SPEAKER ABSTRACTS

Salmonella in Peanut Products – Understanding the Risk and Controlling the Process

March 26, 2009

View from the Peanut Industry – Patrick Archer, American Peanut Council

Peanut Industry Perspective – Darlene Cowart, JLA USA

> The peanut industry is currently facing one of its most defining moments. The ability to overcome a major food safety hurdle and strive to be a leader in food safety is what all industry members are working toward. This presentation will attempt to educate the audience on the current realities of peanut production and shelling as it regards food safety practices. The desire for continuous improvement will lead the peanut industry to review best practices and determine next steps. This presentation is an attempt to describe those processes that will help with continuous improvement. Peanut production from land selection to storage will focus on current industry standards and point out opportunities for improvement. The peanut shelling operation will focus on current best practices from farmerstock storage to finished product storage and cover basic GMP's and food safety systems that exist in today's shelling industry as well as focusing on areas for improvement at the sheller level. The presentation is designed to educate the audience and generate discussions on opportunities that will continue to provide safe, quality peanuts for all consumers.

Outbreak of *Salmonella* Serotype Typhimurium Infections Associated with Peanut Butter and Peanut Butter-Containing Products – United States, 2008—2009 – Casey Barton Behravesh, Centers for Disease Control and Prevention

> On November 25, 2008, an epidemiologic assessment began of a growing cluster of *Salmonella* serotype Typhimurium isolates that shared the same pulsed-field gel electrophoresis (PFGE) pattern in PulseNet. As of January 28, 2009, 529 persons from 43 states and one person from Canada had been reported infected with the outbreak strain. This presentation is an interim summary of results from ongoing epidemiologic studies and recall and control activities by CDC, the Food and Drug Administration (FDA), and state and local public health agencies. Confirmed, reported onset of illness dates have ranged from September 1, 2008, to January 16, 2009. A total of 116 patients were reported hospitalized, and the infection might have contributed to eight deaths. Sequential case-control studies have indicated significant associations between illness and consumption of any peanut butter (matched odds ratio [mOR] = 2.53), and specific brands of prepackaged peanut butter crackers (mOR = 12.25), but no association with national brand jarred peanut butter sold in grocery stores. Epidemiologic and laboratory findings indicate that peanut butter and peanut paste produced at one plant are the source of the outbreak. These products also are ingredients in many foods produced and distributed by other companies. This outbreak highlights the complexities of "ingredient-driven" outbreaks and the importance of rapid outbreak detection and investigation. Consumers are advised to discard and not eat products that have been recalled.

FDA perspective – Don Zink, FDA

Impact of Processing Environment on Control of *Salmonella* in Low Moisture Food Plants – Earl Ehert, ConAgra Foods

Behavior of *Salmonella* in Foods with Low Water Activity – Larry Beuchat, University of Georgia

> Salmonellae are resilient bacteria. They can adapt to physical and chemical stresses in foods and the environment, thereby enabling survival when exposed to conditions that would be lethal to many other microorganisms. There are, however, limits for survival and growth. *Salmonella* can survive for many years at subfreezing temperatures and the rate of inactivation is decreased at refrigeration temperatures. Growth in some foods at temperatures as low as 2 - 4°C and as high as 54°C has been reported. The pH range for growth is about 4.0 to 9.5. Growth can occur at water activity (a_w) as low as 0.93. Specific limits for survival and growth apply only when all other physical and chemical stresses are absent. Most peanut butters have a pH of 6.1 - 6.5 and are stored at temperatures that would, in the absence of other stress factors, support the growth of *Salmonella*. The a_w of peanut butter and peanut spreads (0.20 - 0.33), however, is much lower than that required for growth. While this low a_w prevents growth, it also preserves the viability of *Salmonella* during thermal treatment and long-term storage of peanut butter. The relatively high oil content (50 - 55%) of peanut butter also protects *Salmonella* against heat inactivation. Peanut spreads, pastes, sauces, and other peanut-containing foods and ingredients contain an infinite number of other components that may change the physical and chemical environment and alter the ability of *Salmonella* to survive and grow. Examples of the behavior of *Salmonella* in peanut butter, peanut-containing products, and other foods are presented in an attempt to better understand and predict its survival, growth, and inactivation in low-a_w environments.

Process Validation for Peanut Butter and Other Low Moisture Foods – Linda Harris, University of California-Davis

> Reduced water activity and heating parameters such as humidity and product moisture are among a number of factors that can significantly increase heat resistance in *Salmonella* spp. Therefore, appreciation of heat resistance is critical when designing and validating processes for the thermal inactivation of *Salmonella* in low water activity foods such as peanut butter. This presentation will review the factors that affect the heat resistance of *Salmonella*. Key factors to consider when validating thermal inactivation processes for this organism in specific matrices will be discussed using peanut butter and almonds as examples. In addition, the role of surrogates in validating thermal inactivation processes in food processing facilities will be covered.

Using Modeling and Risk Assessment in Managing Salmonella Risk in Peanut Butter – Don Schaffner, Rutgers, The State University of New Jersey

> Two large outbreaks of salmonellosis associated with peanut butter in the United States in 2006-2007 and 2008-2009 have recently underscored the potential of this shelf-stable food to cause large outbreaks.
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> Although lapses in good sanitary practices may have played a prominent role in both outbreaks, the problem is compounded by the apparent increase in heat resistance of *Salmonella* cells under low water activity conditions seen in peanut butter and related products.

Quantitative microbial risk assessment (QMRA) uses literature data, mathematical models and expert opinion, and integrates this information in such way as to inform decision-making regarding microbial risk. This talk will demonstrate how key variables such as: initial concentration of *Salmonella*, the degree of thermal process applied, and the amount of peanut butter per finished product serving, the total number of servings on the market and a *Salmonella* dose response model can be integrated using QMRA

The QMRA demonstrates that even given a low initial concentration of *Salmonella* cells (1.5 CFU/g), what would normally be considered a severe process (60 C, 10 min), and a small amount of peanut butter in the finished product (~3 g/ serving), when a large number of servings (~1.5M) are considered, a significant number of illnesses (>10) are typically predicted by the risk assessment.

Even low initial levels of *Salmonella* contamination may not be controlled by typical peanut butter thermal processes, and can result in large numbers of illnesses. The QMRA will be useful for food companies seeking to assess the risks posed by particular raw material standards or standard processes.

The Value of Third Party Independent Audits in Assuring Food Safety: Are They Truly Independent? – Paul Hall, AIV Microbiology & Food Safety Consultants, LLC