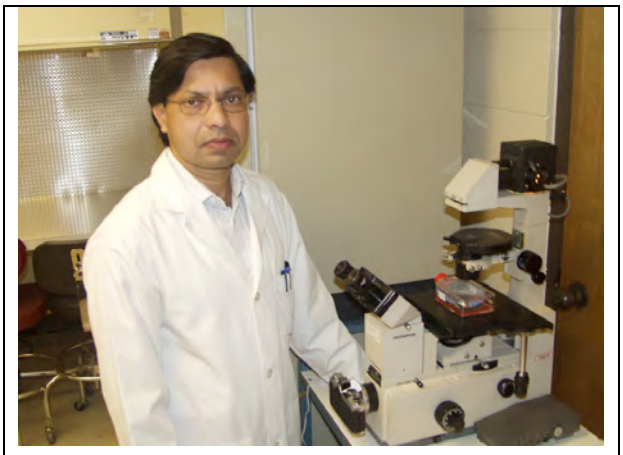
AAFP is asking its members and prospective members to go online and submit their annual dues and meeting registration form. Dues may be paid online at http://arkafp.org/memberspay.aspx. The conference fee may be paid at http://arkafp.org/confpay.aspx.

Any organization or business that would like to be a corporate level sponsor may contact AAFP Treasurer Jennifer Ford to discuss further at jennifer.ford@tyson.com. Sponsorships are available at levels of $1,000, $750 and $500. Exhibition space is available at $150 a booth.

For visitors from outside the area, AAFP has reserved a block of rooms at the Holiday Inn of Springdale at 1500 S. 48th St. at the discounted rate of $86 a night, which includes breakfast. To get the discount rate, a room must be reserved no later than Sept. 2. Contact the hotel directly at 479-751-8300 and refer to the "AAFP block" when making a

reservation.

Biswas Accepts Faculty Position at Maryland



Debabrata Biswas

Debabrata Biswas is leaving his position as a postdoctoral associate at the UA Center for Food Safety in August to join the faculty at the University of Maryland. At Maryland he will be an assistant professor in the Department of Animal and Avian Sciences and will teach a food safety course to master's and doctoral students.

Biswas said he expects his research at Maryland will include collaboration with the biotechnology industry in the Washington-Baltimore area and with the region's poultry industry. He will continue to pursue research similar to what he has done at Arkansas, including issues related to *Campylobacter, E. coli* O157, *Salmonella* and *Listeria.* He also investigates the role of natural products and probiotics such as *Bifidobacteria* and *Lactobacillus* spp. and their fermented bioproducts in host cells-enteric bacterial pathogens interactions.

He also has worked on the development of vaccine to eliminate or reduce the colonization of foodborne bacterial pathogens in poultry, cattle and swine.

Biswas has been at Arkansas since January 2009. He previously worked as a research associate and guest lecturer at the University of Saskatchewan and a postdoctoral research associate at Washington State University. Biswas earned doctoral and master's degrees in cellular and molecular microbiology from the University of Tokyo and another master's degree in medical microbiology and a bachelor's degree in biological sciences from the University of Dhaka in Bangladesh.

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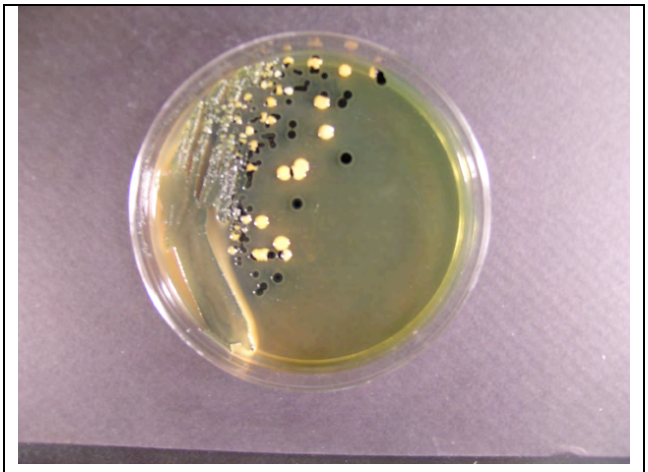
Center for Food Safety, NCTR Personnel Collaborate on Major *Salmonella* Review

Applied and Environmental Microbiology, July 2011, p. 4273-4279
0099-2240/11/$12.00 doi:10.1128/AEM.00598-11



Salmonella subject of journal review

A team of Arkansas researchers were among those collaborating on a review paper highlighting factors that may contribute to shifts in *Salmonella* populations in commercial poultry. The review, "Population Dynamics of *Salmonella* enterica Serotypes in Commercial Egg and Poultry Production," appears in the July 2011 edition of Applied and Environmental Microbiology.

Steven L. Foley of the Food and Drug Administration National Center for Toxicological Research in Jefferson, Ark., is the corresponding author. Other authors are Rajesh Nayak of NCTR, Irene Hanning of the University of Tennessee Department of Food Science and Technology and formerly of the UA Center for Food Safety, Timothy Johnson of the University of Minnesota Department of Veterinary and Biomedical Sciences, Jing Han of NCTR and Steven Ricke, director of the UA Center for Food Safety.

The article noted that the *S*. enterica serovars Pullorum and Gallinarum caused widespread poultry diseases in the early 20th century, but the impact was diminished over the year because of vaccinations and other voluntary programs. *S*. Enteritidis apparently filled the void and proliferated among the birds although it has been declining since the 1990s. That decline has coincided with the rise of *S*. Heidleberg and *S*. Kentucky as predominant serovars in commercial broilers.

"These observed shifts in *Salmonella* serovars in commercial poultry-associated environments appear to be driven by a combination of bacterial genetic factors, host-related factors, and management practices," the review concludes. "Therefore, an improved understanding of the historical factors that likely contributed to population shifts will provide insights for developing strategies to control current *Salmonella* problems and also limit the emergence of additional serovars that are an increased threat to public health."

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Workshops at the UA Institute of Food Science and Engineering

Microbiological Laboratory Logistics and Fundamentals - This workshop will be held on several dates (Aug. 16-18, Sept. 13-15 and Oct. 11-13, 2011). See http://www.uark.edu/ua/foodpro/Workshops/Micro_Lab.html

Molecular Biology and Biotechnology; Workshop for Beginners - This workshop will be held on several dates (to be determined in 2011). See http://www.uark.edu/ua/foodpro/Workshops/Molecular-lab.html

Better Process Control School - This 3.5-day workshop will be held Nov. 1-4, 2011. For more information and registration form, go to http://www.uark.edu/depts/ifse/bpcsrev1.html

Sensory Evaluation of Foods – This workshop will be held June 2012. For details and registration information, see http://www.uark.edu/ua/foodpro/Workshops/Sensory_Evaluation_Workshop.html

CFS Publications and Presentations

Publications

Van Loo, E., V.V. Caputo, R.M. Nayga, Jr., J.-F. Meullenet and S.C. Ricke. 2011. Consumers' willingness to pay for organic chicken breast: evidence from choice experiment. Food Quality and Preference, 22: 603-613.

Sirsat, S.A., A. Muthaiyan and S.C. Ricke. 2011. Optimization of RNA extraction method for transriptome studies of *Salmonella* inoculated on commercial raw chicken breast samples. BMC Research Notes, 4: 60:1-7.

Milillo, S.R., E. Martin, A. Muthaiyan and S.C. Ricke. 2011. Immediate reduction of *Salmonella enterica* serotype Typhimurium following exposure to multiple-hurdle treatments with heated, acidified organic acid salt solutions. Applied Environmental Microbiology, 77: 3765-3772.

Lungu, B., C.A. O'Bryan, A, Muthaiyan, S. R. Milillo, M.G. Johnson, P.G. Crandall and S.C. Ricke. 2011. *Listeria monocytogenes*: Antibiotic resistance in food production. Foodborne Pathogens and Disease, 8: 569-578.

Foley, S., R. Nayak, I.B. Hanning, T.L. Johnson, J. Han and S.C. Ricke. 2011. Population dynamics of *Salmonella enterica* serotypes in commercial egg and poultry production. Applied Environmental Microbiology, 77: 4273-4279.

Jarquin, R., I. Hanning and S. Ricke. 2011. Antimicrobials in feed: benefits and limitations. *In:* Feed and Fodder Contamination: Effects on Livestock and Food Safety, J. Fink-Gremmels (ed.), Woodhead Publishing Ltd., Cambridge, UK.

Perumalla, A.V.S., and N.S. Hettiarachchy. 2011. Green tea and grape seed extracts – Potential applications in food safety and quality. Food Research International, 44 (4): 827-839.

Presentations

Ravichandran, M., N.S. Hettiarachchy, S.C. Ricke and S.P. Singh. 2011. Antimicrobial effects of nanoparticle mediated delivery of phenolic compounds in combination with ethylenediamine tetraacetic acid on *Listeria monocytogenes, Escherichia coli* O157:H7 and *Salmonella* Typhimurium in broth and chicken meat system. Ozark Food Processors Association poster competition, April 2011, Springdale, Ark.

Perumalla, A.V.S., N.S. Hettiarachchy and S.C. Ricke 2011. Effect of reducing potassium lactate and sodium diacetate and incorporating green tea extract, grape seed extract, nisin and EDTA combinations on inhibiting *Listeria monocyto*genes inoculated in hotdog model system. Ozark Food Processors Association poster competition, April 2011, Springdale, Ark.

Perumalla, A.V.S, N. S. Hettiarachchy and S.C. Ricke. 2011. Effect of reducing potassium lactate and sodium diacetate and incorporating green tea extract, grape seed extract, nisin and EDTA combinations on inhibiting *Listeria monocytogenes* inoculated in hotdog model studies. Institute of Food Technologists Annual Meeting and Food Expo, June 11-14, 2011, New Orleans.

Ravichandran, M., N. Hettiarachchy, S.C. Ricke and S.P. Singh. 2011. Antimicrobial effects of nanoparticle mediated delivery of phenolic compounds in combination with ethylenediamine tetraacetic acid on *Listeria monocytogenes, Escherichia coli* O157:H7 and *Salmonella* Typhimurium in broth and chicken meat system. Institute of Food Technologists Annual Meeting and Food Expo, June 11-14, 2011, New Orleans.