

## PhageGuard-Listex reduces Listeria on frozen vegetables

1 november 2017



### Smart

PhageGuard-Listex applied on carrots and beans before freezing, can reduce Listeria up to 2 logs if contamination occurs after defrosting of the products.

### Green

As the natural enemy of bacteria, phages specifically kill pathogens like Salmonella and Listeria, and leave the good ones intact. Organic phages do not require labeling and can be applied in organic foods.

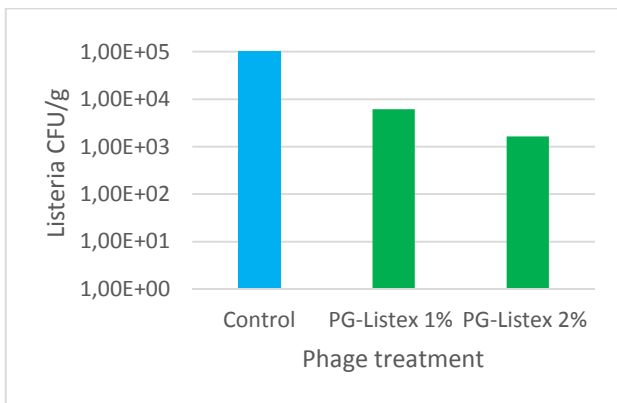
### Easy

Easy to apply. Spray PhageGuard after blanching before freezing. Alternatively PhageGuard can be applied on frozen products via ultrasound spray technology. It has no effect on taste, color or smell of the final product and as a processing aid it does not require labeling.

### Listeria on frozen vegetables

Due to implementation of the Food Safety Modernization Act (FSMA), regulation for frozen produce has become more strict. As these products are now considered ready-to-eat (RTE), they have to comply with the “zero tolerance” policy for Listeria. Even though food companies have safety and hygiene protocols to eradicate Listeria, contaminations still occur, exemplified by the large recall of frozen produce in 2016 regarding 358 frozen consumer products sold under 42 separate brands. Products included in this recall were broccoli, carrots, cauliflower, corn and green beans. This event underlines the importance of finding new and innovative approaches to eliminate Listeria contaminations on frozen produce. Due to the frozen nature of the product as well as the customer’s demand for authentic and organic products, processors are often limited in their choice of antimicrobial interventions. PhageGuard-Listex is an antimicrobial intervention which provides a natural and organic solution that kills Listeria. As PhageGuard-Listex is tasteless and odorless, it has no impact on the organoleptic properties of the vegetables. By applying PhageGuard Listex on carrots and beans before freezing, Listeria is reduced by 99%. PhageGuard-Listex is an effective anti-listeria hurdle during processing of frozen produce, leading to safer products.

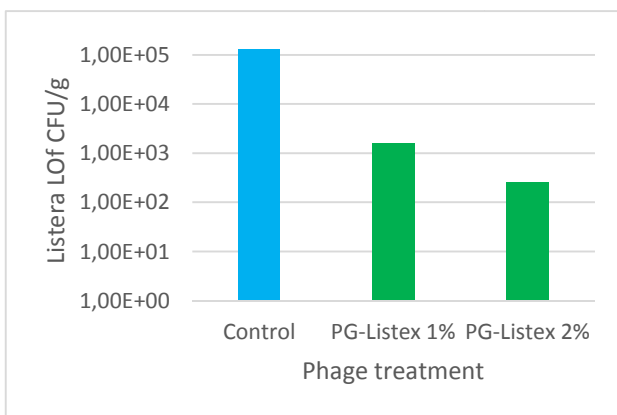
### PhageGuard-Listex on carrots (pre-freezing)



**Figure 1. PhageGuard-Listex on carrots reduces *Listeria* contamination pre-freezing.**

Thawed carrots were contaminated with a single *Listeria monocytogenes* outbreak strain and then treated with either 1% or 2% PhageGuard Listex or tap water (control) at room temperature. Subsequently carrots were frozen at -20°C (-4°F) for 2 hours, after which the frozen carrots were thawed for 1 hour before bacteria were retrieved and enumerated.

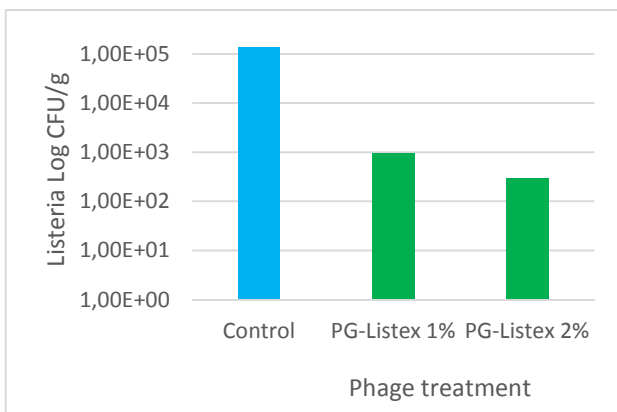
### PhageGuard-Listex on carrots (post-freezing)



**Figure 2. PhageGuard-Listex on carrots reduces *Listeria* contamination post-freezing.**

Thawed carrots were treated with either 1% or 2% PhageGuard Listex or tap water (control) at room temperature, and subsequently frozen at -20°C (-4°F) for 2 hours. After defrosting for 1 hour, samples were contaminated with a single *Listeria monocytogenes* outbreak strain and set a room temperature for 10 minutes before bacteria were retrieved and enumerated.

### PhageGuard-Listex on beans



**Figure 3. PhageGuard-Listex on beans reduces *Listeria* contamination post-freezing.**

Thawed beans were treated with either 1% or 2% PhageGuard Listex or tap water (control) at room temperature, and subsequently frozen at -20°C (-4°F) for 2 hours. After defrosting for 1 hour, samples were contaminated with a single *Listeria monocytogenes* outbreak strain and set a room temperature for 10 minutes before bacteria were retrieved and enumerated.

### Conclusions

- PhageGuard-Listex reduces *Listeria monocytogenes* up to 2 log on carrots if contamination occurs before freezing (Figure 1).
- PhageGuard-Listex applied on carrots and beans before freezing, can reduce *Listeria* up to 2 log if contamination occurs after defrosting of the products (figure 2 and 3).

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