



The Food Safety NETWORK

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CAUGHT 'N THE NET

Can Bacteria “Talk” to Each Other?

By Dr. Gary Smith

Is there a mechanism by which bacteria can detect (i.e., “sense”) changes in their environment and react (i.e., coordinate gene expression) in ways that will enhance their chance for survival?

Researchers at Eastern Regional Research Center, ARS-USDA, Wyndmoor, PA (J.L. Smith, P.M. Fratamico and J.S. Novak) reviewed the pertinent research literature and reported (J. Food Protection 67:1053-1070) that: (a) Cell density-dependent signaling systems, known as “quorum sensing,” allow bacteria of many genera to modulate a number of cellular functions (via genes) including sporulation, biofilm formation, bacteriocin production, virulence responses and — perhaps— food spoilage. (b) Bacteria produce low-molecular-weight signaling compounds (known as autoinducers — AIs — or bacterial pheromones) that are released into the environment. (c) When a critical level of these compounds is reached, the organisms “sense” that a sufficient level or a “quorum” of bacteria is present, and they respond through the coordinated expression of certain genes. (d) Signals are sent to particular bacterial transcriptional regulators, leading to the activation or repression of target genes and allowing the organisms to mount a unified response favorable to population survival. (e) In pathogenic bacteria, a low level of gene expression is maintained at low population densities to avoid triggering of the host immune responses until the bacteria reach a level sufficient to mount an attack and overcome host defenses.



Yohan Yoon (Ph.D. candidate) and Dr. Gina Geornaras (Pathogen Reduction Laboratory Director) in Dr. John Sofos’ program at the Center for Red Meat Safety (Colorado State University, Fort Collins) recently described for me Yohan’s research efforts on quorum sensing. Of the four types of autoinducer molecules, which are bacterial cell-to-cell signaling molecules: (a) AI-1 (AHL) is produced by gram-negative bacteria and is used for biofilm formation, stress response, antibiotic synthesis, and spoilage in some foods; depending on bacteria. (b) AI-2 is produced by gram-negative, but used by both gram-positive and gram-negative bacteria, and is the “universal” cell signaling molecule. E. coli O157:H7 uses AI-2 to activate the Shiga-toxin production gene, synthesize flagella to facilitate mobility and chemotaxis. (c) AI-3 is found in E. coli O157:H7, which might be used for the communication between the bacterium and host cells. (d) Short peptides (bacterial pheromones) are produced only by gram-positive bacteria and are used for sporulation, bacteriocin production and toxin formation; depending on bacteria.

Yohan Yoon’s research has generally focused upon how gram-negative bacteria use AI-2. He intends to determine the roles of AI-2 of E. coli O157:H7 and Salmonella in food environments and of AHL in food spoilage.

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How would industry use results of research on quorum sensing? Yohan and Gina say such findings might induce quorum sensing as a novel target that should be interfered, blocked or triggered to improve food safety by inhibiting or preventing: (a) pathogenesis, (b) biofilm formation, (c) sporulation, (d) toxin production and (e) food spoilage. ■



Our Commitment to Personalized Customer Service

Jim Bell, Director of Laboratory Services



Food Safety Net Services (FSNS) combines unsurpassed individualized customer service with unequivocal technical standards, leading to true partnerships in the food industry. Our employees are passionate about customer service and the benefit this brings to our clients. We recognize that organizations and individuals need continuing support with regard to the comprehensive services that FSNS offers. For this reason, our facilities are open 24 hours a day, 365 days per year, and our customer service department is always available to assist you. We

also know that customer service is a never-ending journey because customers themselves have changing business needs and expectations. Consequently, our commitment to personalized customer service is a key factor in the development of long-term business relationships with our clients.

FSNS Customer Service Representatives (CSR) serve as a direct point of contact for our valued clients, and they are responsible for ensuring that our customers receive a superior level of service or help with their questions and concerns. They interact with customers to provide information in response to inquiries about status of testing, analytical services and invoices. They communicate with our clients through a variety of means, including telephone, email, fax, regular mail, or in person. In addition, the Customer Service Representatives work in concert with the sales team to coordinate requests for quotes and information about our overall services.

The CSR is also tasked with making changes to a customer's profile or account information by updating the database of information for each individual account. This information can be accessed on a computer screen while the representative is talking to a customer so that he or she can answer specific questions relating to the account. Many customer inquiries involve routine questions and requests regarding the certificate of analysis and the methodology employed to produce the analytical results. Obtaining quick answers to such questions is accomplished simply by looking up information on our Laboratory Information Management System (LIMS). Other questions are more involved and may call for further explanation on the part of the CSR or additional support from a Technical Manager. In all cases, our Customer Service Representatives follow up with an individual client until a question is answered or an issue is resolved.

Customer service plays a critical role in providing an interface between the customer and our organization, and for this reason, FSNS employs people who communicate in a friendly and professional manner. As an additional benefit, the Customer Service department helps clients decide what type of services would best suit their needs and can also provide references for consultative support. Food Safety Net Services is proud to offer high quality, timely customer service to our existing and new customers. We invite you to contact our customer service department at (888) 525-9788, and we look forward to exceeding your expectations! ■

- BREAKING NEWS -



Green Bay Facility Accredited!

Food Safety Net Services is pleased to announce the accreditation of its newest facility in Green Bay, Wisconsin. The Green Bay facility proudly boasts one of the most extensive Scope of Accreditations of any accredited commercial biological laboratory listed by The American Association of Laboratory Accreditation (A2LA). The San Antonio facility maintains over 85 pathogenic and chemical methods on its Scope of Accreditation with the Phoenix, Green Bay, and Dallas facilities following closely behind in the extensive listing of industry accepted microbiological and chemical methodologies. This is yet another accomplishment for Food Safety Net Services in the maintenance of technical excellence. Food Safety Net Services is proud to maintain the necessary requirements for several industry recognized accrediting bodies like American Association of Laboratory Accreditation (A2LA) while ensuring customer satisfaction and unequivocal results. ■

San Antonio Food Safety Net Services Awarded USDA-FSIS Contract

for Nationwide Baseline Data Collection Program and Method Development for *Campylobacter* spp.

Congratulations

Contract number FSIS-14-B-05 calls for the nationwide collection of microbiological data collection for beef, chicken, turkey, pork, eggs and egg products as well as other FSIS regulated products to include sheep, lamb and goat. These products will be evaluated for microbial parameters to include qualitative and quantitative analysis of indicator and pathogenic microorganisms. Sample types will include raw ground products, ground components, carcass rinses, swab sponge samples and excision samples. Food Safety Net Services is proud to announce that the San Antonio facility has been awarded its second contract for the performance of baseline analyses. As the contractor for this study, Food Safety Net Services will assist USDA/FSIS with the development of a new *Campylobacter* method for the analysis of food samples. Food Safety Net Services will support the USDA/FSIS with the validation of this method which will be provided by the agency for possible inclusion in the USDA Microbiology Laboratory Guidebook. Food Safety Net Services was awarded this contract based on technical expertise and past performance in the area of microbial analyses of these types of products. **Congratulations to the technical team in our corporate facility!** ■



Food Safety Net Services Laboratory Audit and Proficiency Program

Food Safety Net Services (FSNS) can provide training and audits for any client with an internal laboratory. This training and/or auditing is customized to fit the needs and scope of any testing laboratory. Credentials of our auditors include at least 5 years of auditing experience as well as ISO/IEC 17025 training. Annual internal laboratory audits can assist a laboratory in maintaining a high degree of quality resulting in unequivocal results. Properly trained laboratory personnel are also paramount to a good internal laboratory and FSNS can provide this training on-site for all technical scopes.

Food Safety Net Services also provides a **microbiological and chemical testing program**, which laboratories may use as an external Proficiency Testing program. The basic microbiological program is for quantitative analyses including Aerobic Plate Count, Coliform Count, E. coli Count, and Yeast & Mold Counts. Microbiological qualitative pathogen analyses may be added to the basic quantitative package per your request to include Salmonella, Listeria, and E. coli O157:H7. Chemical analyses include fat, moisture, protein, salt and ash. The program has four test events each occurring during the beginning of each quarter of the calendar year. After each event, a comprehensive analysis of data submitted is provided which will have been compared to all participants in the program as well as to the FSNS control results. Final reports include summary charts of all values reported, descriptive statistics, graphs illustrating all data (both raw counts and log normal results), and problem solving suggestions as appropriate.

Both of these outstanding programs can be beneficial for use in assessing laboratory personnel, laboratory performance, and areas of improvement. For more information, contact us at (888) 525-9788. ■

Bringing the world of food safety to you.



“Reaching for the Stars” Success Through Assessment Rating



Food Safety Net Services introduces a five STAR rating program for Audit Service clients. The program will enable top suppliers to be recognized for outstanding performance. The rating will be based on achieving established criteria in the following categories:

- ★ Food Safety Evaluation Score
- ★ Food Security Score
- ★ Regulatory Compliance

Companies that participate in the program will be honored with a plaque to proudly display for their employees and customers. For additional information about the STAR Audit Program, please contact Shanna Boleman at sboleman@food-safetynet.com. ■

Stop in and visit our booth at these 2006 Trade Shows!

AMI Animal Handling and Care Conference
February 22-24 (Overland Park, KS)

Longhorn IFT Supplier's Night
March 9 (Grapevine, TX) – Booth #84

Food Safety Summit and Expo
March 21-23 (Washington, DC) – Booth #416

Southern California IFT Supplier's Night
March 22 (Pasadena, CA)

PetFood Forum
April 3-5 (Chicago, IL) - Booth #612

International Cheese Technology Exposition
April 25-27 (Madison, WI) – Booth #733

Texas Food Processors Association
April 26-28 (Horseshoe Bay, TX)



FOOD SAFETY NET SERVICES
“Bringing the World of Food Safety to You”

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