



On the

Cutting Edge

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OSU MEATS EXTENSION FACT SHEET
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Listeria intervention revisited

If you are a producer of ready-to-eat (RTE) meat products, you need to be concerned about, and understand the issues related to, *Listeria monocytogenes*. There are many types of *Listeria* that you might find in your operation, however, the type that you hear about the most, *Listeria monocytogenes*, is the only pathogenic form of *Listeria*, that we know of at this time. Generic *Listeria* is not rare at all, in fact, it was at one time estimated to be in the back and bottom of 90% of consumer refrigerators. The real *Listeria* hazard is with one form, *L. monocytogenes*.

L. monocytogenes can cause consumers to become sick or die, however, the average healthy adult would not likely be so seriously affected. The most susceptible consumers would be those with an undeveloped or compromised immunity system, such as small children, cancer or AIDS patients, pregnant women, and elderly people. This means that if you produce a product that is sold primarily to a nursing home, hospital, elementary school or daycare, the likelihood of a hazard likely to occur greatly increases.

There are several methods to intervene with the contamination, survival, and growth of *L. monocytogenes* (i.e., *Listeria* interventions) in your operation or on your products, including sanitation, ingredients that you can add to your products which reduce *L. monocytogenes*, proper lethality during cooking, and proper handling of products after cooking and before packaging.

Proper cleaning and sanitation are a must for preventing *L. monocytogenes* on contact surfaces or in the environment of your operation. The FSIS Directive 10,240.3 (Microbial Sampling of Ready-to-Eat (RTE)

Products for the FSIS Verification Testing Program, 12/9/2002, accessible on the Internet at: <http://www.fsis.usda.gov/OPPDE/rdad/FSISDirectives/10240.3.pdf>) describes contact surfaces as “a surface of equipment or a utensil with which an RTE product has direct contact (e.g., table top, conveyor belt, knife blade, etc.).

From FSIS Directive 10,240.3, environmental contamination could occur from: anything having “indirect contact with RTE products (mop handles, outer garments, etc., that may be handled by personnel who may touch RTE products)”, or “no direct contact with RTE product in the production area (e.g., floors, drains, walls, overhead structures, etc.). While sanitation is important to preventing survival of *L. monocytogenes* on contact surfaces, proper cleaning prior to sanitation is equally as important. Proper cleaning not only the means use of an effective cleaning compound, but likely will also involve sufficient “elbow grease” to remove protein and fat residues that can potentially be cooked (with hot rinse water) or dried on the contact surface, which provides an ideal environment for pathogens, such as *L. monocytogenes*, to form a biofilm. Elbow grease means nothing more than the use of (clean and sanitized) brushes, scratch pads, etc. Some cleaners contain enzymes that digest protein and fat residues, which would seem to mean less need for scrubbing, however, physical removal of these residues is probably the most consistently effective practice.

Biofilms are formed by bacteria, either under fat or protein residues, or anywhere that bacteria can hide out, such as scratches on stainless steel, or other “niches” in contact surfaces. Pathogens produce biofilms as a

protective layer against future cleaning and sanitizing, which allows them to survive and continue to grow to levels necessary to produce toxins, which cause illness and possibly death.

Handwashing and use of clean gloves and outer garments are also very important for any employee handling RTE products. Once disposable gloves are put on clean hands, the gloved hands should also be washed and sanitized. Coats or other outer garments used by employees handling RTE products should be a different color than those used for raw products, to further reduce the chances of cross contamination and to make it visually obvious where cross contamination may be happening.

There are several ingredients that you could use to reduce the chances of *L. monocytogenes* survival in or on your products. These ingredients include lactate or a combination of lactate and sodium diacetate. It appears that these ingredients have some residual effect after the product is cooked, to prevent growth of *L. monocytogenes*.

According to microbiologists, such as Dr. Ahmed Yousef, at OSU, *L. monocytogenes* doesn't grow well on raw meat, like it does on milk. In general, it is felt that our traditional cooking methods are sufficient to destroy *L. monocytogenes* (minimum of 160°F internal for small diameter sausages, and 148°F internal for large diameter hams, etc.), but that the likelihood of a hazard increases dramatically when the cooked product is removed from the oven.

For this reason it is very important that every effort is made to reduce all chances for contamination of the cooked product with *L. monocytogenes*. Contamination at this point is not only possible from hands, or contaminated outer garments, but also from the wheels of the smokehouse cart splashing up water from the floor, from air flow through drains in the cooler (that are connected to floors of less clean rooms), from slicer blades, sausage peelers, etc.

One solution to destroying any *L. monocytogenes* that might have gotten onto RTE products prior to the packaging process has been reheating of the packaged product, also known as post-packaging pasteurization. This sounds highly technical, but simply involves reheating the surface of packaged products (in hot air or water) to a sufficient time and/or temperature to destroy surface contamination of *L. monocytogenes*. However, as you will see in the FSIS Directive 10,240.3, the highest risk products are the deli-type products (ham, luncheon meats, turkey breast, etc.) that are sliced before packaging. Obviously, post-packaging pasteurization is not practical for sliced, packaged products. There are other emerging technologies that may be used on sliced products and surfaces contacting sliced products, such as UV light, ozonated water, and a new technology that we are starting to test at OSU (electrostatic coating of sliced products), etc.

There is a lot of information to keep track of regarding *L. monocytogenes* interventions, and one of the best sources of information available on this subject is from a three-day, AMI Listeria Intervention short course that has been developed by microbiologists and food safety experts from most, if not all, of the large meat processing companies. AMI has given me the materials developed by this prestigious group, in order that I could help disseminate this information to Ohio companies.

Sausage Links



Microbial Sampling of Ready-to-Eat (RTE) Meat Products for the FSIS Verification Testing Program, USDA FSIS Directive 10,240.3:

<http://www.fsis.usda.gov/OPPDE/rdad/FSISDirectives/10240.3.pdf>

USDA FSIS Appendix A:

<http://www.fsis.usda.gov/oa/fr/95033f%2Da.htm>

Use of Microbial Pathogen Computer Modeling

Programs in HACCP Plans, USDA FSIS Notice 55-02:

<http://www.fsis.usda.gov/OPPDE/rdad/FSISNotices/55-02.pdf>