

*Perspective***Antibiotics use in agriculture and its resistance in environmental sources**

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**DESCRIPTION**

It is essential that agriculture be able to sustainably feed a growing global population. Since the introduction of crop cultivation and animal husbandry techniques, bacterial illnesses of plants and animals have steadily decreased production. Numerous antibiotics have been employed to reduce these losses. However, the growth of bacteria that are resistant to antibiotics (AMR) and consumer demands for products devoid of antibiotics offer issues that endanger sustainable agriculture. Alternatives to antibiotics for controlling bacterial populations include bacteriophages (phages). They are very promising yet difficult antimicrobials due to their particular features. There are several particular difficulties associated with the usage of phages in agriculture. This brief overview covers current advancements and future prospects for phages employed as antimicrobial agents in farm-level plant and animal husbandry. There includes discussion of the primary pathogens and the associated phage therapy.

The objective of sustainable agriculture is to implement methods that result in healthy, disease-free plants and animals, provide safe food for a population that is expanding globally, and reduce the environmental impact of agricultural operations. In contrast, economic and disease pressures, customer preferences, geography, climate, and governmental laws have an impact on agricultural operations. Antibiotics have been used to manage plant infections and in animal husbandry since the end of World War II. The extensive use of antibiotics to treat human illnesses, animal husbandry, and the management of bacterial plant infections overshadowed significant advancements in phage therapy. AMR bacteria have become more prevalent globally as a result of overuse in both animal husbandry and medicine. Antimicrobial resistance is prevalent in a variety of geographical areas where antibiotics have been abused in apple and pear orchards, using *Erwinia amylovora* as

an illustration. The impact and repercussions of the existence of streptomycin-resistant *E. amylovora* in orchards are currently being debated and discussed scientifically in the literature.

The majority of antibiotics are non-specific, operating not only against the intended pathogen but also against other naturally occurring bacteria in the environment or in the microflora of plants and animals. Drug-resistant diseases cause millions of people to become unwell each year and cause an estimated 700,000 deaths worldwide; if the drug resistance trend continues that number might rise to 10 million by 2050. Unwise use of antimicrobials in agriculture may impair the effectiveness of antibiotics by promoting the emergence of antibiotic-resistant human diseases, increasing morbidity and mortality in humans, raising healthcare costs, and increasing the likelihood that pathogens will be carried and spread.

**Infections in agriculture**

It becomes crucial and exciting to understand how phages affect agricultural settings when sustainable agriculture is implemented. By nature, phages are quite particular to their bacterial hosts. This trait is advantageous in that it prevents adverse effects on the host microbiota but is detrimental in that it makes it more difficult to identify and get rid of the target pathogen. The development of phage-based biocontrol in food production systems over the last 10 years will be the main topic of this brief overview. In the most current review papers on plant and animal-associated phage therapy, phage-based laboratory research that involve phage isolation, host range determination, molecular characterisation, genomic and proteomics analysis are thoroughly documented. The initial discovery stage of the development of phages as antimicrobial agents in animal and plant production systems follows a similar path, but the processes diverge during the implementation phases. The use of phages in plant and animal farming has advanced, and we will address this development in the parts that follow, focusing on the difficulties and triumphs that have been documented in the scientific literature.

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