ijurp '13

BOOK OF ABSTRACTS

6TH MEETING
OF YOUNG RESEARCHERS OF UNIVERSITY OF PORTO

U.PORTO

ijuf '13

6TH MEETING OF YOUNG RESEARCHERS OF
UNIVERSITY OF PORTO

U.PORTO

CREDITS

Livro de Resumos IJUP'13

6º Encontro
de Investigação
Jovem da U.Porto

AA ID+i
t.22 040 81 46
secidi@reit.up.pt

Design
Ana Fernandes & Daniel Martins
Rui Mendonça

Impressão e acabamentos
Invulgar – artes gráficas

Tiragem
1000 **exemplares**

Depósito Legal
340336/12

ISBN
978-989-746-006-7

Antibiotic resistant bacteria in aquaculture rainbow trouts: a new threat in the food chain?

J. Pereira[1,2], J. Campos[2], J. Mourão[2], M. Barros[2], C. Novais[2], L. Peixe[2] and P. Antunes[1,2]

[1] Faculty of Nutrition and Food Sciences, University of Porto, Portugal
[2] REQUIMTE. Department of Microbiology, Faculty of Pharmacy, University of Porto, Portugal

Background. Aquaculture is currently one of the fastest growing food production sectors, associated with, approximately, 50% of the fish produced worldwide for human consumption. By providing products with standard characteristics, quality control and prices, which are stable and lower than regular fishing products, aquaculture could present advantages for food services. However, 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 *Enterobacteriaceae* carrying clinically relevant ABR genes in aquaculture rainbow trouts (*Oncorhynchus mykiss*) marketed in Portugal.

Methods. We analyzed 27 trout aquaculture samples (3 trouts per 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 (bla_{TEM}, bla_{CTX-M}, bla_{SHV}), 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 *E. coli*. ABR was analyzed by agar diffusion/E-test (CLSI/EUCAST).

Results. *Salmonella* and *L. monocytogenes* weren't 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%; tetracycline:31%, *tetA/tetB*; streptomycin:31%, *strA/strB*; amoxicillin:25%, bla_{TEM}; sulfamethoxazole:19%, *sul2*; ciprofloxacin:19%; chloramphenicol:13%, *floR/catA*; trimethoprim:13%). In Gram negative bacteria extended-spectrum beta-lactamases weren't 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 minimum inhibitory concentration to ciprofloxacin (0.25-0.5 µg/mL) above ECOFF. The *qnrS2* gene was detected in multidrug resistant (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/intI1-dfrA12-aadA*) and the recently described *qnrD* in MDR *Proteus vulgaris* (n=1; SM; *tet/sul2*).

Conclusion. Trouts for human consumption analyzed in this study seem 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.

Acknowledgments: This research was supported by Fundação para a Ciência e a Tecnologia - PEst-C/EQB/LA0006/2011 and PTDC/AAC-AMB/103386/2008.