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# Effect of PhiV10nluc Concentration on Escherichia coli O157:H7 Time to Detection.

Chuyan Chen\*<sup>1</sup> and Claudia Coronel

<sup>1</sup>Purdue University [West Lafayette] – West Lafayette, IN 47907, United States

## Abstract

Shiga-toxin producing *Escherichia coli* O157:H7 infections pose severe risks to public safety. Post-infection illnesses range from bloody diarrhea to life threatening hemolytic uremic syndrome. These complications and resultant deaths have resulted in a zero tolerance for the presence of this foodborne pathogen in the U.S.. Current detection methods of foodborne *E. coli* O157:H7 include a time intensive culture enrichment step followed by PCR, lateral flow assays and culture dependent methods. Recently it was reported that the temperate recombinant bacteriophage PhiV10nluc with specificity for *E. coli* O157:H7 can be used during the selective enrichment to exploit this time consuming step. PhiV10nluc can detect approximately 5 cells in LB broth in roughly 7 hours with a concentration of approximately 200 pfu ml<sup>-1</sup> in the enrichment. To determine the effect of higher concentrations of PhiV10nluc on time to detection assays were carried out using approximately 100 and 1000 fold higher phage titers. Results showed 7.50 x 10<sup>4</sup> pfu ml<sup>-1</sup> of PhiV10nluc could detect approximately 4 cells in roughly 3 hours. This suggested that greater phage concentration increased phage-host interactions decreasing time to detection. However when the concentration of phage PhiV10nluc was increased to 1.80 x 10<sup>6</sup> pfu ml<sup>-1</sup>, it took 11 hours to detect approximately 4 cells. Results indicate that at high ratios of phage-host concentrations, PhiV10nluc phage (although temperate) may have resulted in more lytic events than lysogeny increasing time to detection. These results suggest that phage concentration for detection during selective enrichment is crucial.

**Keywords:** lysogeny, temperate, lytic, reporter phage

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\*Speaker