

Abstract

A Biocontrol Option to Control a Foodborne Pathogen; Using *Campylobacter* Bacteriophages to Control *Campylobacter* in Poultry [†]

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Abstract: *Campylobacter* is a leading cause of foodborne illnesses both in Australia and internationally, and is frequently found in poultry. There is a need for sustainable options to support current farm management strategies that address food-safety. The use of bacteriophages provides a safe biocontrol option. A collaborative study by the Department of Agriculture and Fisheries (QLD), the University of Nottingham (UK) and the Institute of Environmental Science and Research (NZ) is focused on the control of *Campylobacter* in broiler chickens. *Campylobacter* bacteriophages were sourced from Queensland poultry farms and following extensive screening, suitable candidates to be used in cocktails were identified. This followed an on-farm proof of concept study on a small sample of chickens, using selected cocktail candidates, to provide an understanding of the hurdles for practical application. The trial demonstrated a 2-log CFU/g reduction of *Campylobacter* in the caeca of treated birds compared to non-treated ($p < 0.05$). Another important finding of this study was the absence of bacteriophage resistance, a concern with phage therapy. Work at ESR has addressed approaches to select and adapt bacteriophage cocktails to particular hosts, which included screening against NZ and Australian hosts. This approach enabled the formulation of high performing bacteriophage cocktails for Australian and international markets. Work in the UK is exploring the understanding of the host-bacteriophage relationships to ensure safety to meet regulatory requirements and support potential scale-up options. In summary, the work in progress via international collaborations is aimed at delivering a safe biocontrol option that can meet both commercial and regulatory needs aiming at controlling on-farm *Campylobacter*.

Keywords: *Campylobacter*; poultry; biocontrol; phage; phage therapy; food safety; foodborne pathogen

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