



## Short Communication

Isolation and antimicrobial resistance of *Escherichia coli* isolated from farm chickens in Taif, Saudi ArabiaAly E. Abo-Amer<sup>a,b,\*</sup>, Mohammed Y. Shobrak<sup>c</sup>, Abdullah D. Altalhi<sup>a</sup><sup>a</sup> Division of Microbiology, Department of Biology, Faculty of Science, University of Taif, P.O. Box 888, Taif, Saudi Arabia<sup>b</sup> Division of Microbiology, Department of Botany and Microbiology, Faculty of Science, Sohag University, Sohag 82524, Egypt<sup>c</sup> Division of Zoology, Department of Biology, Faculty of Science, University of Taif, P.O. Box 888, Taif, Saudi Arabia

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## ABSTRACT

**Objectives:** Poultry is one of the main sources of food in the world. Antimicrobial-resistant *Escherichia coli* can be transmitted to humans by contact with poultry waste or by contaminated poultry products, contributing to the increasing crisis of antimicrobial resistance. This study aimed to determine the incidence of antimicrobial resistance in *E. coli* isolated from chickens in Taif province, Saudi Arabia, and to identify the genes responsible for any resistance observed.

**Methods:** A total of 150 cloacal swabs were aseptically obtained from chickens from different farms, from which 180 colonies of *E. coli* were identified using standard microbiology procedures. Antimicrobial susceptibility testing was performed by the Kirby–Bauer disk diffusion method. The genes *bla*<sub>SHV</sub>, *aac*(3)-IV, *tet*(A), *tet*(B), *aadA1*, *catA1*, *cmlA*, *ere*(A) and *sul1* were detected by PCR.

**Results:** Most of the *E. coli* isolates showed resistance to oxacillin (99%), lincomycin (98%) and oxytetracycline (97%). The prevalence of resistance to chloramphenicol (73%), ciprofloxacin (59%) and ampicillin (51%) was lower. Genes conferring resistance to β-lactams (*bla*<sub>SHV</sub>) and tetracyclines [*tet*(A) and *tet*(B)] were observed at prevalences of 96% and 95%, respectively, among the *E. coli* isolates. Chloramphenicol (*catA1* and *cmlA*) and erythromycin [*ere*(A)] resistance genes showed prevalences of 72% and 15%, respectively, whereas gentamicin [*aac*(3)-IV], streptomycin (*aadA1*) and sulfonamide (*sul1*) resistance genes were detected in 20%, 20% and 10% of the studied isolates, respectively.

**Conclusion:** A significant prevalence of antimicrobial resistance genes was observed among *E. coli* isolates from farm chickens, supporting strict regulatory procedures for the use of antimicrobial agents.

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## 1. Introduction

Poultry is an increasing source of food in the world. However, it is also one of the most consumed foodstuffs commonly associated with outbreaks of foodborne disease. Pathogenic micro-organisms can be transferred to humans by contact with poultry waste or by contaminated poultry foodstuffs. The avian gut has been considered as a reservoir of *Escherichia coli* that could potentially be transmitted from birds to humans [1]. *Escherichia coli* is a Gram-negative bacterium that generally acts as a natural commensal in the digestive tracts of humans, animals and birds, but some strains are significant intestinal and extraintestinal pathogens [2].

Pathogenic *E. coli* from animals, birds and humans can cause a variety of diseases, ranging from self-limiting gastrointestinal infections to bacteraemia. Antimicrobial agents have been used for various veterinary and agricultural purposes, including animal husbandry and poultry production where poultry feed is supplemented with antibiotics [3]. Moreover, antibiotics are widely utilised to control infectious illnesses and as growth promoters in poultry production. Application of antimicrobials and their misuse is considered to be the most important selecting influence for the spread of antimicrobial resistance in bacteria both in human and veterinary medicine [4]. Indeed, antimicrobial resistance developed in pathogens colonising animals can cause the emergence and distribution of resistant *E. coli* that are subsequently transmitted to humans by contact with infected animals or derived products [5]. During carcass processing, resistant bacteria from the poultry gastrointestinal tract can contaminate the meat product. Even wild migrating and resident birds can act as carriers and transmitters of multidrug-resistant (MDR) *E. coli* and *Escherichia vulneris* [1].

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