Isolation, characterization and *in vitro* evaluation of lytic bacteriophages for the biocontrol of *Salmonella enterica*

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The vast majority of foodborne diseases are caused by microorganisms, being one of the main pathogens *Salmonella enterica*. Treatments such as steam, dry heat and UV light have been evaluated for the control of the main foodborne pathogens causing food poisoning. However, the current technologies used to inactivate pathogens in foodstuff are not always effective and, moreover, can cause problems of acceptability and deterioration of the organoleptic properties of foods. In this context, bacteriophages have emerged as a potential tool for the biocontrol of pathogenic bacteria. The research work presented herein aimed to isolate and characterize lytic phages for *S. enterica*. For the isolation, effluent waters from a food company were used. The physicochemical characterization of the isolated bacteriophage particles included UV-Vis spectral scans for determination of the molar extinction coefficient, analyses of the phage particles structural proteins by SDS-PAGE electrophoresis, and morphological characterization by TEM analyses. The biological characterization entailed included determination of the host range using several bacterial strains, determination of the efficiency of plating (EOP) in those bacterial strains where spot-testing was positive, determination of the phage growth parameters (eclipse period, latent period, intracellular accumulation period, and burst size) via their one-step growth curves, determination of the adsorption rate of the phage particles onto their bacterial host cells, and evaluation of planktonic bacteria inactivation *in vitro* by the phage particles. Two lytic phage particles against *S. enterica* were isolated and characterized, being named as phage vB_SeM_UNISO_36 and phage vB_SeM_UNISO_46. Both phages showed lytic activity against the host bacteria, with high specificity, which may indicate promising use in the biological control of this pathogen in foodstuff.

Keywords: *Salmonella enterica*; Bacteriophage particles; Physicochemical and biological characterization; Phage-based inactivation

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