

Antibiotic resistance phenotypes and genes of *Escherichia coli* isolates from rainbow trout (*Oncorhynchus mykiss*) sold in retail settings in Kerman, Iran

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Abstract

Antibiotics are widely used to treat infectious diseases in humans and animals. However, the indiscriminate use of antibiotics contributes to the emergence of antibiotic-resistant bacteria, making infections more difficult to treat. In this study, we randomly collected thirty-six rainbow trout fish from various retail stores in Kerman city, located in the southeast of Iran. Skin samples were obtained from each fish using a swab, and *Escherichia coli* (*E. coli*) isolates were identified and screened for antimicrobial resistance (AMR) phenotypes, as well as related genes, using microbiological culturing, disc diffusion, and conventional PCR methods. Our findings showed that the prevalence of phenotypic resistance against the tested antibiotics was high, with erythromycin (88.57%), florfenicol (77.14%), oxytetracycline (74.28%), trimethoprim-sulphamethoxazole (71.42%), trimethoprim (65.71%), chloramphenicol (62.85%), flumequine (60%), ciprofloxacin (54.28%), and tetracycline (54.28%) having the highest resistance rates. Moreover, 8.57% of the *E. coli* isolates were found to be ESBL-producing strains, and 74.28% of the isolates were multi-drug resistant (MDR). The highest frequencies of antibiotic resistance genes were 5.71 % for *bla*_{TEM}, 14.28% for *qnrA*, 17.14% for *sul1*, and 20% for *sul2*. *E. coli* is a mesophilic bacteria and is not naturally present in fish. Fishes have mostly psychrophilic bacteria in their microflora. The origin of *E. coli* on the skin of fish is water contaminated with human and animal feces, so the antibiotic resistance of this bacterium has an indirect relationship with aquaculture. Our study showed that *E. coli* isolates from the skin of rainbow trout has a high level of antibiotic resistance, which may be a risk to public health. Therefore, it is very important to control the use of antibiotics in fish farming to reduce the selection pressure to emergence and spread of antibiotic-resistant bacteria.

Key words: *Escherichia coli*, Antibiotic resistance, Fish, Kerman

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