

## The Study of CRE (Carbapenem-resistant *Enterobacteriales*) Harboursing Carbapenemase-resistant Genes from Poultry Farm

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### Structured Abstract

**Background:** The issue of carbapenem-resistant *Enterobacteriales* (CRE) in poultry farms in Malaysia is the main focus of this study, as it is very much related to the wider issues of antibiotic resistance in humans. CRE, known as *Enterobacteriales* are commonly associated with resistance against carbapenem antibiotics. Carbapenem antibiotics are often administered to poultry to boost growth and prevent disease. Carbapenem is frequently used as a last resort antibiotic to treat Multidrug Resistant (MDR) bacteria in humans. However, carbapenem resistance among humans has increased as a result of the widespread use of these antibiotics in poultry through exposure to the environment and the food chain. This study focused only on *Escherichia coli* and *Klebsiella pneumoniae* under the group of *Enterobacteriales*.

**Methods:** The chicken manure samples were collected from a local poultry farm in Shah Alam, Selangor. The presumptive identification of *E. coli* and *K. pneumoniae* isolates were determined by selective media and standard biochemical tests.

**Results:** A total of nine bacteria were successfully isolated, whereby four were presumptive *E. coli* and the remaining five were presumptive *K. pneumoniae*. Their antibiotic profiles against cefotaxime, gentamicin, imipenem, meropenem and rifampicin were determined. Antibiotics Susceptibility Testing (AST) showed that all the isolates (100%) were resistant against gentamicin, meropenem and rifampicin. In contrast, they were sensitive against cefotaxime and imipenem. For gentamicin, a mixture of sensitive and resistant strains was observed. The presumptive *E. coli* isolates (60%) and the presumptive *K. pneumoniae* isolates (50%) were resistant against gentamicin. A total of bacteria isolates (54.5%) were found to be MDR. The results also indicate a mixture of reactions against carbapenem antibiotics, which were meropenem and imipenem. Results of the amplification of *blaKPC* and *blaNDM* genes showed that none of the isolates were found to harbour both genes. This suggests that the carbapenem resistant trait by these bacteria were probably achieved by other mechanisms and not by producing *blaKPC* and *blaNDM* genes. These other mechanisms include efflux pumps, porin mutations and other  $\beta$ -hydrolyzing enzymes to break down carbapenems.

**Conclusion:** In conclusion, further research is essential to understand the mechanisms of these resistance genes to prevent contamination of humans.

**Keywords:** Carbapenem-resistant *Enterobacteriales* (CRE), Carbapenem antibiotics, Multidrug Resistant (MDR), Antibiotics Susceptibility Testing (AST), *blaKPC* and *blaNDM* genes

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