

Bacteriophage Therapy in *Campylobacter*-Infected Broiler Chickens

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Campylobacter jejuni is a worldwide common cause of bacterial gastroenteritis associated predominantly with the consumption of poultry products. The reason for this high incidence is that *Campylobacter* are widespread commensal organisms of many mammals and birds, including poultry. Recent legislation restricting the use of antibiotics as growth promoters in animal production, together with the risk of antibiotic-resistant bacteria entering the human food chain, has produced a requirement for alternatives, to the use of antibiotics, as methods to control and treat animal infections. Bacteriophages (phages) are naturally occurring predators of bacteria and they are ubiquitous in the environment. Their use as therapy is one possible way to control *Campylobacter* colonization of poultry and prevent *Campylobacter* entering the human food chain.

This study exploits phages as biocontrol agents to reduce the levels of *C.jejuni* in broilers. Thirty-three lytic phages were isolated and screened against a panel of 19 *Campylobacter* isolates from broiler chickens and 11 clinical isolates. Three of these, PT3A, PT5A and PT4C, were selected for their broad lytic activity against the panel of *Campylobacter* strains. These phages were administered orally, in an antacid suspension, individually and in a cocktail, to groups of 15 eight-day-old broiler chicks experimentally colonised with wild-type *C. jejuni*.

The *in vivo* performance of the phages was evaluated over 14 days, by enumerating *Campylobacter* Colony Forming Units (CFU) and phage Plaque Forming Units (PFU) in faecal samples from the birds. The numbers of campylobacter and phage were compared between treatment groups and with the control group that had not received any phage.

Phage treatment of *C. jejuni*-colonised birds resulted in mean *Campylobacter* numbers falling between 0.5 and 2 log₁₀ CFU/g compared to the untreated controls over the experimental period. The largest reduction in *Campylobacter* numbers was observed two days post-treatment with phage PT4C. However, by the end of the study, the numbers in this group were similar to those in the control group, indicating that the phage had become ineffective. Treatment with the phage cocktail, or PT3A or PT5A administered individually lead to a reduction of the *Campylobacter* numbers by approximately 1 log₁₀ CFU/g throughout the 14-day experimental period.