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The use of bacteriophages to control biofilms

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After several years of abandonment, the use of bacteriophages (phages) for killing bacteria has withdrawn recent attention and appraisal. This has led to a vast phage research, in varied fields, with impressive outcomes. Despite this enthusiasm, there is a lack of research concerning phage utilization to reduce bacteria living on surfaces in a lifeform known as biofilms.

This work explores the potential of newly isolated phages in controlling bacteria present in single and dual species biofilms. Gram-negative *Pseudomonas fluorescens* and Gram-positive *Staphylococcus lentus*, widespread inhabitants of dairy plant surfaces and products were the studied bacterial hosts.

Two broad host range phages belonging to the *Podoviridae* family, phiIBB-PF7A for *P. fluorescens* and phiIBB-SL58B for *S. lentus* were selected for the experiments. Both phages were efficient towards single species biofilms of each host, even against 7 days old biofilms. Furthermore, phage phiIBB-PF7A showed ability to infect and control cells with two distinct morphologies (rod and elongated) resulting in different numbers of progeny phages released after infections of these different hosts. Although phages need actively reproducing host, we obtained good destruction of cells living under severe starvation conditions and of cells in the stationary growth phase [1].

Dual species biofilms were challenged using two approaches: i) a phage cocktail and ii) a single phage for the less predominant species. The cocktail with phages for each of the dual species biofilms host decreased efficiently not only the cell number in the biofilm, but also the cells which were released to the planktonic phase while, on the other hands, the use of a single phage caused the release of the non-susceptible species to the planktonic phase [2].

References

[1] Sillankorva S, Neubauer P, Azeredo J, “Pseudomonas fluorescens biofilms subjected to phage phiIBB-PF7A”, *BMC Biotechnology.* (2008) 8:79.

[2] Sillankorva S, Neubauer P, Azeredo J, “Phage control of dual species biofilms of Pseudomonas fluorescens and Staphylococcus lentus”, *Biofouling.* (2010) 26:567 - 575.