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**PhD Dissertation**

Entitled

*CHARACTERIZATION AND GENOMIC ANALYSIS OF TWO ESCHERICHIA COLI O157:H7  
BACTERIOPHAGES ISOLATED FROM PIGEON'S FEACES*

by

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Abstract

The majority of food borne outbreaks globally are caused by the verotoxin-producing *Escherichia coli* O157:H7, which may lead to death in some cases. Bacteriophages or bacteria eaters are Natural enemies of bacteria. All *E. coli* O157:H7 phages that have been previously announced were found in ruminants or swine. Here, we investigated characterization and genomic analysis of two lytic *E. coli* O157:H7 bacteriophages isolated from feaces of wild pigeon from a single nest; UAE MI-01 and Ec\_MI-02. To the best of our knowledge this is the first time to report *E. coli* O157:H7 phages from birds feaces. UAE\_MI-01 belongs to the family of Siphoviridae in the order of Caudovirales. UAE\_MI-01 had a latent period of 40 minutes with burst size of almost 100 pfu/host cell and was found stable at a wide range of temperature, pH and some of the common laboratory disinfectants. The 44,281 bp-long genome of the phage had an average GC content of 54.7%. While Ec\_MI-02 was suggested to belong to the family *Guttaviridae* based on its droplet-shape in electron microscopy and therefore the terms guttabacteriophage and guttaphage were introduced. To the best of our understanding, this is the first time to isolate, characterize and report droplet-shaped bacteriophage of *E. coli*, if not the first droplet bacteriophage in the entire bacteria domain. The guttaphage Ec\_MI-02 had a latent period of 40 minutes, interestingly, phage particles were releasing continuously after 40 minutes until 120 minutes with burst size approximately 100. Ec\_MI-02 was also stable at a wide range of pH, Temperature and some of disinfectants that are usually used in laboratories. Its genome was made of 263 gens with total 165453 bp and average GC content of 35%. It is worthy of note that whenever the phage is present, the host cell must be present. Thus, if the bacteriophage of *E. coli* O157:H7 is present in the feaces of a wild bird, then the host cell *E. coli* O157:H7, is also present in wild birds. Therefore, it is crucial to check other birds, particularly poultry, for the presence of *E. coli* O157:H7 and its phage.

**Keywords:** Bacteriophage; Guttaphage, *E. coli* O157:H7; Phage therapy; Characterization; Genomic comparative