Controlling the colonization of *Vibrio parahaemolyticus* and *Vibrio harveyi* in *Artemia* by the use of phage therapy

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### Introduction

The abuse in the use of antibiotics in the hatcheries has led to the emergence of resistant bacteria (Karunasagar et al. 1994) and to the urgent necessity of the substitutes environmentally more friendly bacterio-phages, are viruses that infect and kill and appear as an alternative to antibiotics for control pathogenic bacteria (Suvalaskidz et al. 2001). Bacteriophage can be found in all places where their hosts exist (Ackerman, 1996) and the host are the resource for their proliferation and life cycle (Weinbauer, 2004). The use of phages has been reported as effective to control pathogen bacteria in marine organisms (Vinod, 2006, Da Silva, 2005, Park et al., 2000, Nakai, 1999 and Karunasager, 2007). In this study we evaluate the use of several phages to control the colonization of *Vibrio parahaemolyticus* and *Vibrio harveyi* during the production of *Artemia nauplii*.

### Material and Methods

The phages used in this study were isolated during an extensive phage isolating program, in which, samples of marine organisms and sea water from natural areas and aquaculture facilities were included. The phages included in this study were lytic on *Vibrio parahaemolyticus* and *Vibrio harveyi*. The effect of individual and mixture of phages on the bacterial growth were evaluated under in vitro conditions and in vivo conditions. Axenic cultures of *Artemia* were challenged with each bacterium and the infected artemias were treated with phages to evaluate the effect on bacterial colonization after 24-72 hours of exposition.

### Results

During the experiments to control the colonization of *Vibrio harveyi* we found differences between the studied phages which apparently reflect the ability of this bacterium to resist the phage infection of each phage (fig. 1). In some cases the complete inhibition of the colonization was recorded at 12 h, while in other cases only a partial inhibition was induced (fig. 2).

### Conclusion

In the present study we found that the use of phages allows control on incidence of pathogenic bacteria in brine shrimp, which is a critical factor to reduce the risk of transference to shrimp and fish larvae when used as food.

We found differences in the effect of the tested phages. The phage F12 showed a total inhibition of *Vibrio harveyi* during the whole experiment, while the phage F8 inhibited *Vibrio parahaemolyticus* in the brine shrimp nauplii after 2 h of infection, keeping this condition throughout the experiment. The observed results apparently reflect the effect of the phages on the bacteria under in vitro conditions.

### References