P5   Modelling Bacteria and Bacteriophage Population Dynamics

Sílvio R.B. Santos, J. Azeredo, A. Nicolau and E.C. Ferreira

Centro de Engenharia Biológica, Universidade do Minho

Campus de Gualtar, 4700-057 Braga, Portugal

E-mail: silviosantos@deb.uminho.pt

Phage therapy is complicated by the self-replicating nature of phage. The success of phage therapy is dependent on the knowledge of the phage replication kinetic properties in the presence of the host as well as on the prediction, controlling and optimization of phage production for future application. Moreover, it is necessary to evaluate and to understand the phage and bacteria population dynamics in order to foresee its potential for use in vivo.

To understand how natural communities are affected by environmental factors and will respond in time, it is important to develop predictive models.

The aim of the present work was the development of a dynamic model that predicts the interaction between a Salmonella phage and its respective host.

Simulated data are compared with the data obtained experimentally to assess the suitability of the model for two multiplicity of infection (MOI): 0.1 and 1.0. For a high multiplicity of infection (MOI=1.0), the simulated and experimental data have a better correlation than for a low MOI (0.1). In this case, the differences were also more notorious for bacterial concentration.

From the results it can be concluded that the model produces better correlations in terms of phage concentration, when a higher MOI is used. So, for a high MOI (MOI=1), given the initial values and the parameters used in the model, we can predict the concentration of phage and bacteria. In this way, the model can be used to predict the amount of phage obtained in the production process.

It is expected that the developed model may help the optimization of phage production and the guidance of the experimental studies of population dynamics by identifying and evaluating the relative contribution of phage and bacteria in the course and outcome of an infection.

Keywords: Bacteriophage, Model, Phage Therapy.