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## **IDENTIFICATION OF EXTENDED-SPECTRUM $\beta$ -LACTAMASE (ESBL)- PRODUCING *ESCHERICHIA COLI* ISOLATES IN DISEASED FOOD-PRODUCING ANIMALS FROM GERM-VET 2008-2014**

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### **Introduction**

Food-producing animals are an important reservoir of antimicrobial-resistant bacteria. Extended-spectrum  $\beta$ -lactamase (ESBL)-producing bacteria represent risks for public health and economic losses for food-animal production. The aim of this study was to identify ESBL-producing *Escherichia coli* isolates originating from diseased food-producing animals.

### **Material and methods**

A total of 6,849 *E. coli* collected from diseased cattle (n=2,896), pigs (n=1,562) or poultry (n=2,391) in the German national resistance monitoring program GERM-Vet (2008-2014) were characterized by antimicrobial susceptibility testing and screened for an ESBL phenotype. ESBL genes were identified by PCR and sequencing. The isolates were further characterized by PCR-based phylotyping.

### **Results**

ESBL-producers were identified in 324 cattle isolates (11.2%), 75 pig isolates (4.8%) and 20 poultry isolates (0.8%). The ESBL genes detected were: *bla*<sub>CTX-M-1</sub> (69.9%), *bla*<sub>CTX-M-15</sub> (13.6%), *bla*<sub>CTX-M-14</sub> (11.7%), *bla*<sub>TEM-52</sub> (1.9%), *bla*<sub>SHV-12</sub> (1.4%), *bla*<sub>CTX-M-3</sub> (1.0%) and *bla*<sub>CTX-M-2</sub> (0.5%). Phylogroup A was the dominant one (57.0%) being followed by D (23.4%), B1 (17.9%) and B2 (1.7%). Whereas bovine isolates belonged predominantly to group A or D, porcine and avian isolates belonged to A or B1. Most ESBL-producing isolates were detected in animals suffering from gastrointestinal tract infections. In 399 isolates (95.2%), additional resistance to non- $\beta$ -lactam antibiotics was seen and 369 (88.1%) isolates were multi-resistant (resistant to at least three classes of antimicrobial agents). Resistance to all classes of antimicrobial agents tested [aminoglycosides, fluoro(quinolones), sulfonamides, tetracyclines, and trimethoprim] was found in 157 isolates (37.4%).

## **Conclusion**

Different frequencies of ESBL-producing *E. coli* isolates were found in the different animal hosts. However, no clear tendency of a continuous increase or decrease of such frequencies was seen over time. Due to the additional resistance to non- $\beta$ -lactam antibiotics, co-selection of ESBL-producing *E. coli* isolates may occur also under selection pressure by aminoglycosides, (fluoro)quinolones, sulfonamides, tetracycline or trimethoprim.

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