Evaluation of resistant enteric bacteria in raw meat from Portuguese retail stores

Miguel Carvalho[1], Carolina Balbino[2,3], Margarida Martins[1,4], Mariana Borges[2,4], Matilde Cordas[3,5], Leonor Silveira[4], Isabel Santos[6,7], Mariana Camoesas Silva[8], Ana Lima[6,7], Laurentina Pedroso[6,7], Alexandra Nunes[3,6,7], Ângela Pista[4], <u>Sónia Ramos</u>[6,7]

[1]Faculty of Science, University of Lisbon, Portugal.
[2]Faculty of Science and Technology, NOVA University of Lisbon, Portugal.
[3]Genomics and Bioinformatics Unit, Department of Infectious Diseases, National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal.
[4]National Reference Laboratory for Gastrointestinal Infections, Department of Infectious Diseases, National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal.
[5]School of Psychology and Life Sciences, Lusófona University, Lisbon, Portugal.
[6]Research in Veterinary Medicine (I-MVET), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.
[7]Veterinary and Animal Research Centre (CECAV), Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Portugal.
[8]Faculty of Veterinary Medicine, Lusófona University, Lisbon University Center, Lisbon, Portugal.

Objectives: The presence of multidrug resistant (MDR) pathogens in foods is an increasing global public health concern, with most foodborne diseases being associated with animal-origin foods such as meat. Our goal was to enhance our knowledge about the presence of MDR enteric bacteria in poultry and pork meat obtained from retail stores in Portugal.

Material and Methods: A total of 75 meat samples (25 chicken, 25 turkey, and 25 pork) were collected from various Portuguese retail stores. All samples underwent testing to detect *Escherichia coli*, *Salmonella* spp., and *Shigella* spp.. Additionally, pork samples were also tested for *Yersinia enterocolitica*. Moreover, 32 isolates (19 chicken, 13 turkey) were further evaluated for antimicrobial susceptibility using the disk-diffusion method, following the European Committee on Antimicrobial Susceptibility Testing recommendations, and using a panel of 18 antibiotics.

Results: The meat samples have tested negative for *Salmonella* spp. and *Shigella* spp.. However, *E. coli* was isolated from 69.3% of the samples (23/25 chicken, 23/25 turkey and 6/25 pork). Additionally, *Y. enterocolitica* was isolated from two of the pork meat samples. In this study, it was found that 84.2% of chicken samples and 92.3% of turkey samples were resistant to at least one of the tested antibiotics, with the majority showing resistance to ampicillin and tetracycline. Moreover, MDR profile was detected in 26.3% of chicken samples and 69.2% of turkey samples, with five turkey isolates showing resistance to four or more different classes of antimicrobials. Notably, resistance to critically important antimicrobials for human health, such as fluoroquinolones and cephalosporins, was observed, predominantly in turkeys.

Conclusion: This study emphasizes the role of meat as a potential source of multidrug-resistant *E. coli* and stresses the importance of monitoring it throughout the entire food chain to ensure food safety.