

***Stephen J. Knabel, Ph.D.***

**Professor of Food Science  
437 Food Science Building  
The Pennsylvania State University, University Park, PA 16802**

**EDUCATION AND PROFESSIONAL EXPERIENCE**

- July 1, 2006 – Present. Professor of Food Science, Penn State University  
July 1, 1995 – June, 31, 2006. Associate Professor of Food Science, Penn State University  
August 1989 - July 1, 1995: Assistant Professor of Food Science, Penn State University  
1989 Ph.D. in Microbiology and Food Technology from Iowa State University  
1986 M.S. in Food Technology from Iowa State University  
1983 - 1989. Graduate Research and Teaching Assistant in the Food Technology and Microbiology Departments at Iowa State University. Research on the spoilage of poultry, mechanism of inhibition of bacteria by polyphosphates, and the recovery of heat-injured *Listeria monocytogenes* from milk.  
1974 - 1983. Corporate Microbiologist for FDL Foods in Dubuque, Iowa. Responsible for all microbiology programs.  
1973 B.S. in Food Technology, Iowa State University

**RESEARCH PROGRAM (70%)**

Research program focuses on detection, tracking and control of foodborne pathogens, especially *Listeria monocytogenes*. Applied and basic research on the development of novel recovery/enrichment systems and rapid molecular methods for detection and molecular epidemiology of foodborne pathogens. Also, research on the destruction of *Salmonella* and *E. coli* O157:H7 on poultry, beef, fruits and vegetables. Research on mechanisms of injury, recovery and destruction of *Listeria monocytogenes* during heating and high pressure processing. Member and former Chair of the Food Safety Group.

**TEACHING PROGRAM (30%)**

Currently teaching Microbial Diversity (MICRB 413). This undergraduate course stresses the integration of molecular phylogeny, evolutionary ecology, genomics, and geology to better understand the diversity and importance of prokaryotes in the Earth's biosphere. Currently teaching Advanced Food Microbiology (FD SC 507). This graduate-level course emphasizes critical review of recent developments in food microbiology including spoilage organisms, starter cultures and probiotics, and the detection, tracking and control of foodborne pathogens. Currently teaching the Food Microbiology Section of Fundamentals of Food Science (FD SC 500). Guest lecture in various microbiology and food microbiology courses and short courses at Penn State.

## PUBLICATIONS

1. Knabel, S. J., H. W. Walker, P. A. Hartman, and A. F. Mendonca. 1990. Effects of growth temperature and strictly anaerobic recovery on the survival of *Listeria monocytogenes* during pasteurization. *Appl. Environ. Microbiol.* 56:370-376.
2. Knabel, S. J., H. W. Walker, and P. A. Hartman. 1991. Inhibition of *Aspergillus flavus* and selected Gram-positive bacteria by chelation of essential metal cations by polyphosphates. *J. Food Protect.* 54:360-365.
3. Kim, J. W., S. J. Knabel, and S. Doores. 1993. Penetration of *Salmonella typhimurium* into turkey skin. *J. Food Prot.* 56:292-296.
4. Catalano, C. R., and S. J. Knabel. 1994. Incidence of *Salmonella* in Pennsylvania egg processing plants and destruction by high pH. *J. Food Prot.* 57: 587-591.
5. Catalano, C. R., and S. J. Knabel. 1994. Destruction of *Salmonella enteritidis* by high pH and rapid chilling during simulated commercial egg processing. *J. Food Prot.* 57:592-595.
6. Karr, K. J., A. N. Maretzki, and S. J. Knabel. 1994. Meat and poultry companies assess USDA's Hazard Analysis and Critical Control Point system. *Food Technol.* 48:117-122.
7. Knabel, S. J., and S. A. Thielen. 1994. Enhanced recovery of severely heat-injured, thermotolerant *Listeria monocytogenes* from USDA and FDA primary enrichment media using a novel, simple, strictly anaerobic method. *J. Food Prot.* 58:29-34.
8. Mendonca, A. F., and S. J. Knabel. 1994. A novel one-step enrichment system incorporating lithium for the detection of severely heat-injured *Listeria monocytogenes* in milk containing background microflora. *Appl. Environ. Microbiol.* 60:4001-4008.
9. Mendonca, A. F., T. L. Amoroso, and S. J. Knabel. 1994. Destruction of gram-negative food-borne pathogens by high pH involves disruption of the cytoplasmic membrane. *Appl. Environ. Microbiol.* 60:4009-4014.
10. Knabel, S. J. 1995. Foodborne illness: role of home food handling practices (Scientific Status Summary). *Food Technology* 49(4):119-131.
11. Fajardo, T. A., R. C. Anantheswaran, V. M. Puri, and S. J. Knabel. 1995. Penetration of *Salmonella enteritidis* into eggs subjected to rapid cooling. *J. Food Prot.* 58:473-477.
12. Teo, Y.-L., T. J. Raynor, K. R. Ellajosyula, and S. J. Knabel. 1996. Synergistic effect of high temperature and high pH on the destruction of *Salmonella enteritidis* and *Escherichia coli* O157:H7. *J. Food Prot.* 59:1023-1030.
13. Woody, J. L., R. A. Wilson and S. J. Knabel. 1998. Screening for *E. coli* O157:H7 in fresh and frozen ground beef using the Difco EZ Coli™ rapid detection system. *J. Food Prot.* 61:110-112.

14. Ellajosyula, K., R. A. Wilson, S. Doores, and S. J. Knabel. 1998. Destruction of *Escherichia coli* O157:H7 and *Salmonella typhimurium* in Lebanon bologna by interaction of fermentation pH, heating temperature and time. *J. Food Prot.* 61:152-157.
15. Alavi, S. H., V. M. Puri, S. J. Knabel, R. H. Mohtar, and R. C. Whiting. 1999. Development and validation of a dynamic growth model for *Listeria monocytogenes* in fluid whole milk. *J. Food Prot.* 62:170-176.
16. Woody, J. L., R. A. Walsh, S. Doores, W. R. Henning, R. A. Wilson, and S. J. Knabel. 2000. Role of Bacterial Association and Penetration on Destruction of *Escherichia coli* O157:H7 in Beef Tissue by High pH. *J. Food Prot.* 63:3-11.
17. Teo, Y.-L. and S. J. Knabel. 2000. Development of a Simple Recovery-Enrichment System for Enhanced Detection of Heat-Injured *Listeria monocytogenes* in Pasteurized Milk. *J. Food Prot.* 63:441-444.
18. Suh, J.-H., and S. J. Knabel. 2000. Comparison of different reducing agents for enhanced detection of heat-injured *Listeria monocytogenes*. *J. Food Prot.* 63:1058-1063.
19. Suh, J.-H., and S. J. Knabel. 2001. Comparison of different enrichment broths and background flora for detection of heat-injured *Listeria monocytogenes* in whole milk. *J. Food Prot.* 64:30-36.
20. Chikthimmah, N., R. B. Guyer, and S. J. Knabel. 2001. Validation of a 5-Log<sub>10</sub> reduction of *Listeria monocytogenes* following simulated commercial processing of Lebanon bologna in a model system. *J. Food Prot.* 64:873-876.
21. Chikthimmah, N. and S. J. Knabel. 2001. Survival of *Escherichia coli* O157:H7, *Salmonella* Typhimurium and *Listeria monocytogenes* in and on vacuum-packaged Lebanon bologna stored at 3.6 and 13.0°C. *J. Food Prot.* 64:958-963.
22. Teo, A. Y.-L., G. R. Ziegler, and S. J. Knabel. 2001. Optimizing detection of heat-injured *Listeria monocytogenes* in pasteurized milk. *J. Food Prot.* 64:1000-1011.
23. Chikthimmah, N., R. Anantheswaran, R. F. Roberts, E. W. Mills and S. J. Knabel. 2001. Influence of sodium chloride on growth of lactic acid bacteria and subsequent destruction of *Escherichia coli* O157:H7 during processing of Lebanon bologna. *J. Food Prot.* 64:1145-1150.
24. Chen, H., R. C. Anantheswaran, and S. J. Knabel. 2001. Optimization of iron supplementation for enhanced detection of *Salmonella enteritidis* in eggs. *J. Food Prot.* 64:1279-1285.
25. Knabel, S. J. 2002. Optimized one-step, recovery-enrichment broth for enhanced detection of *Listeria monocytogenes* in pasteurized milk and hot dogs. *J. AOAC Int.* 85:501-504.

26. Chen, H., R. C. Anantheswaran, and S. J. Knabel. 2002. Effect of rapid cooling on the growth and penetration of *Salmonella* Enteritidis into egg contents. *J. Food Safety* 22:255-271.
27. Kieras, S. J., E. W. Mills, S. J. Knabel, and A. N. Maretzki. 2003. Validation of pathogen destruction during manufacture of a meat-based potato snack (Chiparoo). *J. Food Processing Preservation* 26:385-399.
28. Parameswaran, S., R. B. Guyer and S. J. Knabel. 2004. Simple oPSU Broth-Bax PCR-PicoGreen system for rapid detection of *Listeria monocytogenes* in pasteurized milk and hot dogs. *J. Food Safety* 23:233-248.
29. Zhang, W., B. Jayarao, and S. J. Knabel. 2004. Multi-Virulence-Locus-Sequence Typing of *Listeria monocytogenes*. *Appl. Environ. Microbiol.* 70: 913-920.
30. Knabel, S. J. 2004. Food biosecurity in the U.S. *Microbiology Australia* 25:10-16.
31. Zhang, W., G. Wilt, A. Hughs, and S. J. Knabel. 2004. The BAX PCR for screening *Listeria monocytogenes* targets a partial putative gene lmo 2234 similar to iolE. *J. Food Prot.* 67:1507-1511.
32. Bull, M. K., M. M. Hayman, C. M. Stewart, E. A. Szabo and S. J. Knabel. 2005. Effect of prior growth temperature, type of enrichment medium, and temperature and time of storage on recovery of *Listeria monocytogenes* following high pressure processing of milk. *Int. J. Food Microbiol.* 101:53-61
33. Zhang, W., and S. J. Knabel. 2005. Development of a multiplex PCR assay for simultaneous species- and serotype-specific detection, and DNA sequence-based subtyping of *Listeria monocytogenes*. *J. Food Prot.* 68:1907-1910.
34. Chen, Y., Zhang W. and S. J. Knabel. 2005. Multi-virulence-locus sequence typing clarifies the epidemiology of two recent listeriosis outbreaks. *J. Clin. Microbiol.* 43:5291-5294.
35. Fatemi, P., L. F. LaBorde, B. A. Annous, G. M. Sapers, J. F. Patton and **S. J. Knabel**. 2006. Evaluation of sanitizer penetration and its effect on destruction of *E. coli* O157:H7 on/in Golden Delicious apples. *J. Food Prot.* 69:548-555.
36. Fatemi, P and **S. J. Knabel**. 2006. Influence of Punctures, Cuts and Apple Surface Morphologies on Penetration and Growth of *E. coli* O157:H7. *J. Food Protect.* 69:267-275(9).
37. Sawant, A. A., N. V. Hegde, B. A. Straley, S. C. Donaldson, B. C. Love, **S. J. Knabel**, and B. M. Jayarao. 2007. Antimicrobial-resistant enteric bacteria from dairy cattle. *Appl. Environ. Microbiology* 73:156-163.

38. Hayman, M. M., R. C. Anantheswaran and S. J. Knabel. 2007. The effects of growth temperature and growth phase on the inactivation of *Listeria monocytogenes* in whole milk subject to high pressure processing. *Inter. J. Food Microbiol.* (in press).
39. Chen, J., B. W. Zhang, and **S. J. Knabel**. 2007. Multi-Virulence-Locus Sequence Typing identifies single nucleotide polymorphisms that differentiate epidemic clones and outbreak strains of *Listeria monocytogenes*. *J. Clin. Microbiol.* (in press).

## **LIST OF PROFESSIONAL ACTIVITIES AND ACCOMPLISHMENTS**

### **Membership in Professional Organizations**

American Society for Microbiology, Food Microbiology Division, 1983 -Present.  
 Chair, 2005  
 Institute of Food Technologists, Food Microbiology Division, 1973 - Present.  
 International Association for Food Protection, 1989 - Present.  
 Central Atlantic States Association of Food and Drug Officials, 1990 - Present

### **Students and Postdoctoral Scholars Advised**

Undergraduate Students Advised (Independent Study Projects)	15
M.S. Students	14
Ph.D. Students	6
Post-doctoral Scholars	3
Research Committees (other than candidate's students)	35

### **New Extension/Outreach Programs Developed**

Implementing HACCP Throughout the Food System  
 The Master Food Handler Program  
 Implementing HACCP in Foodservice Operations Workshop

### **New Resident Education Courses Developed**

Microbial Diversity (MICRB 413) – 2 credits  
 Detection and Control of Foodborne Pathogens (FD SC 597D) – 3 Credits  
 Fundamentals of Food Science (Food Microbiology Section) (FD SC 500) – 1 Credit  
 Advanced Food Microbiology (FD SC 507) – 3 Credits

## PROFESSIONAL ACTIVITIES AND ACCOMPLISHMENTS – cont.

### Invited Paper Presentations in Last 5 Years

1. **Knabel, S. J.** 2001. “Destruction of gram-negative pathogens on fruits and vegetables by high pH.” Presented at the Fresh Conference, Melbourne, Australia.
2. **Knabel, S. J.** 2002. “Detection of injured *Listeria monocytogenes* in milk following high pressure processing”. Presented at Food Science Australia, Sydney, Australia.
3. **Knabel, S. J.** 2003. “Contamination of horticultural products in the U.S. and strategies for decontamination”. Presented at the Australian Food Microbiology Conference, Noosa, Queensland.
4. **Knabel, S. J.** 2004. “Tracking foodborne pathogens: Importance for food safety and biosecurity.” Presented at a Symposium, "Novel rapid molecular methods for tracking foodborne pathogens throughout the food chain," at the 2004 Annual IFT Meeting in Las Vegas, NV. Session was developed and co-chaired by the candidate.
5. **Knabel, S. J.** 2006. Molecular Epidemiology. Presented at the 2006 Central Atlantic States Association Annual Meeting on May 19 in Gettysburg, PA.
6. **Knabel, S. J.** 2006. Identifying epidemic clones of *Listeria monocytogenes*. Presented at the symposium, “Identifying and tracking epidemic clones: The evil-doers of foodborne disease” at the 2006 Annual Meeting of the American Society for Microbiology, May 23, Orlando, FL. (Candidate was author and presenter).
7. **Knabel, S. J.** 2006. Molecular epidemiology of foodborne disease. Presented at The International Food Safety Congress, November 9-11, Puerto Vallarta, Mexico. (candidate was author and presenter).

### Sabbatical Leave

July, 2001-July, 2002: at Macquarie University and the University of New South Wales in Sydney, Australia to “conduct molecular biology research related to microbial diversity and the detection of foodborne pathogens to enhance my research and teaching programs.”