Key Takeaways

"Human Enteric Virus Contamination of Soft Fruits: Management of Risk in the Face of Uncertainty"

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Top 5

1) Human enteric viruses are shed in high concentrations in the feces of infected individuals, are able to cause human illness at low infectious doses, and can be resistant to many food processes, preservation methods, sanitizers, and disinfectants.
2) Reverse transcription PCR can detect viral genetic material, but this does not mean an actual infectious agent is present, which makes it difficult to reliably or directly interpret PCR data for human health risks beyond "the presence of a viral RNA fragment amplified by PCR may or may not represent contact with human wastes".
3) A direct comparison of sensitivity, specificity, and equivalency between viral detection methods used by the FDA and the ISO has not to date been conducted. This is important because most commercial labs use the ISO method while surveillance and regulatory testing in the U.S. is done exclusively using the FDA method.
4) On July 22, 2022, the FDA announced plans to develop a food safety prevention strategy for fresh and frozen berries.
5) Human enteric viruses are transmitted ONLY by human wastes, the most common being fecal matter from infected individuals. In soft fruit production and processing, water, workers, and human waste are the most common ways products become contaminated. Both fresh and frozen berries have been associated with viral foodborne disease outbreaks, but the vast majority of outbreaks have been linked to frozen berry products produced or ingredients produced in other countries and imported to the U.S. In order to implement a useful prevention and control strategy for domestic berry production, the source of contamination must be identified, which requires a robust root cause analysis to be done.

Acronym Key:

FDA: U.S. Food and Drug Administration
ISO: International Organization for Standardization
PCR: Polymerase Chain Reaction

Additional Reading

Bosch A, Gkogka E, Le Guyader FS, et al (2018). Foodborne viruses: Detection, risk assessment, and control options in food processing. *Int J Food Microbiol* 285:110–128. https://doi.org/10.1016/j.ijfoodmicro.2018.06.001.

Bosch A, Pintó RM, Guix S (2016). Foodborne viruses. *Curr Opin Food Sci* 8:110–119. https://doi.org/10.1016/j.cofs.2016.04.002.

Bozkurt H, Phan-Thien K-Y, van Ogtrop F, et al (2021). Outbreaks, occurrence, and control of norovirus and hepatitis a virus contamination in berries: A review. *Crit Rev Food Sci Nutr* 61:116–138. https://doi.org/10.1080/10408398.2020.1719383.

Center for Food Safety and Applied Nutrition (CFSAN) (2022a). Microbiological Surveillance Sampling: FY 19-22 Frozen Berries (Strawberries, Raspberries and Blackberries). https://www.fda.gov/food/sampling-protect-food-supply/microbiological-surveillance-sampling-fy-19-22-frozen-berries-strawberries-raspberries-and.

Center for Food Safety and Applied Nutrition (CFSAN) (2022b). FDA Works to Enhance the Safety of Berries. https://www.fda.gov/food/cfsan-constituent-updates/fda-works-enhance-safety-berries.

Center for Food Safety and Applied Nutrition (CFSAN) (2022c). BAM Chapter 26 and Appendices: Concentration, Extraction and Detection of Enteric Viruses from Food. https://www.fda.gov/food/laboratory-methods-food/bam-chapter-26-and-appendices-concentration-extraction-and-detection-enteric-viruses-food.

Nasheri N, Vester A, Petronella N (2019). Foodborne viral outbreaks associated with frozen produce. *Epidemiol Infect* 147:e291. https://doi.org/10.1017/S0950268819001791.

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