Effectiveness of phage phT4A incorporated in pullulan films against *Escherichia coli*

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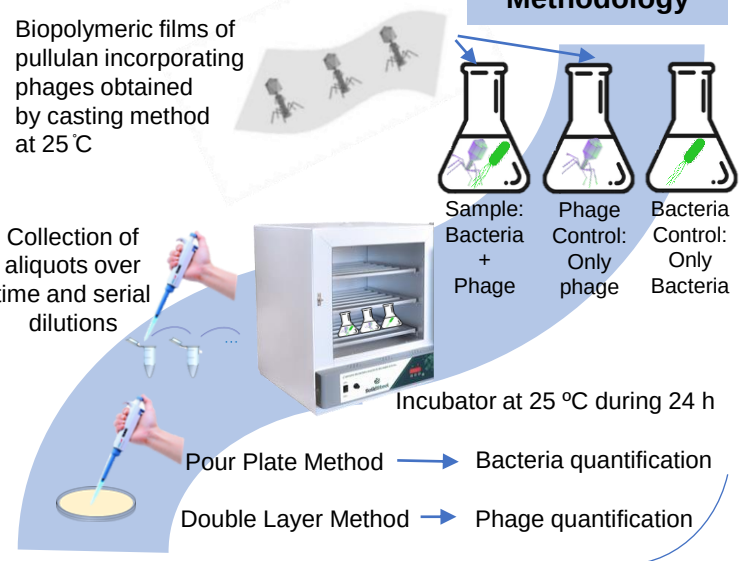
Introduction

- Despite the recent advances in food industries, microbial contamination remains a serious issue;
- *E. coli* is one of the most important foodborne pathogens;[1]
- Bacteriophages have been recognized for their great effectiveness in controlling bacterial pathogens in agro-food industry;[1]
- Their ubiquity, high specificity against a target host, self-replication capacity, low inherent toxicity, easy and economical isolation and production make them promising antibacterial candidates;[2,3]
- The incorporation of phages in food packaging can be an effective alternative to protect phages from environmental challenges and improve their efficacy, allowing a slower and continuous release.

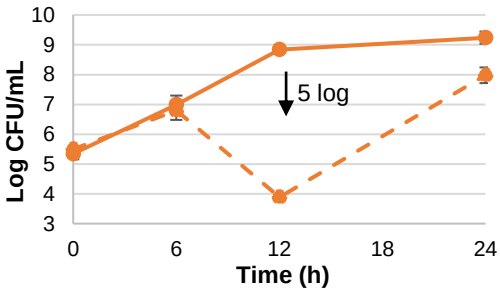
Methodology

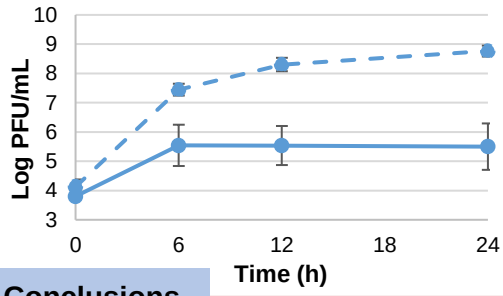


PURPOSE:
Evaluate the effectiveness of phage phT4A incorporated in pullulan films against *E. coli* for future application in packaging materials

Results

In vitro - TSB

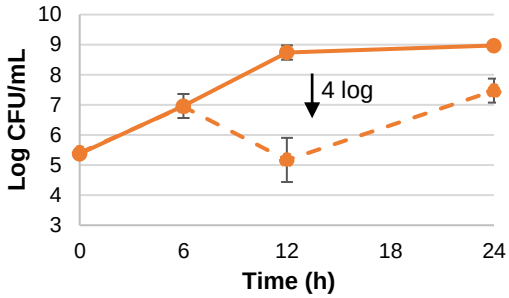


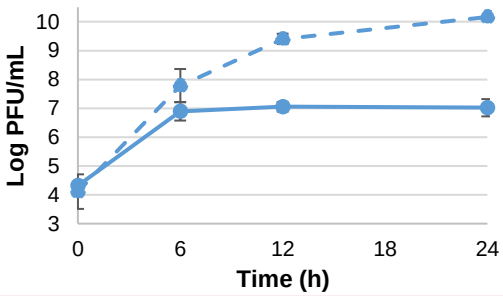


E. coli Quantification
Bacteria Control
Bacteria + Phage

Phage Quantification
Phage Control
Bacteria + Phage

In food - Milk





Conclusions

- Phage phT4A was successfully incorporated in the pullulan films increasing its concentration in solution until it remains stable until the end of the assays;
- The antibacterial efficacy of phage phT4A incorporated in pullulan films was demonstrated *in vitro* and artificially contaminated milk, with around 5 and 4 log CFU/mL of inactivation, respectively, during first 12 h of incubation;
- Overall, pullulan-based films incorporating phages constitute a simple approach to preserve the activity of phages in order to improve food safety.

References: 1. O'Sullivan, L. *et al*. *Annual Review of Food Science and Technology* 2019, 10:151–72; **2.** Altamirano, F. L. G., & Barr, J. J. *Clinical Microbiology Reviews* 2019, 32 (2),1–25; **3.** Principi, N. *et al*. *Frontiers in Pharmacology* 2019,10 (513),1–9.

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