



Characterization of *E. coli* strains isolated during HACCP procedure in meat plants



L. Grisoldi*, P. Sechi, M. F. Iulietto, M. Ceccarelli, M. Revoltella, G. Ventura, C. Crotti, B. T. Cenci-Goga.

Dipartimento di Medicina Veterinaria, University of Perugia, Italy

*grisluca@outlook.it

Introduction

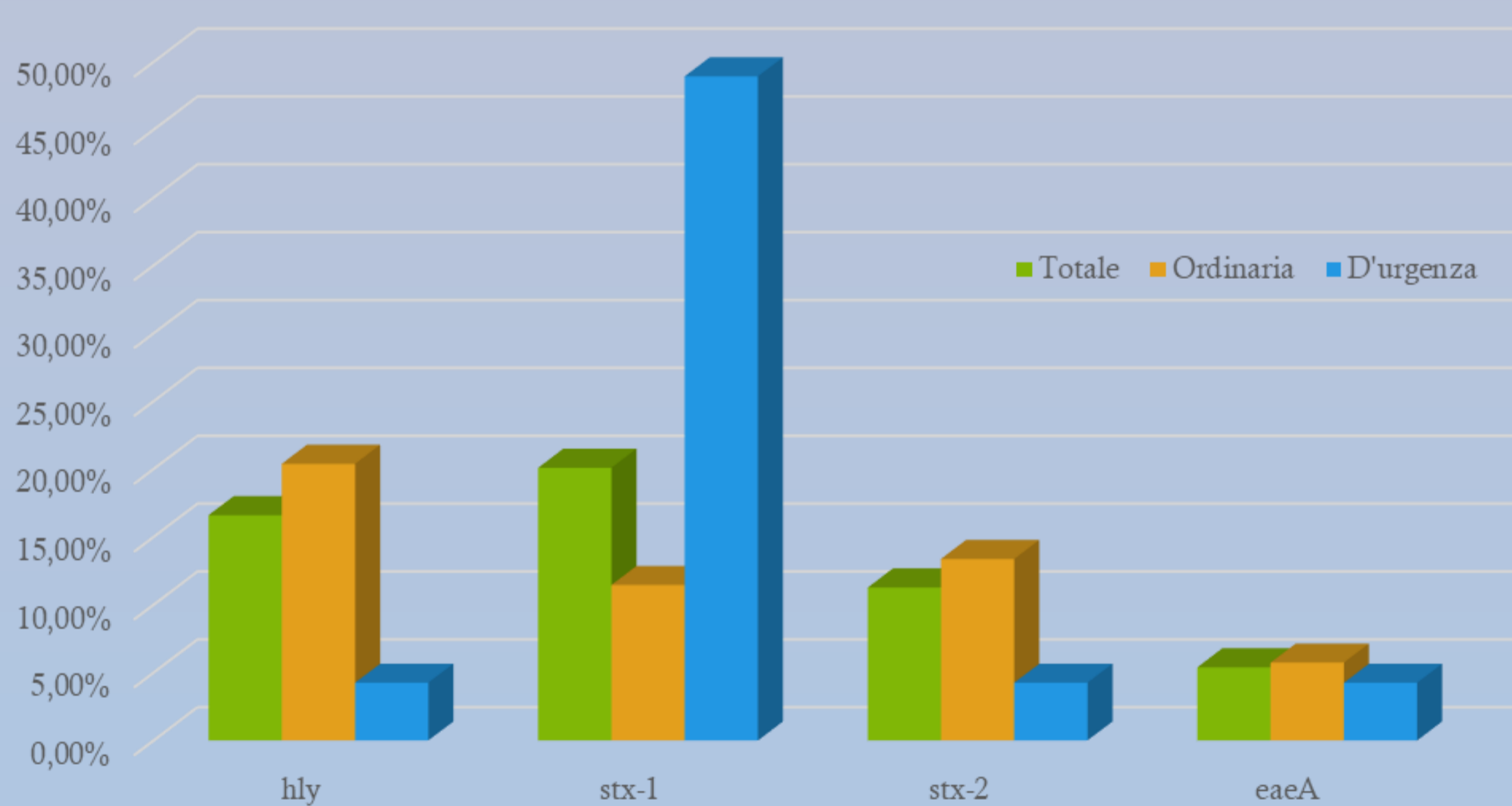
A potential source of pathogenic bacteria in ground beef is the lymphatic system, specifically the lymph nodes. The objective of the current study was to determine the prevalence of *Escherichia coli* in bovine lymph nodes.

Materials and methods

Bovine lymph nodes were collected from 597 carcasses at a commercial slaughterhouse located in central Italy between May 2012 and September 2017. 492 (82.41%) lymph nodes samples were obtained from regular slaughter, and the remainder 105 (17.58%) were obtained from emergency slaughter. Subiliaci lymph nodes were collected for this study. The isolates were analysed by PCR for the presence of the *stx-1*, *stx-2*, *hly* and *eae* genes and by the Kirby Bauer test for susceptibility to the most commonly used antimicrobials.

Results

Thirty-four (16.6%) strains were positive for the *hly* gene, 41 (20.09%) for *stx-1*, 23 (11.27%) for *stx-2*, 11 (5.39%) for *eaeA* and 4 (1.96%) for both *stx-1* and *stx-2*. The prevalence of the genes in the strains isolated from regular slaughter was: 20.38% *hly*, 11.46% *stx-1*, 13.37% *stx-2* and 5.73% *eaeA*. The prevalence of the genes in the strains isolated from emergency slaughter was: 4.25% *hly*, 48.93% *stx-1*, 4.25% *stx-2* and 4.25% *eaeA*. 14.7% of the isolates were resistant to sulfamides, 8.3% to sulphamethoxazole/trimethoprim, 0.49% to ciprofloxacin, 4.4% to nalidixic acid, 0.49% to enrofloxacin, 5.39% to chloramphenicol, 5.39% to amoxicillin/clavulanic acid, 41.6% to ampicillin, 0.49% to cefotaxime, 0.49% to ceftriaxone, 89.70% to cephalothin, 2.45% to ticarcillin, 18.62% to tetracycline, 1.96% to amikacin, 3.43% to gentamicin, 4.4% to kanamycin, 5.9% to neomycin, 11.27% to streptomycin, 98.52% to erythromycin and 0% to colistin.



Name	RESISTANT	INTERMEDIATE	SENSITIVE
<i>Sulphamethoxazole/trimethoprim</i>	8,3%	0,49%	91,2%
<i>Tetracycline</i>	18,62%	1,96%	79,4%
<i>Gentamicin</i>	3,43%	0%	96,56%
<i>Cephalothin</i>	89,70%	7,35%	2,94%
<i>Enrofloxacin</i>	0,49%	1,96%	97,54%
<i>Chloramphenicol</i>	5,39%	0%	94,6%
<i>Ampicillin</i>	41,6%	18,3%	40,19%
<i>Amoxicillin/Clavulanic Acid</i>	5,39%	11,76%	82,85%
<i>Compound sulphonamides</i>	14,7%	1,96%	83,33%
<i>Ceftriaxone</i>	0,49%	0%	99,5%
<i>Ciprofloxacin</i>	0,49%	1,47%	97,54%
<i>Nalixidic Acid</i>	4,4%	0,98%	94,6%
<i>Cefotaxime</i>	0,49%	2,45%	97%
<i>Ticarcillin</i>	2,45%	10,29%	87,25%
<i>Erythromycin</i>	98,52%	1,47%	0%
<i>Amikacyn</i>	1,96%	0,49%	97,05%
<i>Kanamycin</i>	4,4%	8,33%	87,25%
<i>Neomycin</i>	5,9%	60,29%	54,4%
<i>Colistina</i>	0%	14,7%	85,29%
<i>Streptomycin</i>	11,27%	20,58%	68,13%

Conclusions

The prevalence of *E. coli* was higher in lymph nodes isolated from emergency slaughter and the difference was statistically significant ($p < 0.05$). The prevalence of *stx* positive strains was also higher in lymph nodes isolated from emergency slaughter and the difference was statistically significant ($p < 0.01$). Our results indicate that the presence of *E. coli* in the lymph nodes that remain in the carcass after grooming may represent an important source of contamination of the meat, especially if these are used for the production of minced meat.