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introduction

To avoid the overuse of antibiotics in animal production, the EU prohibited their use as a prophylactic tool and hence it is necessary to find alternatives such as phage therapy. The objectives of this project are to assess bacteriophages and their applicability to avoid infections in poultry and swine, as well as the current legislation and the obstacles to this therapy and their possible solutions.

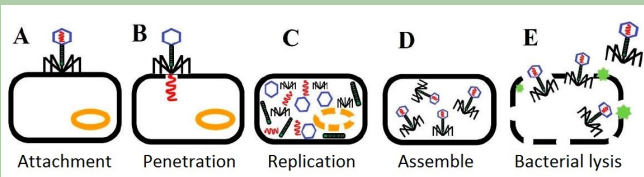


Figure 1. Lytic cycle modified from Żbikowska et al., 2020.

bacteriophages

Phages with a **lytic cycle** cause the death of the bacteria along with the amplification of the virus. Thus, phage therapy uses virulent bacteriophages, which have to be encapsulated, or their derivatives.

prophylactic therapy

Since phages require bacterial cells to expand, it is needed a previous infection to manifest an effect.

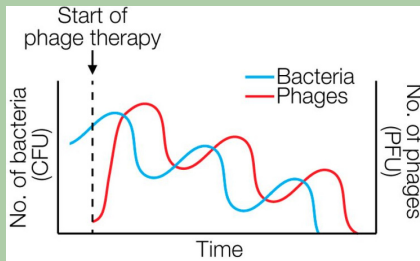


Figure 2. Graph of the oscillation in phage number depending on the number of bacteria by Moelling et. al, 2018.

poultry

They are a reservoir for *Salmonella* and *Campylobacter*. Prophylactic administration has been proven effective, although it depends on the dosage and the moment of administration.



swine

Several studies are focused on phage administration previous to slaughter to reduce *Salmonella* colonization, or post-weaning to reduce the severity of diarrhoea.



legal framework

Current legislation does not include the use of bacteriophages in any law on veterinary medicines or feed additives.

problems

Limited range of action	Cocktails
Resistance development	
Gene transduction	Lytic phages/derivatives
Immune system	Phage encapsulation
Endotoxins release	Non-lytic derivatives
Production and distribution	New fabrication models
Bad perception of phages	Information, awareness
Lack of economic benefit	Public investigation

solutions

conclusions

The emergence of bacterial resistance has led to the research of other antibacterial tools such as bacteriophages, which must have a lytic cycle and be encapsulated. Prophylactic phage therapy does not avoid the infection, but it delays it and it decreases the bacterial load. However, its use is not allowed in the EU, and it has got several obstacles which require an important economic inversion.

References

Moelling, K., Broecker, F., & Willy, C. (2018). A wake-up call: We need phage therapy now. *Viruses*, 10(12), 1–14.
Żbikowska, K., Michalczyk, M., & Dolka, B. (2020). The use of bacteriophages in the poultry industry. *Animals*, 10(5).