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Paper Poster Session

Antibacterial resistance: the animal and food production part of one health

Identification of third-generation cephalosporins-resistant *Escherichia coli* from chicken and chicken meat in Brazil

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Background: ESBL-producing Enterobacteriaceae are a public health concern worldwide. The number of CTX-M-producing *Escherichia coli* reported from food-producing animals is increasing. Since Brazil is an important producer and the greatest exporter of chicken meat in the world, it is of utmost importance to monitor the presence of these bacteria in this food sector.

Material/methods: In a surveillance study in the northwest of Sao Paulo State, Brazil, five pieces of chicken meat from different markets and 117 chicken cloacal swabs from three separate farms were sampled. Meat samples were enriched in peptone water with 4 µg/mL of cefotaxime or 16 µg/mL of ceftazidime and plated on MacConkey agar supplemented with the same antimicrobials. Cloacal swabs were diluted in 5 mL of sterile saline water and inoculated on MacConkey agar with 4 µg/mL of cefotaxime. One colony typical of *E. coli* morphology was picked up and identified with automated biochemical system. Antimicrobial susceptibility was tested by disc diffusion, PCRs for detection of *bla*_{CTX-M} and *bla*_{CMY-2/4} genes were performed and phylogenetic groups were determined. *bla*_{CTX-M} and *bla*_{CMY} genes were sequenced, and plasmids characterized by rep-typing (Diatheva) and southern blot on S1-PFGE gels.

Results: All pieces of chicken meat presented a multidrug-resistant ESBL-producing *E. coli*, and 53.8% of chickens were also colonized by third-generation cephalosporin-resistant (ESBL/CMY) *E. coli*. All four major phylogenetic groups (A, B1, B2, D) were present, but phylogroup D was predominant. From 57 isolates, 41 carried the *bla*_{CTX-M-2} gene (meat samples and cloacal swabs), 7 carried *bla*_{CTX-M-55}, 6 carried the *bla*_{CMY-2} gene (only cloacal swabs), 2 carried *bla*_{CTX-M-15} and 1 *bla*_{CTX-M-8} (only meat sample). The *bla*_{CTX-M-15} and *bla*_{CTX-M-55} genes were preceded by *ISEcp1*. Conjugation was successfully performed for all CTX-M-55-, the CTX-M-8-, one CTX-M-15- and one CTX-M-2-producers. The sizes of the CTX-M-carrying plasmids ranged from 55 kb to 242.5 kb, and incompatibility groups identified in transconjugants were IncI1 (*bla*_{CTX-M-8}), IncX1 (*bla*_{CTX-M-15}), IncHI2/P (*bla*_{CTX-M-2}), IncFII (*bla*_{CTX-M-55}) and IncFII/N (*bla*_{CTX-M-55}). Additional experiments are in progress to determine the location of the other *bla*_{CTX-M} genes.

Conclusions: *E. coli* carrying *bla*_{CTX-M-2}, *bla*_{CTX-M-8} and *bla*_{CTX-M-15}, which are ESBL genes often detected in human clinical strains in Brazil, are also present in chicken meat. Live chickens were colonized by *E. coli* carrying *bla*_{CTX-M-2}, *bla*_{CTX-M-55} and *bla*_{CMY-2}, which were also found in animals. Such differences in the ESBL/CMY variants colonizing chicken meat and live chickens may partly reflect different sources of contamination such as from handlers or selection in the chicken production (or both). More studies are required to clarify the sources of such a high prevalence of ESBL genes in chicken meat and chickens in Brazil, which is of great importance for public health.