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# Phage therapy in the inactivation of *Aeromonas salmonicida* in aquaculture systems: Inactivation in water and in juvenile Senegalese sole (*Solea senegalensis*)

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One of the major sources of financial loss for the fish farming industry is the occurrence of infections by pathogenic bacteria, especially multidrug-resistant variants. This problem is most prominent during the early stages of fish development and is difficult to address with traditional antibiotic treatment or vaccination. In this way, alternative environmental-friendly biological strategies to control bacterial infections need to be implemented. Under this scenario, phage therapy appears as a useful and flexible tool for the inactivation of bacterial pathogens in aquaculture. The aim of this study was to test the efficacy of phage therapy to inactivate *Aeromonas salmonicida*, the causative agent of furunculosis, a fish disease characterized by high mortality and morbidity. In order to achieve this goal, a new phage was isolated, characterized and tested in artificially-infected *Solea senegalensis* juveniles and in batch bacterial cultures. Results showed that after 6 hours of treatment the phage inhibited the growth of *A. salmonicida* both in batch cultures and seawater in the presence of fish juveniles (≈4 and 2.5 Log PFU mL-1, respectively). After 72 hours, fish juveniles treated with phages after exposure to *A. salmonicida* showed no mortality, contrarily to fishes that were only exposed to the bacterium, which presented a mortality of 36%. This result indicated that phage treatment was effective. In general, it was observed a limited re-growth of resistant cells and absence of lysogeny conversion. No significant impact of phage inoculation on natural bacterial communities of aquaculture water was detected. However, the bacterial community associated with the fish intestinal tract was moderately affected by the addition of the phage. Interestingly, the differences were not significant when the phage was added in the presence of the host bacteria. Taking this into account, this study provides evidences that the tested phage can be effective and safe against furunculosis during the production of juvenile fish.

## Biography

Maria Adelaide de Pinho Almeida is an Assistant Professor at the Department of Biology from the University of Aveiro, Portugal, where she obtained her PhD degree in 2001. She is an integrated Member of the Associated Laboratory Centre for Environmental and Marine Sciences (CESAM). In the last years, she has been involved in the development and application of alternative methods to the use of antibiotics, such as photodynamic therapy and phage therapy.

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