

Letter to the Editor

First report of CTX-M-44 in *Escherichia coli* isolated from chicken meat produced in Brazil

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Dear Editor,

Antimicrobial resistance genes transferred among microorganisms have transcended country borders. The food export market may be responsible for this phenomenon. The study of bacterial resistance profiles in Brazil, the second largest chicken meat producer and largest exporter [1], is extremely important to help monitor and control the spread of resistance genes.

One of the main mechanisms of β -lactam resistance involves the production of β -lactamase enzymes, such as extended-spectrum β -lactamases (ESBLs) and AmpC β -lactamases. ESBLs may confer resistance to third- and fourth-generation cephalosporins. More than 600 ESBL variants are known, and the more prevalent variants are CTX-M, TEM, and SHV [2]. AmpC-type β -lactamase confers resistance to cephamycins and third-generation cephalosporins and is not inhibited by β -lactamase inhibitors [3].

CTX-M variants isolated from humans have distinct geographic distributions: CTX-M-2 is more commonly found in South America; CTX-M-14, in China; and CTX-M-1, -9, -14, and -15, in Europe. In Brazil, CTX-M-2 is the most frequent gene in ESBL-producing *Escherichia coli* isolated from humans [4] and chicken meat [5-10].

Antimicrobial resistance in strains isolated from food animals can be caused by the administration of antibiotics for therapeutic purposes or other uses. In Brazil, several antimicrobial agents used for enhancing zootechnical performance are banned [11].

Nevertheless, recent studies have suggested that Brazilian chicken meat may be an important reservoir of multi-resistant strains, including bacteria carrying β -lactamase genes [5 -10].

We investigated the antimicrobial susceptibility and prevalence of different resistance gene groups in seventy-nine *E. coli* strains isolated from 107 chicken meat samples produced by six different Brazilian chicken meat exporters and commercialized in the city of Londrina, Paraná, Brazil.

Antimicrobial susceptibility was determined by the disk diffusion method, according to recommendations of the Clinical and Laboratory Standards Institute (CLSI) [12]. Strains resistant to third-generation cephalosporins were tested for ESBL production [12]. Detection of genes that encode β -lactamase enzymes was carried out in seventy-nine *E. coli* strains by polymerase chain reaction (PCR). Specific initiator oligonucleotides and different protocols were used to detect resistance genes and to sequence genes of the CTX-M group. Notably, 23 isolates (29%) were confirmed as ESBL-producing. CTX-M-2 was the most prevalent gene group, detected in 11 strains. CTX-M gene sequencing revealed the enzyme CTX-M-44 β -lactamase, which was included in the Genbank database in 1996. This enzyme was first identified as Toho-1 in reference to the Toho University School of Medicine, Tokyo, and later renamed to CTX-M-44 [13]. It has been reported in Japan in human and broiler chicken

isolates [14], but this is the first report of CTX-M-44 in *E. coli* isolated from chicken meat produced in Brazil.

One of the main causes of antimicrobial resistance in strains found in foods is the administration of antibiotics to livestock for therapeutic or non-therapeutic purposes, such as promotion of growth and prophylaxis of diseases. Brazilian legislation prohibits the use of various antimicrobial agents as performance-enhancing zootechnical additives or as preservatives of animal feed [11].

Our findings showed that *E. coli* strains isolated from chicken meat harbored antimicrobial resistance genes. In addition, this is the first report of CTX-M-44 in *E. coli* isolated from chicken meat produced in Brazil. The chicken meat export market can contribute to the spread of bacteria carrying antimicrobial resistance genes. A continuous control of the use of antibiotics in chicken production chains is necessary, and frequent epidemiological studies are required to help prevent this zoonotic risk.

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