Junior Science Communications
Faculty of Applied Sciences, UiTM Shah Alam
https://journal.uitm.edu.my/ojs/index.php/JSC

E-ISSN 2637-0689
Vol 45 2025

Colloquium on Applied Sciences 2 2024
8-14 July 2024, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

The Characteristics of Carbapenem Resistance *Enterobacterales* (CRE) From a Local Poultry Farm

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Structured Abstract

Background: Carbapenem antibiotics are often administered to poultry in order to reduce illness, prevent disease, and boost their growth. In humans, carbapenem is always used as a last resort antibiotic in multidrug resistance bacteria (MDR). However, the intensive use of antibiotics in poultry have increased the incidence of carbapenem resistance in humans. These carbapenem resistance from poultry can be transmitted to humans via food chain, direct contact with the poultry and also environmental exposure. This study aims to focus on the issues of carbapenem-resistant *Enterobacterales* (CRE) in Malaysian poultry farms and how it relates to the comprehensive problem of antibiotic resistance in humans.

Methods: The bacteria were isolated from local poultry farm and their antibiotic resistance profile against cefotaxime (10 μg), gentamicin (10 μg), meropenem (10 μg), imipenem (10 μg) and rifampicin (10 μg) was determined. Amplification of ESBL genes were focused only on two genes including *bla*TEM and *bla*CTX-M.

Results: A total of 12 pure bacteria cultures were successfully isolated whereby four were presumptive *E. coli* and the remaining six were presumptive *K. pneumoniae.* Results from antibiotic susceptibility tests showed that all the isolates were resistant against rifampicin and meropenem, a carbapenem antibiotic. In contrast, they were found to be sensitive against cefotaxime and imipenem, another carbapenem antibiotic. For gentamicin, 50% of the presumptive *E. coli* and 75% of the presumptive *K. pneumoniae* isolates were resistant against this antibiotic. Further analysis showed that a total of eight isolates (66.7%) were found to be MDR whereby two were *E. coli* and six were *K. pneumoniae*. Amplification of ESBL genes, there are none of the isolates observed to harbor a *bla*TEM gene. However, *bla*CTX-M gene was found in 50% of the isolates whereby 25% were *E. coli* and 62.5% were *K. pneumoniae.*

Conclusion: These isolates could have acquired the resistance against meropenem by other mechanisms that are not related to ESBL genes. These mechanisms could be porin mutation, efflux pumps and producing carbapenemase.

Keywords: Carbapenem Resistance *Enterobacterales* (CRE), Multidrug Resistance (MDR), *bla*TEM, *bla*CTX-M, antibiotic resistance profile

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