

Risk management and listeria monitoring

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Listeria spp. are common environmental organisms. They can be isolated almost anywhere and thrive in wet, dirty, cool areas. Listeria is found in most food factories particularly in floors, drains, coolers and drip trays as well as on raw materials, pallets and trucks. Accordingly, it is almost impossible to eradicate. Listeria is a genus of eight named species of which only one (*Listeria monocytogenes*) is pathogenic with a 30% mortality rate causing 2,500 deaths per annum in the USA in young, old, infirm or immunocompromised patients.

It is these characteristics that make listeria a significant hazard in the manufacture of ready to eat (RTE) foods. Following thermal processing, the main environmental control measures are containment and prevention:

- 1 Effective cleaning.
- 1 Segregation.
- 1 Prevention of cross contamination.
- 1 Temperature controlled storage and distribution.

European regulation 2073/2005 includes requirements for managing listeria in food-stuffs and lists two types of criterion:

- 1 Food safety criteria to assess the safety of the product and process itself.
- 1 Process hygiene criteria to 'ensure the production processes are operating properly'.

The food company must take corrective action if the criteria are not met. In the USA, the FSIS have specified a *Listeria monocytogenes* risk based verification testing programme that includes;

- 1 RLMCONT – routine risk based testing of surfaces in direct contact with RTE production areas, for example, conveyor belts, cooler, storage racks, luggers, slicers, peelers, loaders and table tops.
- 1 RLMENVR – routine risk based testing of environmental (non food contact) surfaces in the RTE production areas, for example, floors, drains, walls, air-vents and overhead structures.
- 1 RLMPROD – routine risk based testing of intact products.

There are several different types of methods for the detection of listeria, and many take one to five days to produce results and require skilled laboratory analysts. The results of comparative studies indicate that hands on labour and total elapsed time are

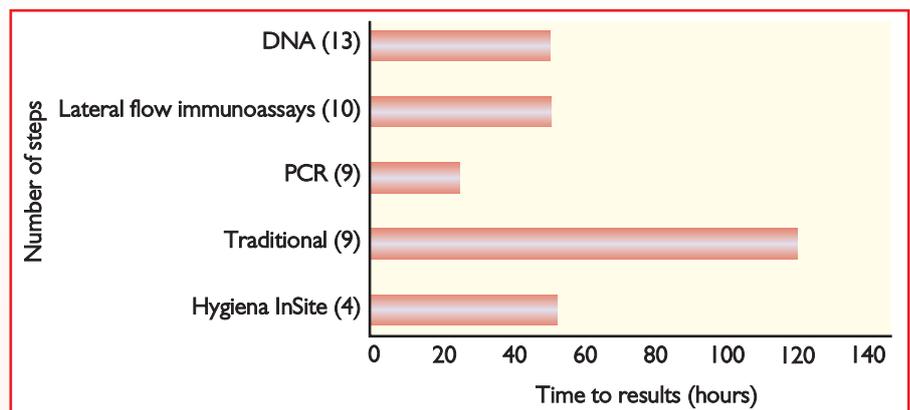


Fig. 1. Ease of use and time to result of listeria tests.

factors that most differentiate the methods, directly relating to the overall efficiency and utilisation of labour within the laboratory.

Material and disposable costs were not found to be a significant factor. Simplicity is a key consideration when considering which test method to choose for monitoring listeria in environmental samples.

A method that has few steps also reduces the opportunity to introduce errors.

Reduced operator hands on time also reduces labour costs through greater efficiency and less training. Results delivered quickly enable greater control in the manufacturing process. Hygiena International's InSite allows environmental testing for listeria to be done quickly and easily on site without the need for complex procedures or expensive equipment.

It can be seen from Fig. 1 that InSite is the simplest test available. After taking the sample, the device is simply activated with a 'snap and squeeze' and then placed in the incubator. Result interpretation is by a simple colour change with a total hands on time of just two minutes! The standard reference method has a hands on time of approximately 67 minutes per sample.

InSite listeria generates results in as little as 30 hours, which is faster than most of the other methods currently available.

The methods available have been generalised and grouped in Fig. 1 into the following categories:

- 1 The traditional USDA FSIS method.
- 1 Lateral Flow Immunoassays – based on an immunological reaction (presence of flagella

antigens) and tested for on a small device much like a pregnancy test.

- 1 Those that test for DNA or RNA characteristics.
- 1 Those that utilise PCR.

The test results of many finished product and samples from product contact surfaces will be negative if good processing and environmental controls are in place. Simple, rapid screening methods provide a significant benefit because they quickly eliminate the negative samples and do not require a skilled analyst and expensive hardware. This will save time and cost and allow production to proceed with confidence.

Two rapid screening methods can be used in conjunction for an effective listeria risk management programme:

- 1 Non specific rapid hygiene monitoring test based on ATP bioluminescence (such as Hygiena's SystemSure Plus) that demonstrates effectiveness of cleaning procedures.
- 1 Simple, specific, cultural indicator tests (such as InSite listeria) that will demonstrate the presence or absence of *Listeria* sp.

Any presumptive positives from listeria screening can then be sent for further analysis and confirmation, while immediate investigations can be initiated to identify potential sources of contamination using both rapid screening methods. Accordingly simple, cost effective, rapid screening programmes for listeria can be implemented to satisfy the needs and requirements of industry and the regulators.

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