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© Universidade do Porto
AA ID+1
t.22 040 81 46
secidi@reit.up.pt

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Ana Fernandes & Daniel Martins
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Rainbow trouts containing Enterococcus with virulence factors, antibiotic and biocide resistance genes: Can your dinner be a matter of concern?

M. Barron1, P. Antunes2, J. Pereira1, J. Camara1, E. Silva1, A. R. Freitas1, L. Peixe1, C. Novais1

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

Portuguese marketed trouts (Oncorhynchus mykiss) for human consumption are mostly of aquaculture origin and studies showing their contribution to the human spread of potential clinical relevant bacteria through the food chain are unavailable. Our goal was to study the occurrence of Enterococcus carrying virulence and antibiotic (AB)/biocide resistance genes in rainbow trouts marketed in Portugal.

Trout samples of aquaculture origin (n=27; 3 trouts/sample; muscle and visceral) were collected from 8 supermarkets (n=25) and an aquaculture facility (n=2) (May-July 2012). Samples were enriched in peptone water (1:10) and plated in Slanetz-Barley agar with/without antibiotics. Species identification and search of genes coding for AB (vanA, vanB, vanC, tetM, tetC, tetS, tetK, tetG; ermA, ermB, ermC, oxford), copper (3 mulycoperoxidase, 2 copper export ATPases), mercury (4 merA sequences) and virulence (esp, hyl, acn, gel, aac) were done by PCR. Susceptibility to 13 AB was tested by disk diffusion (CLSI).

Enterococcus were detected in 81% of the samples corresponding to 7 supermarkets and one aquaculture (27 E. faecium-Efm, 9 E. faecalis-EfR, 17 E. durans, 2 E. hirae, 6 Enterococcus spp). They were resistant to tetracycline (43%; tetA-B-92%, tetL-35%, tetS-12%, erythromycin (8%), tetracycline-2% or tetracycline-resistance (3%). Multiple resistance was detected in 7% of the isolates. Genes encoding for copper (cypB-5%, cypA-11%) and mercury (merA-1%, merA2-7%, merA3-7%) resistance were detected only in Ef m and those coding for virulence in different species (gel-15%, esp-12%, esp-12%, esp-12%, esp-12%, esp-12%); EFm and AB or copper or mercury resistance genes were co-detected in 11% and 7% of the isolates, respectively.

Market trouts are vehicles of Enterococcus spp carrying virulence (e.g. associated with adhesion), AB and biocide resistance, which might colonize human after ingestion. Studies in aquaculture production setting are needed to better understand the source of bacteria and genetic determinants contamination found in trout samples.

Assessment of knowledge and behaviours of nutrition, hygiene, and food safety of non-teaching staff at nursery schools.

C. Rocha1, 2, A. Almeida3 and I. M. Cunha4

1Faculty of Nutrition and Food Sciences, University of Porto, Portugal
2Sens Test, Lda. V. N. Giez, Portugal (current affiliation)
3Municipality of Villa Nova de Gaia, Portugal
4REQUIMTE/EGGAT, Faculty of Sciences, University of Porto, Portugal

Pre-school is the first stage of basic education in the process of training and learning of a child's life. At the nursery school, children contact daily with a group of adults that symbolize role-models. Within this set, non-teaching staff including sociocultural animators, education assistants and cooks, which mainly provide assistance at mealtime (lunch and morning and afternoon snacks), transmit concepts of food education to children [1]. The main objective of this study was to assess knowledge, attitudes and behaviours that these professionals apply in the context of daily food, to evaluate if both knowledge and behaviour are at an acceptable level, considering the role those professionals represent to children. This cross-sectional study consisted on the application of a questionnaire, which include a Portuguese version [2] of the Nutrition Knowledge Questionnaire, and a set of questions from the Questionnaire for food service staff [3,4], to 270 people.

A sample of 270 non-teaching staff from nursery schools at the Municipality of Villa Nova de Gaia, Portugal, was obtained. Participants, with age between 20 and 66 years (59 ± 9.3 years), shown that only basic nutrition messages are well understood, failing to understand more complex ones. More than 90% of participants know they should eat more fruit and vegetables, however, only 23.2% know the recommended amounts.

As the nutritional knowledge is low, there is no proportion relation on translating of messages to food choices, and on associating health problems (such as cancer, hypertension and obesity) with intake of fruits and vegetables, salt and fat. The knowledge level of hygiene and food safety is good and higher than reported behaviours. The results show that for these professionals, knowledge isn’t transformed into behaviour, and they fail to apply it in their daily work. The assistants present more knowledge than cooks. However, cooks are the ones that receive more training; concluding that training isn’t effective or misdirected.

The level of knowledge acquired is reasonable but should be improved, aiming for a structured training to fill the gaps in nutrition, hygiene and food safety knowledge, assessing constantly the transformation of the knowledge into behaviour.

References