Prevalence of extended-spectrum cephalosporinase (ESC)-producing Escherichia coli in Danish slaughter pigs and retail meat identified by selective enrichment and association with cephalosporin usage

OBJECTIVES: To investigate the prevalence of extended-spectrum cephalosporinase (ESC)-producing Escherichia coli in pigs at slaughter and retail meat, and possible associations with the consumption of third- and fourth-generation cephalosporins. METHODS: During 2009, faecal samples from Danish pigs (n = 786) were collected at slaughter, and 866 meat samples [Danish: pork (153), broiler meat (121) and beef (142); and imported: pork (173), broiler meat (193) and beef (84)] were randomly collected in retail stores and outlets. E. coli was isolated after enrichment in MacConkey broth with ceftriaxone (1 mg/L). ESC genotypes were detected using PCR, microtube array and sequencing. The MIC of cefotaxime was determined for 150 E. coli from the pigs and 606 E. coli from meat isolated without selective enrichment. RESULTS: Eleven percent (86/786) of slaughter pigs contained ESC E. coli and a significantly higher prevalence was observed among pigs originating from farms with registered cephalosporin consumption in slaughter pigs (P = 0.034). Among ESC E. coli from pigs, 66% contained blaCTX-M-1. From meat, a high prevalence of ESC E. coli was found in imported broiler meat (36%) compared with 0.7%–3.3% in other meat types. ESC E. coli from imported broiler meat (n = 69) contained blaCMY-2 (48%), blaCTX-M-1 (25%) and blaSHV-12 (16%). Without selective enrichment, no ESC E. coli from pigs and only 4.1% from imported broiler meat were found. CONCLUSIONS: The usage of cephalosporins for slaughter pigs may increase the prevalence of ESC E. coli in slaughter pigs. Meat may be a source of ESCs in humans, especially imported broiler meat. Selective enrichment should be considered as a supplementary surveillance method.