Opinion Article

Future Use of Bacteriophages in Agricultural Industry

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Abstract

Bacteriophages, which were first identified by Twort and d'Herelle in the early 1900s, have been recognized as a viable means of combating bacteria. They have been employed in a range of sectors, including agriculture and the food industry, to prevent bacterial growth on crops and food items. Despite their numerous advantages, bacteriophages have faced challenges in the western world. However, they have achieved greater success in eastern Europe. I am of the opinion that widespread use of bacteriophages in the west is feasible due to their potent properties, which in many cases surpass those of antibiotics. Furthermore, employing bacteriophages can help mitigate the issue of antibiotic resistance and reduce the environmental and human health consequences caused by chemicals.

Opinion

The application of bacteriophages for the treatment of human ailments enjoys a storied and well-established history in the former Soviet Union, particularly in the Republic of Georgia. During the Soviet era and beyond, the Eliava Institute served as the epicenter for this purpose [1]. Conversely, the Western world was heavily reliant on the utilization of antibiotics, which led to the marginalization of bacteriophages for several decades. However, with the emergence of antibiotic resistance and following the dissolution of the Soviet Union, there has been a resurgence of interest in bacteriophages as a potential solution for combating human diseases, which is a matter of great significance. Additionally, phages can be employed in agriculture and the food industry to prevent the contamination of food and crops, thereby obviating the need for chemicals, antibiotics, and additives that may engender myriad health problems and degrade the environment [2,3].

The application of bacteriophages in the Western world has gained increased attention over the past two decades, with countries acknowledging its potential as a feasible solution for the food industry. While regulatory frameworks are being developed to govern the use of phages and related products, albeit at a modest scale, certain products have received approval from regulatory authorities for widespread utilization. Despite the promising prospects of bacteriophages, their extensive use is still in its nascent stages, with considerable progress still needed to be made.

The field of structural biology has enabled the investigation of viruses at atomic resolution, wherein individual proteins can be assembled to construct the overall structure of the virus [4,5]. As evidenced in Figure 1.

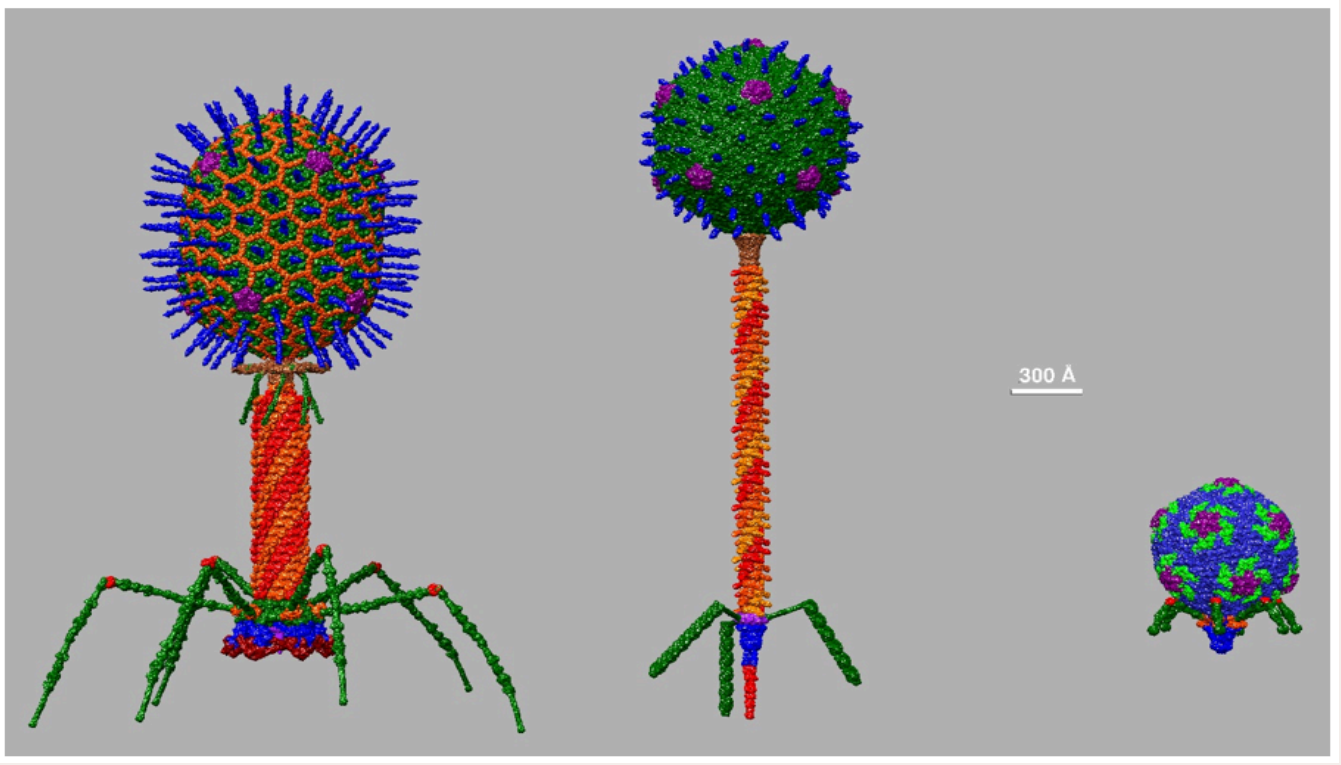

Figure 1: Bacteriophages T4, T5, and T7, respectively. Their structures are at atomic resolution and at scale, composed of individual protein structures obtained from the Protein Data Bank. The bar denotes 300 Angstroms.

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Conclusion

The collaboration between the West and Eastern European experts in bacteriophage utilization presents an opportunity to promote the beneficial applications of bacteriophages in Western agriculture. With the availability of molecular details about phages, our products can be optimized to enhance productivity and safety. The integration of bacteriophages in the industry, as well as their potential in combating antibiotic resistance, represents a significant advancement that could contribute to a better world in the 21st century.

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