# ABSTRACT

Bacteriophage therapy is gaining renewed interest as the problem of antibiotic resistance in bacteria becoming more widespread. Their application as a biocontrol agent of bacterial pathogens in the environment has been investigated. There is still a lack of information about proper formulations and preservation methods that guarantee the successful outcome of phage therapy. Therefore, the aim of this study is to isolate, characterize and study the effect of bacteriophages on the growth of *S. enterica* in pond water, as well as to develop a better bioformulation for preservation of phages. Phages were isolated from various environmental samples by sequential membrane filtration and then concentrated using 50 kDa cut-off membranes. Subsequently, the concentrated samples were subjected to spot test against lawn cultures of different *S. enterica* strains to detect presence of live phages. After enrichment, the morphology of the phages was characterized using transmission electron microscopy and type of genetic material was analyzed by nuclease digestion. The biocontrol study was done by inoculating the bacteriophage in spiked pond water and incubated for 5 days. The stability of phages was tested using three different stabilizers by lyophilization and monitored at 4°C and room temperature for 12 weeks. A total of five novel strains of lytic bacteriophages against *S. enterica* were isolated. They belong to the Myoviridae family. The biocontrol studies with the 5 phages revealed a proportional relationship between the bacteria and phage titre, whereby the phages were able to multiply and control the bacterial growth in pond water. For phage preservation using lyophilization, 5% sucrose was shown to be best stabilizing additives and it was most stable when stored at 4°C with only 1 log decrease in phage count after 12 weeks. In conclusion, this study showed the potential of bacteriophages to be used as biocontrol agent to control the growth of *S. enterica* in contaminated pond water. In addition, a method for long term preservation of the phages was also developed.