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Be Aware of Lenticular Soft Rot and How to Minimize it in Potatoes

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Pit rot or lenticular soft rot is a disease typically caused by one or more species of soft rot bacteria (such as *Pectobacterium*). Pit rot lesions are small (usually 0.01 – 0.2 inches in diameter) round, dark sunken lesions centered on lenticels (Fig. 1). Neighboring lesions may coalesce to form larger, irregularly shaped sunken areas (Fig. 2). Pit rot differs from normal tuber soft rot in that the infection is limited to the lenticel and conditions are usually unsuitable for full soft rot development. Unfortunately, as packing sheds scramble to meet fresh market demands, we hear reports of problems with this disease almost annually at this time of year.

These bacteria can be found on contaminated tubers, plant debris, in field soil, wash water, or handling equipment. They often become problematic in the packing shed after tubers are washed and placed in large totes, plastic bags or boxes when still wet. Natural openings in the tuber called lenticels are excellent points of entry for the bacteria, particularly when the lenticels become enlarged due to lack of oxygen, such as when they are covered by a film of water after washing. A healthy tuber with access to ample oxygen can usually guard against invasion of these pathogens through the lenticels due to oxygen-dependent host resistance systems. However, when oxygen is depleted, such as when tubers are covered in a film of water after washing and then stored at ambient temperatures (above 60°F), they are oxygen-deprived and their defenses are compromised. As carbon dioxide levels rise, lenticels open further, and the resulting enlarged lenticels allow easier entry of the anaerobic bacteria, which can still infect in the absence of oxygen and reproduce rapidly. Just a thin film of water can promote disease in as little as 12 hours, meaning that tubers washed and allowed to sit in wet conditions overnight may develop pit rot by the next morning. Pit rot rarely leads to full-blown soft rot if tubers dry out and then are able to limit infection.

To minimize the risk of promoting lenticular soft rot in the packing shed for fresh-pack potatoes that are being shipped soon after harvest, we recommend the following:

- Measures should be taken prior to harvest to avoid the build-up of soft rot bacteria on the tuber surface. These include reducing irrigation and allowing tubers sufficient time after vine kill to set skin and not harvesting in muddy conditions, to reduce the amount of soil on the tuber surface.
- If soft rot is present at harvest, the tubers should be graded as they are washed and packed or moved into storage.
- When washing or transporting tubers in fluming systems, tubers should not be submerged in flumes or dump tanks any longer than absolutely necessary. Bacteria in the water will be absorbed through lenticels and any wounds.
- If fluming systems are used, the system should be cleaned and sanitized frequently.

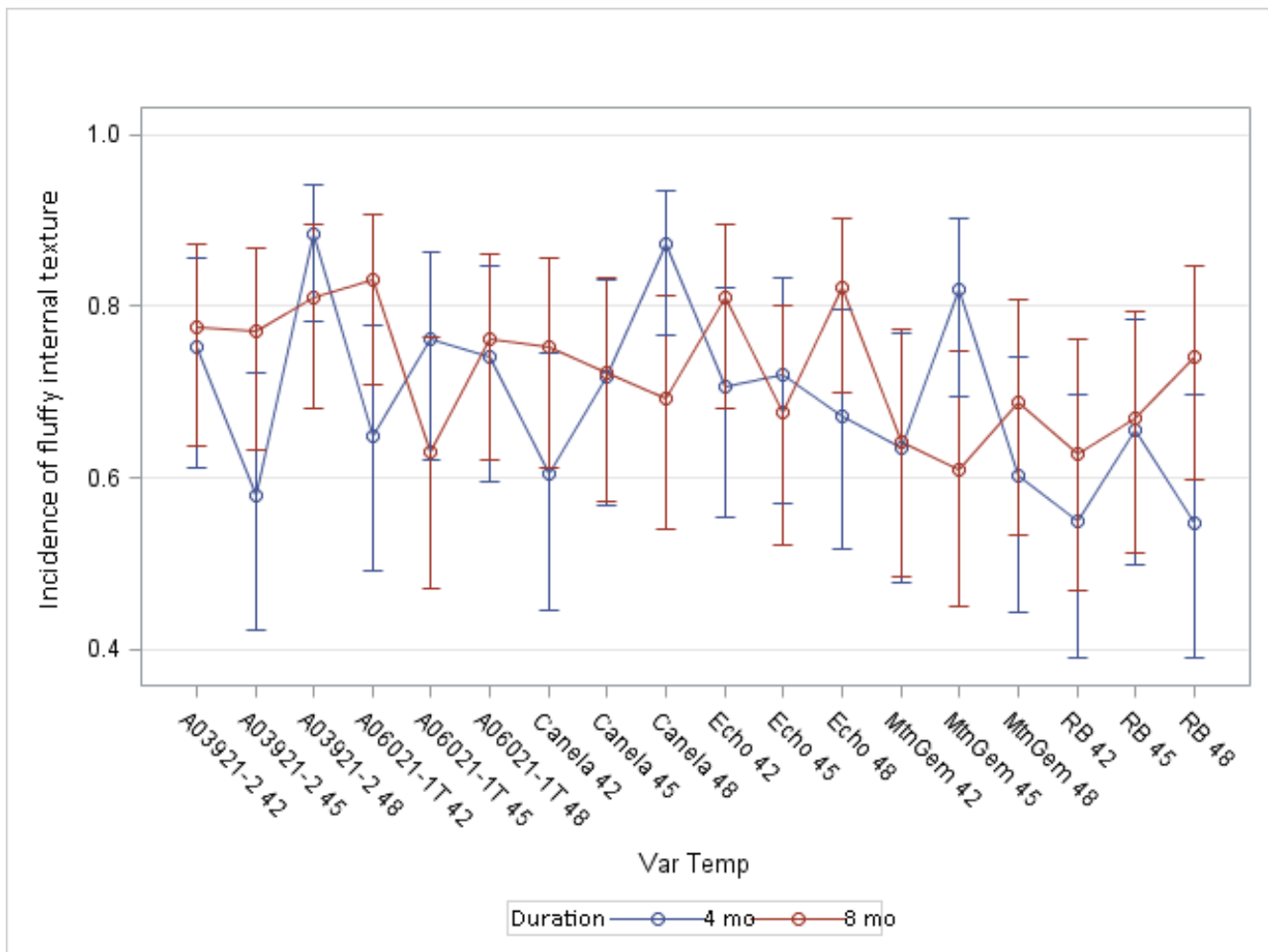


Fig. 6 Incidence of French fries with fluffy internal texture from each variety/temperature/sampling time treatment.

In summary, consumer attribute test during potato long-term storage can provide useful information about the processing quality of new promising varieties, which is important when evaluating their commercial potential and possibility of future adoption by the QSR. The test can find a potentially outstanding variety like A03921-2 that has performed well in all of the tested parameters, compared with Russet Burbank. The test might also identify some potential issues with the new varieties, e.g. the color variation of A06021-1T and poor internal texture incidence of Echo Russet, based on one year of data. Variety selection for the Kimberly variety storage study has been based on years of field trials, meaning that the varieties have already displayed premium yield and quality potential, and therefore consumer attribute test during storage will be a good addition to provide comprehensive overview for new variety development and future Russet Burbank replacement. Low storage temperature at 5.6°C and long storage duration for 8 months may have some impacts on degrading the fry color and internal texture for the French fries, and thus more research needs to be done in this area in the future.

References

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