



## Veterinary and food applications of phages and derived proteins

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Bacterial infections pose a substantial challenge in both veterinary health and food safety, requiring effective strategies for their control and prevention. The escalating threat of antibiotic resistance, coupled with regulatory constraints on antibiotic use, has heightened concerns regarding the management of bacterial infections in these two fields. Antibiotic-resistant bacteria can compromise animal welfare, lead to economic losses, and have the potential for transmission to humans through the food chain, resulting in serious public health consequences. Additionally, the presence of pathogenic bacteria in food products can cause foodborne illnesses, resulting in significant morbidity, mortality, and economic burden.

Adopting a One Health perspective, bacteriophages offer a holistic solution for enhancing both animal health and food safety. By reducing antibiotic usage in animal production, bacteriophages contribute to the preservation of antimicrobial effectiveness in humans, animals, and the environment. Additionally, their targeted approach mitigates the risk of bacterial contamination in the food chain, safeguarding public health and minimizing economic losses. Bacteriophages also offer a rapid and sensitive detection approach, ensuring the timely identification of bacterial pathogens in both veterinary and food settings. This bacteriophage-based approach extends beyond utilizing phage particles as replicating organisms; it encompasses the utilization of phage proteins, which confer many of the distinctive characteristics of phages. Recent advancements in sequencing technologies, DNA manipulation, and synthetic biology have driven the envisioning of numerous applications for phage proteins.

Here, we will overview the most recent progress reported on the use of phages and phage-encoded proteins in enhancing animal health, improving food safety, and alleviating the burdens of antibiotic resistance and bacterial contamination in the agro-food industry, while promoting the interconnected health of humans, animals, and the environment in a One Health approach.

### References

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