

POSTHARVEST HINTS

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Getting A Grip On L. Mono

WITHOUT question, one of the top three topic questions reaching my Extension office for the past nine months has been about *Listeria monocytogenes* and generic Listeria testing in the produce packing and processing environment. While I jokingly call it El Mano (actually “L. mono” being much easier to repeatedly say in grower workshops than *L. monocytogenes*) it is certainly nothing to laugh off.

Recent tragic outbreaks and increasingly frequent, even massive, recalls due to “L. mono” on both whole produce and fresh cut SKUs have deeply shaken the whole supply chain. One reason for the confusion is that the recent wave of recalls is far greater than the actual incidents of known cases of illness. By my count, there have been more than 12 recalls of fresh produce due to *L. monocytogenes* in the past six months alone. Many of these recalls, triggered by surveillance testing of bagged salads at or days past their use-by labeling, involve product that has been consumed by thousands, well before shippers are notified of a potential issue.

Frankly, it is hard to stand in front of a room full of growers of leafy greens and justify the value of these “after-the-fact” federal programs. But make no mistake: L. mono is a deadly pathogen capable of continuing to multiply from low numbers under normal refrigerated distribution conditions. A great challenge for all of us is to appreciate the low probability high consequence nature of L. mono if contamination occurs anywhere in the fresh produce supply chain.

10 Points To Consider

Growers and shippers have been open to educating themselves on the nature of

this pathogen, comparing known risks to the now more familiar pathogens *Salmonella* and *E. coli*. Understanding the basic biology and harborage sites, as well as some lessons learned from outbreaks and recalls is an essential foundation for building an on-farm and postharvest prevention and control plan tailored to your operation and region. Here are 10 things to



This new line has a clear design flaw, showing junction gaps and trapped crop tissue still present after cleaning. It would be considered a safe harbor site for Listeria.

consider when constructing a plan.

1 *Listeria monocytogenes* is considered and spoken of as “ubiquitous” in both the urban and rural environments.

2 L. mono is known in more than 50 species of domestic and wild animals, and can be prevalent in small ruminants such as sheep and goats. L. mono is commonly found in water ways impacted by runoff from dairy cattle operations.

3 While it can be shed by domestic and wild animals, L. mono can persist and grow very well in the environment without passing through an animal or human host (in water bodies, drainage ditches, soil, around roots, in silage, in cull piles, and in many places in a packing or processing facility, especially where standing water is around).

4 Due to the multiple environments that L. mono can call home, it would be virtually impossible to expect to prevent it from being present in a vegetable farm. Growers can minimize its abundance but they cannot eradicate it from the farmscape.

5 L. mono will survive and grow at moderate to cool, even cold conditions, if moisture and some small amounts of nutrients are around. Importantly, L. mono will grow at low temperatures when pathogens like *Salmonella* and *E. coli* have stopped, even at near freezing, though very slowly.

Listeria Hiding Spots

LISTERIA can be found hiding in and around packing and processing facilities; leaching out of hollow packing table legs and hollow rollers, inside saturated bumper pads, under damaged molding, in floor slots at the entrance to the common cold room storage and high traffic areas, in splash zones near produce-filled totes and many more.

Here is a list of areas on the farm and in the packing facility that are known to harbor the pathogen:

- Silage and decaying vegetation
- Irrigation ditches and ponds
- Adjacent animal corrals
- Stacked manure and compost feedstock piles
- Floor flumes and drains
- Areas of water pooling
- Cull accumulation and off-site haul staging areas
- Insulated walls that have become water saturated
- Overhead fixtures where condensation accumulates
- All equipment that has areas difficult or essentially impossible to disassemble and deep clean
- Reusable totes and bins
- Lift truck and lift-jack wheels
- Human and equipment traffic from outside to inside and from areas of receiving to finished pack-out

6 L. mono causes far fewer illnesses per year in the U.S., around 2,500, than *Salmonella* at 1.4 million or the most common, *Campylobacter* (another bacterial pathogen often associated with eating undercooked poultry or contamination of other foods during handling) with more than 2.4 million cases per year. A key reason for the seriousness and attention being paid to L. mono is the high death rate; on average 20% to 30% of all illnesses due to L. mono are fatal.

7 Growth of L. mono on a food, such as fresh vegetables, must occur to reach the high numbers most likely to cause illness. The highly susceptible groups include pregnant women and the unborn fetus, persons immune-compromised by various medical therapeutic treatments, individuals taking high doses of antacids, and the elderly.

8 Although not generally found in high numbers in packing environments, L. mono can hang around in cracks, gear boxes, belts and conveyors, and numerous other sites in biofilms, a protective slime with living cells embedded like concrete

MORE ONLINE

For a list of resources about on-farm survival sites for Listeria and for some pointers on testing for generic Listeria, go to

GrowingProduce.com



aggregate, for decades. Biofilms help L. mono resist cleaning and sanitizers and small numbers typically survive anything but careful, complete, and consistent disinfection.

9 Even with a well-managed cleaning and sanitizing program in a packing facility, it is likely in most operations, and highly likely in others with a wash and cooling step (especially where significant amounts of field soil is typically brought in with the harvested vegetable), that L. mono will periodically or even frequently be re-introduced to the post-harvest environment.

10 USDA policy for *L. monocytogenes* on food is zero-tolerance;

therefore, even small numbers not likely to cause illness will trigger a recall once detected.

Focusing On The Ag Environment

So what the heck does it mean when scientists and public health officials say L. mono is ubiquitous and this concept finds its way into almost every popular media report and food safety or consumer blog? Ubiquitous is defined as being everywhere at the same time: constantly. Is this the case for L. mono? Absolutely not!

Let's focus on the ag-environment. Based on credible published information from controlled scientific surveys, L. mono can certainly be found frequently in ag environments and pasture land (actually more prevalent in urban environments), but absolutely not every sample in every location in every region of the country. In reality, there is a lot of older data for animal ag environments where 5% to 35% of samples may be positive for L. mono and even higher frequencies in retail outlets with 60% of swabs testing positive on slicers and equipment in the deli section. This knowledge has prompted improvements over the past decade in employee training and cross-contamination prevention programs across the retail industry.

As far as the vegetable production and packing environments, we know very little about L. mono prevalence, as this has not been a primary concern outside of true processing facilities, but this is slowly changing. The reality is that the prevalence must be greater than anyone realized given the number of surveillance positives we now know have been found in sealed bags and on raw agricultural whole vegetables and fruit-vegetables.

With the greatly increased produce surveillance testing conducted by government labs in the U.S., Canada, and Mexico, as well as testing by buyers, L. mono is and will continue to be found on an expanding list of produce items, seemingly on at least a monthly basis. Growers and handlers should target disrupting the safe-harbor sites for L. mono survival and especially growth to minimize the chance that product contamination will occur.

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