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High occurrence of multidrug-resistant *Escherichia coli* from Holstein-Friesian cattle in Northern Portugal: a One Health challenge

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Abstract

Background: *Escherichia coli* is currently a leading pathogen for deaths associated with antimicrobial resistance (AMR) [1]. AMR related to food-producing animals is a public health risk requiring a One Health approach [1,2]. Animals are major reservoirs of antibiotic resistant *E. coli* which can easily reach humans through the food chain, direct contact, or the environment [3]. **Objective:** To analyze the AMR profiles of *E. coli* in fecal samples from Holstein-Friesian cattle, as information on AMR from dairy farming in Portugal is scarce. **Methods:** Samples (n=112) collected from 7 different farms at Northern Portugal were pooled during February-March 2023 based on age group (8 calves and 8 cows per farm). Characteristic *E. coli* colonies were selected from MacConkey Agar supplemented with or without antibiotics (4 µg/ml cefotaxime; 3 µg/ml colistin), for confirmation by MALDI-TOF mass spectrometry and antimicrobial susceptibility testing (AST), according to EUCAST/CLSI guidelines. ESBL phenotype were searched using the Double-Disk Synergy Test. **Results:** Presumptive *E. coli* isolates (n=110) representing different farming production systems were obtained and 51 representatives were identified by MALDI-TOF and tested by AST. From both calves and cows, 95% and 63% of the *E. coli* isolates exhibited resistance to ≥1 antimicrobial classes and multidrug resistance (MDR, resistance to ≥3 antimicrobial classes), respectively. Isolates were mostly resistant to gentamycin (88%), ampicillin (72%), amoxicillin plus clavulanic acid (63%), tetracycline (63%) and cefotaxime (53%). Only two isolates showed susceptibility two all tested antibiotics. ESBL activity was observed in 21% of *E. coli* isolates. All analyzed pools were classified as MDR. **Conclusions:** This is one of the first studies on AMR rates of *E. coli* from dairy cattle in Northern Portugal. It reveals a high prevalence of MDR *E. coli*, which is a worrying finding and emphasize the need of a multisectoral One Health approach to minimize its impact.

Keywords: One Health; antimicrobial resistance; livestock; *Escherichia coli*

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