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LISTERIA

Technical Bulletin

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BACKGROUND - The genus *Listeria* includes a number of different species. In the food industry, the most important species is *Listeria monocytogenes* (LM). While many species of *Listeria* can be found in foods and in the food processing environment, LM is the only known human pathogen. Twenty years ago, the food industry was just beginning to understand the significance of *Listeria* in foods. Today, *Listeria* has become one of the most prominent foodborne pathogens. However, the industry still struggles to understand the testing that is needed to prevent illness and regulatory intervention.

Listeria is a unique pathogen because it can grow at refrigerated temperatures. Refrigerated foods that do not have a secondary barrier such as low moisture or low pH have the potential to support the growth of LM. If LM grows to high levels, it can pose a significant health risk. Therefore, food producers must take specific steps to eliminate or prevent the presence of LM.

TESTING METHODS - The standard laboratory method for determining if *Listeria* species are present in a food sample includes an enrichment step, followed by an enzyme linked immunosorbant assay (ELISA). If a sample is found to be positive using the ELISA, the enrichment sample is streaked on selective agar plates. Next, suspect colonies are subjected to biochemical testing. The biochemical profile can be used to determine which species are present in the sample. This process is labor intensive and can take a week to complete. In addition, a certain degree of interpretation is required and therefore, an experienced analyst is needed to get accurate results.

NEW TECHNOLOGIES - New technology is now available that is more specific than the older ELISA techniques. Qualicon's BAX® System can be used to detect the presence of LM in less than 3 days. The BAX® System uses polymerase chain reaction (PCR) technology to detect the presence of pathogens in food and environmental samples. While ELISA methods can only screen for the genus *Listeria*, the BAX® System can screen for the genus *Listeria* and specifically for LM.

In most situations, just confirming that LM is present in the environment or in a food sample is sufficient. In other situations, it may be useful to determine the genetic fingerprint of the species. The Qualicon RiboPrinter™ can be used to rapidly determine a genetic fingerprint for a number of bacterial species, including *Listeria*. When investigating the source of a specific problem, determining the genetic fingerprint of a microorganism can be a powerful tool.

SIGNIFICANCE OF RESULTS - Since LM is the only human pathogen in the genus Listeria, it is often important to be sure that LM is not present in a food. If the purpose of testing a food sample is to validate that a particular lot is free of LM, it is important to specify that information when submitting samples to a laboratory. If a production facility is screening environmental samples, it may be sufficient to determine if any Listeria species are present.

What if Listeria species other than LM are present in a food sample or an environmental sample? In general, LM is the only species that would generate a regulatory concern. However, many food companies take the conservative approach that if any Listeria species are present, it is an indication that LM could be present. It is important for each company to have policies in place that will allow decisions to be made in the event of a positive result.

The presence of LM in the environment is an indication that additional cleaning should be done to eliminate the source. Products that are packaged after receiving a thermal process are at great risk for recontamination. Therefore, environmental sources of LM must be controlled to prevent recontamination of the food

SUMMARY - Listeria monocytogenes will continue to be of great concern to the food industry. Ongoing effects in risk assessment will no doubt lead to new policies and regulations. Prevention is always the best policy when dealing with foodborne pathogens. However, testing is often needed as a validation step or as a requirement for customers and regulators. Understanding the methods and the significance of results is essential to having the best policies for dealing with LM.

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