Publication abstract

Susceptibility of 50 *Listeria monocytogenes* strains to a commercial phage product

Based upon:
"Susceptibility profile of clinical and food-associated Listeria monocytogenes strains to a commercial phage product using different test methods"

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Listeria monocytogenes is a significant foodborne pathogen, capable of causing serious illness. While bacteriophage-based biocontrol solutions—such as Phageguard L (PGL) (also known as Listex)—have shown promise in reducing *Listeria* contamination on food products, limited data exist on their efficacy across a broad range of genetically diverse strains using different susceptibility testing methods. A study conducted by Max Rubner-Institute, Kiel, Germany, aimed to evaluate the effectiveness of the commercial PGL phage product against 50 whole-genome-sequenced *L. monocytogenes* strains of clinical and food-associated origin, using five different testing methods.

Trial setup

The study used a diverse panel of 50 *L. monocytogenes* isolates (30 food-associated and 20 clinical strains). Each strain was tested for susceptibility to the PGL phage using five different assays: spot assay, plaque assay, colony reduction assay, optical density measurement (OD_{600}), and flow cytometry with live/dead staining. Assays were conducted in conditions intended to represent relevant food production environments. The goal was to determine not only the overall susceptibility range, but also whether classical plaque-based methods capture the full antimicrobial activity of the PGL phage compared to more viability-focused approaches.

Conclusion

Susceptibility varied depending on the method of evaluation. Spot and plaque assays showed lytic activity in 70–76% of the strains, primarily reflecting productive phage infection. However, all strains were found to be susceptible when using viability-based assays. Colony reduction assays and OD_{600} measurements revealed decreased bacterial growth in all isolates after 24 hours, while flow cytometry demonstrated reductions in live cell populations as early as 3 hours post-treatment—reaching 99.7–100% reductions in most strains at 24 hours. The study highlights the limitations of relying solely on plaque-based methods, which may underestimate phage effectiveness. Notably, there was no strong correlation between phage susceptibility and strain genotype or source, suggesting broad-spectrum potential for PGL. These findings support the relevance of PGL for industrial *Listeria* control and emphasize the importance of selecting appropriate evaluation methods to reflect practical efficacy of phage application in food safety settings.

Susceptibility profile of 50 *Lm* strains to PGL phage

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Discover more about our phage technology for *Listeria* control in the Phageguard Knowledge Center
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