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Abstract (poster session)

Aquaculture rainbow trout are contaminated with multidrug-resistant Enterobacteriaceae species carrying clinically-relevant antibiotic resistance genes

J. Pereira, J. Campos, J. Mourao, M. Barros, C. Novais, L. Peixe, P. Antunes* (Porto, PT)

Objectives: Aquaculture is currently one of the fastest growing food production sectors and is associated with ~50% of the fish produced worldwide for human consumption. Food safety threats, such as clinically relevant antibiotic resistance (ABR), are currently a FAO/WHO/EFSA recognized concerns. Our goal was to assess the presence of pathogenic bacteria and clinically relevant ABR genes in aquaculture rainbow trouts marketed in Portugal. Methods: We analysed 27 trout aquaculture samples (3 trouts/sample; muscle and viscera), 25 from 8 supermarkets (SM) and 2 from an aquaculture facility (TA) (May-June 2012). We screened for Salmonella, Listeria monocytogenes and Escherichia coli (standard methods) and for ABR Gram negative bacilli using selective media with/without AB (ceftazidime, cefotaxime and ciprofloxacin) after enrichment. Genes conferring resistance to beta-lactams (blaTEM, blaCTX-M, blaSHV), fluoroquinolones [qnrA, qnrB, qnrC, qnrD, qnrS, qepA, aac(6')-Ib-cr, oqxAB] and other AB were searched by PCR/sequencing. Species were identified by ID32GN/16SPCR and phylogenetic group was determined in Escherichia coli. ABR was analysed by agar diffusion/Etest (CLSI/EUCAST). Results. Salmonella and L. monocyotgenes were not detected. E. coli (n=16; phylogenetic groups A0-5/A1-1/B1-5/B2-1/D-4) was found in 48% of samples (TA/7 SM), with 56% (TA/4 SM) resistant to different AB (nalidixic acid-38%; tetracyclin-31%, tetA/tetB; streptomycin-31%, strA/strB; amoxicillin-25%, blaTEM; sulfamethoxazole-19%, sul2; ciprofloxacin-19%, chloramphenicol-13%, floR/catA; trimethoprim-13%). In Gram negative bacteria ESBL were not detected (n=0/146) but plasmid mediated quinolone resistance (PMQR) genes were observed in 9% (n=6/68; TA/4 SM) of the isolates, with MIC to ciprofloxacin (0.25-0.5 µg/mL) above ECOFF. The qnrS2 gene was detected in MDR Hafnia alvei (n=2; 2 SM; tetA- florA-strA-strB-sul1), the qnrB10/new qnrB variant in MDR Citrobacter freundii complex (n=3; SM/TR; tetA/florA/sul1-sul2/int1-dfrA12-aadA) and the recently described qnrD in MDR Proteus vulgaris (n=1; SM; tet-sul2). Conclusions: Trouts for human consumption analysed in this study seems not to be a source of Salmonella and L.monocytogenes but are a vehicle of ABR bacteria/genes of relevance for human and animal health. Detection of MDR bacteria and PMQR in fish products is of concern and highlights the need to establish ABR control policies and surveillance in the food chain.