

Use of alginate-based films as a carrier of bacteriophages: antimicrobial assessment against *Pseudomonas fluorescens*

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The use of edible films as packaging materials showed great potential, due to their biodegradability and edibility, and is already well known and studied by scientific community. However, the use of this kind of packaging for the incorporation and transport of bacteriophages has not yet been explored. In this work the bacteriophage ΦIBB-PF7A, with antimicrobial properties against *Pseudomonas fluorescens*, was incorporated in alginate-based films and its use was explored in poultry packaging cuvettes. A 1% alginate-based film cross-linked with CaCl₂ was selected based on its capability to form films with good mechanical properties, and to incorporate bacteriophage and maintain their activity (1.53×10^4 Plaque forming units per millilitre PFU/mL), and its affinity to water (18.5% moisture and 52.3% solubility). Antimicrobial activity was tested in chicken meat infected with 2.92×10^7 colony forming units per gram (CFU/g) of *P.fluorescens*. The active pre-formed alginate-based film with bacteriophage and with 1×10^3 PFU/mL was used as absorbent pad, in a closed recipient. It was observed that after 24 hours of storage at 4°C it was possible to achieve a decrease of *P.fluorescens* (2.86×10^6 CFU/g) in the meat indicating a release of the bacteriophage from the film along the time, showing the bacteriophage is being released and bacteria lysis occurs in the chicken meat.

Results showed that bacteriophage ΦIBB-PF7A can be incorporated in alginate-based films, maintain their activity and being released into chicken meat leading to a decrease of *P.fluorescens* contamination. Consequently, there is a clear industrial potential of using alginate-based films with bacteriophages as a substitute of common poultry cuvettes absorbents pads.