

Virus weaponry versus post-harvest germs gains momentum

By Rod Addy+, 14-May-2013

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Killing pathogens by applying bacteriophages to food surfaces is gaining momentum, but several challenges must be overcome for them to be routinely used for such purposes in the US, one study asserts.

The study in the Journal of the Science of Food and Agriculture states deploying bacteriophages –types of virus – directly on to food to attack and kill harmful bacteria is becoming more popular.

Recent studies "*strongly support the idea that lytic phages may provide a safe, environmentally friendly and effective approach for significantly reducing contamination of various foods with foodborne bacterial pathogens*". That's according to the paper's author Alexander Sulakvalidze.

The effectiveness of treatments using phages vary depending on the type of foods, the contamination levels and phage concentration levels, according to Sulakvalidze's overview of other studies.

Commercialisation

Some companies have made considerable headway in commercialising phage use with large, multinational corporations, according to the analysis.

For example, Omnilytics has signed a collaborative research and licensing agreement with Elanco, a division of Eli Lilly and Company, to develop and market phage-based products, Sulakvalidze observes.

"These types of partnerships with large corporations are likely to accelerate the introduction of phage-based products into various food industries and result in benefits to the industries and the consumers of their products."

Salmonella enterica

The most recent instance of US regulatory approval of the use of a phage was the Generally Recognised As Safe (GRAS) approval in February 2013 of SalmoFresh to kill *Salmonella enterica*.

Phages can be approved for use by achieving recognised GRAS status, with most processors waiting for a 'no objection' letter from the FDA. According to Sulakvalidze, this is the simplest and most economical approach.

"Thus it is likely that increasing numbers of new phage-based products for post-harvest food safety applications will be entering the marketplace under the GRAS designation."

Pathogen resistance

Pathogens could become resistant to particular phages, restricting their use, but one way around this is to apply cocktails of phages to food, rather than just one, Sulakvalidze states.

Another way is to apply them to food surfaces after processing, just before packaging and shipping, rather than over-reliance on them at earlier stages.

That said, the best way to avoid phage-resistant germs gaining the upper hand is to constantly update phages with new lytic strains which have developed in parallel with harmful bacteria, states Sulakvalidze.

Regulatory flexibility

This partly depends on regulatory flexibility to allow for phage updates as soon as required, but he said there were signs this was possible.

Phage efficacy is partly dependent on the method of application. A fine, rather than a coarse, spray could help cover food surfaces more evenly, improving its kill rate.

Other areas of research for bacteriophages include using them to treat domesticated livestock in order to reduce

their internal colonisation with germs and to decontaminate surfaces in food factories and other establishments.

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