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CAUGHT 'N THE NET

Antimicrobial Resistance

By Dr. Gary C. Smith

Amy Pruden (Colorado State University) is "seeking out snippets of rogue genetic material that transforms annoying bacteria into unstoppable supergerms as part of an international forensic investigation into a potentially colossal new health threat—DNA pollution" (*Discover* February, 2008). She reports that: (1) Newly antimicrobial-resistant strains of bacteria have been identified in 90,000 potentially fatal infections a year in the US; chief among these are methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE). (2) The rapid rise of bacterial genes for antimicrobial drug resistance occurs because those genes spread via the microbial equivalent of sexual promiscuity; bacteria can swap and can scavenge the DNA that spills from their dead compatriots out into the environment. (3) Researchers have found that *Streptomyces toyocaensis*, a soil-borne microorganism, contains three resistance genes in its DNA which are nearly identical to the resistance genes in VRE. (4) When manure from livestock fed or administered antibiotics is used to fertilize agricultural fields, antibiotic-resistant strains of bacteria are bred by bacteria in the soil and—subsequently—transferred back to humans and livestock fed products from those fields.



With the help of Dr. Larry Goodridge (left), my colleague at Colorado State University, we considered Dr. Pruden's argument and those of other experts and concluded that: (1) *Streptomyces toyocaensis* produces antibiotics and is resistant to many antibiotics but such resistance is natural and was not caused by misuse of antibiotics. (2) Over-use of antibiotics contributes to antimicrobial resistance in bacteria—some of which are human pathogens. (3) Contributing to antimicrobial resistance are: (a) massive use of antibiotics (AB) for sanitation in hospitals [CDC reports (*JAMA*, 2007) that 85% of all MRSA cases in 2005 were related to hospital and health-care settings]; (b) over-prescription of ABs by physicians [EPA studies (*Associated Press*; March, 2008) say tens of millions of Americans drink tap water that tests positive for pharmaceuticals]; (c) failure of human patients to complete their physician-prescribed AB regimen; (d) use of soaps, cleansers, sanitizers, etc., containing ABs; and (e) use of ABs in livestock production (Dr. Goodridge says there is no conclusive evidence that use of ABs in livestock is most to blame; www.AntibioticTruths.com says there is no scientific evidence to support the theory that *Staphylococcus aureus* acquired resistance in animals is a result of antibiotic use in them). CDC (*JAMA*, 2007) says the best advice for avoiding infection with MRSA is "wash your hands." Dr. Goodridge concludes that "Cooperation—of the health industry, the livestock industry and consumers—is required to reduce the use of AB in daily life." ■



USING SANITATION TO CONTROL *Listeria monocytogenes*

By Karen Watkins, Audit Specialist

What is *Listeria monocytogenes*?

Listeria monocytogenes, or *Listeria* as it is commonly referred to, is a pathogen that causes listeriosis in humans. *Listeria* is a diverse pathogen that is prevalent in many environments and can survive at a wide range of temperatures. The elderly, newborns and children, pregnant women and individuals with weakened immune systems are most susceptible to contracting listeriosis.

Sanitation is a key element in controlling *Listeria monocytogenes*. Equipment surfaces and the environment must be cleaned thoroughly on a regular basis. Thorough cleaning should include adequate dry pick up, rinsing of equipment, correct chemical concentration (i.e. foam, scrub soap and sanitizers) and ample coverage of equipment surfaces and scrubbing equipment surfaces. Rinsing and chemical application is not effective if equipment is not scrubbed thoroughly. Scrubbing removes residues that are not visible to the human eye and it reduces the opportunity for biofilms to form on equipment.

Sanitation as a control method

Often times, enough emphasis is not placed on the cleaning of non-product contact surfaces and incidental contact surfaces. These surfaces are just as important as product contact surfaces, as the goal is to keep all equipment surfaces free from *Listeria*. In order to achieve this, the same emphasis must be placed on these surfaces as it is on product contact surfaces. Items such as chain guards, control panels, motor covers, lights, ceilings and walls are sometimes overlooked during the sanitation process. These items should be on a master sanitation schedule so that they can be cleaned on a routine basis; these cleanings should be monitored and documented as they are conducted. Thorough cleaning of these items is key to the sanitation process, as employees often incidentally touch these surfaces and then touch product contact surfaces or product without any intervention. Observing employees during operations to determine what items they are touching will aid in determining

how to classify surfaces and will also help to determine at what frequency surfaces should be cleaned. A rule of thumb is that any surface that an employee touches and then touches product should be considered a product contact surface.

Drying out the room during the sanitation cycle is another key component of the sanitation cycle. Condensation and excess water from the floor should be removed prior to the application of the final sanitizer. Visual inspections should be utilized to monitor how well equipment is being cleaned. The condition of equipment should be observed during visual inspection. Equipment that is not in good repair should be documented and repaired immediately. Pitted or damaged equipment does not allow for adequate cleaning of equipment, instead niches are created that allow the growth of *Listeria*.



All steps of the sanitation process should be documented, tracked and trended. Operational sanitation cleaning should be documented and monitored as well. Wet cleanup during operations should be eliminated as this is a contributor to cross contamination. Mechanical repairs should be documented and procedures should be implemented to ensure that appropriate cleaning of equipment is conducted after repairs are complete.

Employee training is another key component to the sanitation program. An effective sanitation program will only be as good as the employees performing the tasks. It is important to ensure that all employees understand the importance of proper sanitation practices by providing up-to-date and "hands on" training.

A successful sanitation program is one of the best weapons to combat the growth of *Listeria monocytogenes*. ■

HACCP & Micro 101

San Antonio, TX

May 13-16, 2008

Join us for this 2-day HACCP course and/or a 2-day Micro 101 course. Fully accredited by the International HACCP Alliance, the HACCP course will be taught by **Dr. Gary C. Smith** of Colorado State University and **Sherri Jenkins**, Vice President of Auditing and Consulting at FSNS. The Micro 101 course will be led by an expert staff including **Bill Centrella**, Lead Microbiologist of FSNS.

Registration fee is \$695 per person per class. **Discounts:** 10% Early Bird Registration (must register by May 2, 2008), 10% when registering one person for both courses, 10% when registering 2 or more people for one course, 15% when registering 2 or more people for both courses. **Registration fee includes:** All course materials; lunch during 3 full days; Certificate of Completion. **Cancellation Policy:** No penalty if registration is cancelled before May 2, 2008, \$100 fee if cancellation occurs after May 2, 2008, FSNS holds the right to cancel the course(s) if a minimum of 10 people are not registered by May 2, 2008. If this occurs, you will receive a full refund of your registration fee.

Please contact **Terri Pease** at tpease@food-safetynet.com or **888.525.9788 x244** if you are interested in receiving more information on this course.

WASHINGTON UPDATE

By Danny Spellacy, FSNS Washington Representative

The U.S. Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) prohibits non-ambulatory disabled cattle and cattle tissue identified as specified risk materials for use in human food.



The Agricultural Marketing Service (AMS) of USDA purchases meat and meat products for Federal food and nutrition programs that come from livestock that are humanely handled and harvested in accordance with all applicable FSIS regulations and the Humane Slaughter Act. In addition to this requirement, AMS has longstanding contract requirements that preclude the use of meat and meat products derived from non-ambulatory disabled livestock, even if the animal initially passed ante-mortem inspection and went down due to a localized injury.

USDA's FSIS has evidence that Hallmark/Westland Meat Packing Company did not consistently contact the FSIS public health veterinarian in situations in which cattle became non-ambulatory after passing ante-mortem inspection. This is not compliant with FSIS regulations. Because the cattle did not receive complete and proper inspection FSIS has determined them to be unfit for human food and the company is conducting a recall.

In response to the Hallmark/Westland Meat Packing Company recall, the U.S. Department of Agriculture and the Congress are considering actions to provide more consistency in the humane slaughter inspection activities conducted inside slaughter facilities.

In meetings with Administration and Congressional staff, Food Safety Net Services has learned USDA intends to have considered and vetted improvements to the humane slaughter inspection system to be rolled out at the May 22, 2008 public meeting on school meal purchasing specifications. The industry has been charged with constructing a list of potential remedies to the humane slaughter deficiencies for the Agency to consider.

Congress has begun conducting hearings to explore Agency actions, authorities, and resources in an effort to ensure that an incident such as this does not happen again. ■

upcoming tradeshows



April 16-18, 2008

Texas Food Processors Assn.
Westlake, Texas

April 22-24, 2008

International Cheese
Technology Exposition
Madison, Wisconsin
Booth #920

May 4-7, 2008

United Fresh Produce Assn.
Las Vegas, Nevada
Booth #4933

May 6, 2008

Northern California
IFT Suppliers' Expo
Pleasanton, California

May 17-20, 2008

National Restaurant Assn. Show
Chicago, Illinois
Booth #9387

June 29-July 1, 2008

IFT Annual Meeting
and Food Expo
New Orleans, Louisiana
Booth #702

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NEW LAB OPENS IN SAN ANTONIO

Food Safety Net Services (FSNS) is proud to announce the opening of its newly expanded laboratory at the corporate headquarters in San Antonio, Texas!

Of the new lab, Gina Bellinger (pictured at right) states, "This state-of-the-art facility will house a broader scope of services, including, advanced analytical chemistry capabilities." The spacious laboratory will also increase the capacity of our special projects and research divisions. As with all FSNS laboratories, the new San Antonio facility is open 7 days a week, 365 days a year in order to readily and consistently serve our clients with accuracy, efficiency, and unparalleled customer service. Bellinger concludes, "We are excited to present this outstanding facility to our valued clients as we continue to provide unequivocal technical standards and unsurpassed, individualized customer service in support of important industry issues." ■



MICROBIAL CHALLENGE STUDIES



Dr. Wendy Warren-Serna of FSNS recently co-presented a seminar entitled "A Good Challenge (Study)! Issues and Insights for Microbial Challenge Studies" at the 2008 Food Safety and Security Summit with Drs. Scott Brooks of YUM! Brands and Larry Steenson of Danisco. In this session, key elements to preparing, performing and interpreting challenge/validation studies were discussed.

Challenge/validation studies can help determine whether a new processing procedure supports your objective for such areas as pathogen reduction and/or control, improved microbial integrity and shelf-stability over time. FSNS can specially design studies to support verification of whether Critical Control Points and/or new antimicrobial ingredients reduce pathogens to a level that meets or exceeds regulatory guidelines.

Challenge/validation studies can seem overwhelming at times. Often customers ask, "What factors should I consider when preparing for my study?" Dr. Warren-Serna discussed five important considerations to remember when preparing for a challenge/validation study in her presentation at the Food Safety and Security Summit: Key Personnel, Objective, Resources, Design, and Data/Interpretation.

Key Personnel: The team that is chosen to conduct the study is vital. How much experience in planning and executing a study do they have? What is their knowledge pool? How are their communication skills? Are they adept at interpreting the results of the study? These factors, among others, are important questions to ask when building the team that will design and implement the challenge/validation study.

Objective: Why is this study being conducted? There are several key driver influences that lead companies to perform challenge/validation studies. First is regulatory compliance. Will adding a new ingredient to the product change it so that it fails a regulatory requirement? Another driver is safety/quality issues. Does an anti-microbial agent added to the product significantly reduce bacteria? Another

important driver is the customer or consumer. What is the best and safest way for a consumer to prepare a product? What happens if they prepare it differently? Lastly, economics plays a large role in driving challenge/validations studies. How will modifications in raw materials and processing techniques designed to improve margins impact the safety and quality of the finished product?

Resources: Using industry resources can save valuable time and money when designing and implementing a challenge/validation study. What resources are available regarding previous similar studies performed? Are there guidance documents available? Does the company performing my study have numerous industry colleagues they can refer to?

Design: The design of the study serves as the backbone of the entire project. It is important that the team selected is able to pull the critical elements together in a strategically dynamic manner. Budget can be a challenge when designing a study. The team that is selected to design and implement the study should be able to balance the budget in a scientifically responsible manner. Finally, it is imperative to critically review the design before it is implemented because it can save time and money in the long run.

Data/Interpretation: The team conducting the study should be able to take the data they have learned, sort through the dynamics, and present meaningful and scientifically sound information to the client. The data obtained throughout the study should address the objectives set during the design phase. Communication is key when interpreting data; it should be presented in a manner that is appropriate for the intended audience.

Food Safety Net Services has successfully provided challenge/validation studies for commercial and regulatory purposes to many in the food industry over the years. Moreover, in collaboration with industry organizations and academic scientists, our technical experts have provided seminars, training and education to better equip industry players in understanding how such studies bring value to their operations. ■

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