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## Multiple Antimicrobial Resistance of the *Escherichia coli* isolates from Nile Tilapia sold in wet markets in Metro Manila and their Conjugative Transferability of drug resistance

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### 1. INTRODUCTION

Foodborne microbial contaminants are one of the serious causes of outbreaks and illnesses in the country today, and the control of the spread of these contaminants must be strictly implemented. Among the sources of food in the country and around the globe today are fish products from aquaculture such as the Nile Tilapia. Nile Tilapia is a popular fish sold in the market where it might be exposed to microbial contaminants such as *Escherichia coli*. *Escherichia coli* is a fecal bacterium used as an indicator for the biological conditions of food and the environment (FAO, 2016; Carson et al. 2001). Contamination with *E. coli* may be from the waters in the aquaculture ponds, the handlers or storage in contaminated ice (Rocha et al 2004; Lateef et al. 2004). Antimicrobial resistant strains may be positively selected for by antibiotics in the environment, which may lead to the dissemination by mobile genetic elements of resistance to potentially pathogenic bacteria (Alexander et al. 2010; Berglund, 2015). In the Philippines, antimicrobial agents, which are used for treatment of infectious diseases, are still routinely used to promote the growth of food animals like tilapia fish in aquaculture. The occurrence of multiple antimicrobial resistance in *Escherichia coli* poses risks to both human and animal health.

### 2. METHODOLOGY AND RESULTS

Thirty-five (35) *E. coli* isolates from the gills of Nile tilapia sold in three (3) wet markets in Metro Manila were isolated, phenotypically identified, and studied for their antimicrobial susceptibility patterns using the disc diffusion method recommended by CLSI. Results showed high resistance percentage of the *E. coli* isolates to ampicillin (77.14%), trimethoprim-sulfamethoxazole (co-trimoxazole) (60%), tetracycline (45.71%), cephalothin (17.14%), gentamycin (11.43%), nalidixic acid (8.57%), and ciprofloxacin (5.71%), which except for nalidixic acid, are commonly used to treat human and animal diseases. On the other hand, the isolates were susceptible to amikacin, aztreonam, cefotaxime, ceftazidime, and imipenem, signifying the absence of extended spectrum- $\beta$ -lactamase and carbapenemase producing *E. coli*. Multiple antimicrobial resistances were found in 21 out of 35 isolates (60%). Moreover, ten (10) *E. coli* isolates were tested for the conjugative transferability of the drug resistances on solid medium. Seven (7) completely transferred their resistance determinants to drug susceptible *E. coli* J532, converting it to a multiple resistant strain with ampicillin-cotrimoxazole-tetracycline resistance, while three (3) isolates transferred the ampicillin resistance only.



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### 3. CONCLUSIONS

The study showed the occurrence of *E. coli* isolates with conjugatively transferable multiple antimicrobial resistance determinants in the gills of the tilapia studied. The results call for the strict regulation of the use of antimicrobials in aquaculture and the proper handling of fish sold in the market. The recovery of these *E. coli* bacteria from the gills of tilapia fish, which are potentially pathogenic to humans, suggests that contaminated fish that are improperly handled, undercooked or consumed raw may be a medium for the spread of multiple antimicrobial resistant potential pathogens among the consuming public, a cause for public health concern.

### 4. REFERENCES

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