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Characterisation of Resistant Enteric Bacteria Isolated from Poultry Faeces and Meat in Portugal - Is there a Risk to Public Health?

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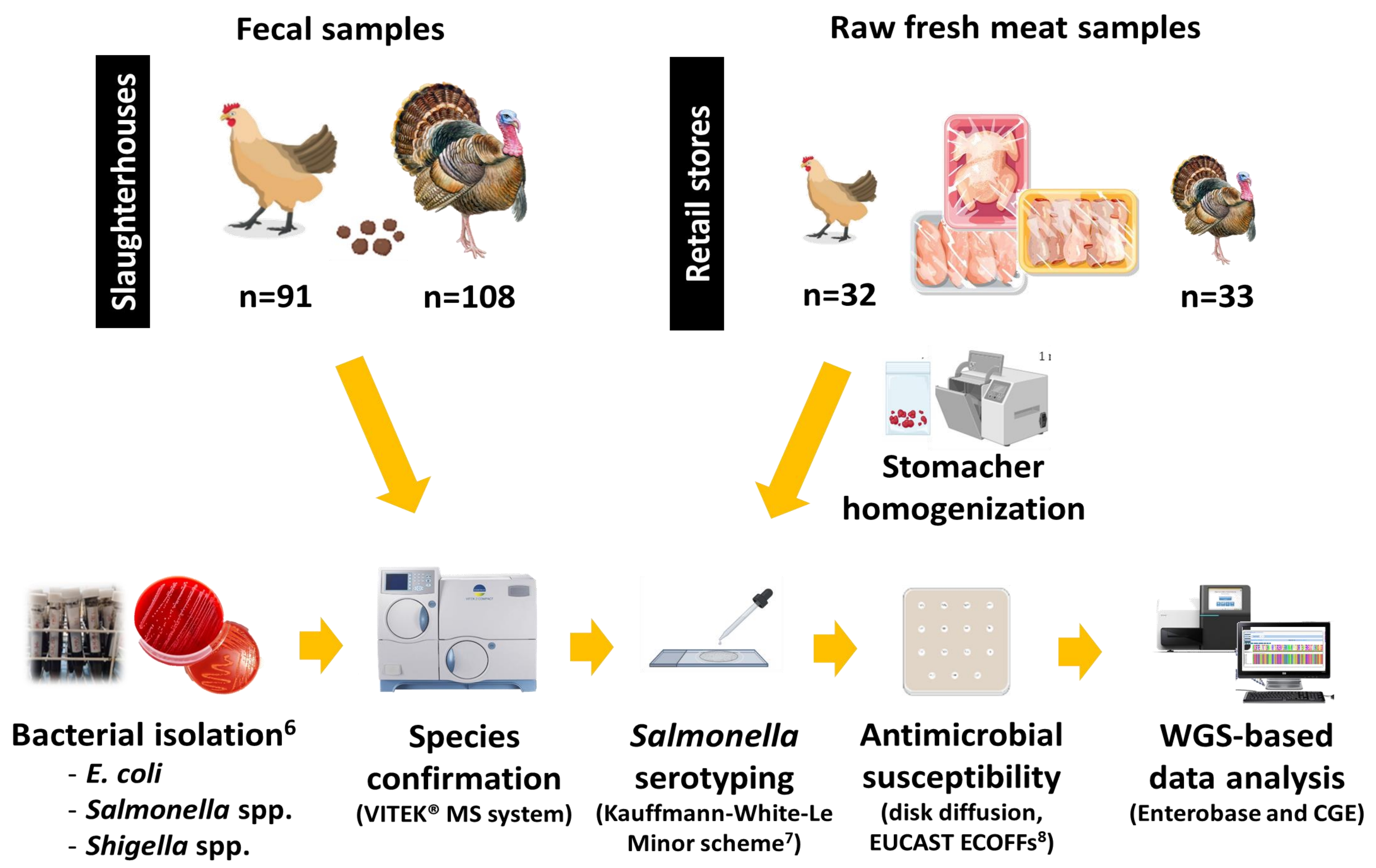
INTRODUCTION & OBJECTIVE

- Foodborne diseases caused by resistant and multidrug-resistant (MDR) bacteria are a growing public health concern.
- Food-producing animals represent a significant public health concern, with contamination of meat products occurring at multiple stages along the food production chain, particularly in slaughterhouses and meat-cutting facilities[1-3].
- Antimicrobial resistance in these pathogens increases the risk to both human and animal health[3,4].
- While *Escherichia coli* (*E. coli*) and *Salmonella* spp. are well-established agents in such infections, the occurrence of *Shigella* spp. in poultry remains poorly understood and warrants further investigation[5].

➢ **The aim of this study was to identify and to characterize *E. coli*, *Salmonella* spp., and *Shigella* spp. isolated from turkeys and chickens of Portuguese origin produced for human consumption.**

METHODS



RESULTS

➢ No cases of *Shigella* spp. were detected in the 264 studied samples.

➢ *Salmonella* spp. (*S.* Newport) was isolated in one turkey faecal sample (0.9%) (Table 1).

➢ Overall, *E. coli* was recovered from 97.5% faeces and 92.3% meat samples.

➢ Virulence genes of enteropathogenic *E. coli* (EPEC), ExPEC and APEC were identified in both animals (Table 1).

➢ *S.* Newport was susceptible to all tested antibiotics.

➢ For *E. coli*, 78.1% faecal (74.1% in turkeys; 83.0% in chickens) and 78.7% (90.0% in turkeys; 67.7% in chickens) meat isolates were resistant to at least one antibiotic (Figure 1).

➢ The most common resistances were to ampicillin, tetracycline, and ciprofloxacin (Figure 1).

➢ All isolates were susceptible to meropenem, cefoxitin, amikacin and temocillin (Figure 1).

➢ A MDR profile was observed in 58.6% isolates (56.5% in turkeys; 61.7% from chickens), corresponding to 59.1% isolates from faeces and 56.8% from meat samples.

➢ Seven *E. coli* isolates (four from turkey faeces, one from turkey meat, and two from chicken faeces samples) were identified as extended-spectrum beta-lactamase (ESBL) producers (*bla*CTXM-15, *bla*CTX-M-55 and *bla*SHV-12).

➢ Eight isolates from turkeys (seven isolates from faeces and one isolate from meat samples) carried the *mcr-1.1* gene.

➢ Phylogenetic analysis of *E. coli* isolates revealed 11 clusters among turkey and 14 clusters among chicken samples. In turkeys, one cluster included both a faecal and a meat isolate. In chickens, two clusters showed similar patterns: one comprised a faecal and a meat isolate, and the other two faecal and one meat isolates.

➢ *S.* Newport clustered with a national environmental isolate from Enterobase.

Table 1. Isolation and characterisation of *E. coli* and *Salmonella* spp. in the 264 studied samples.

No. of Tested Samples		Turkey		Chicken		Total
		Faeces	Meat	Faeces	Meat	
		108	33	91	32	264
Salmonella isolates	Total (% +ve)	1 (0.9)	0	0	0	1 (0.4)
E. coli isolates	Total (% +ve)	108 (100)	30 (90.9)	86 (94.5)	30 (93.8)	254 (96.2)
	EPEC (% +ve)	1 (0.9)	0	8 (9.3)	1 (3.3)	10 (3.9)
	ExPEC (% +ve)	107 (99.1)	30 (100)	78 (90.7)	29 (96.7)	244 (96.1)
	APEC (% +ve)	33 (30.6)	10 (33.3)	19 (22.1)	18 (60.0)	80 (31.5)

Extraintestinal Pathogenic *E. coli* (ExPEC) and Avian Pathogenic *E. coli* (APEC) were defined according to the literature[9-11].

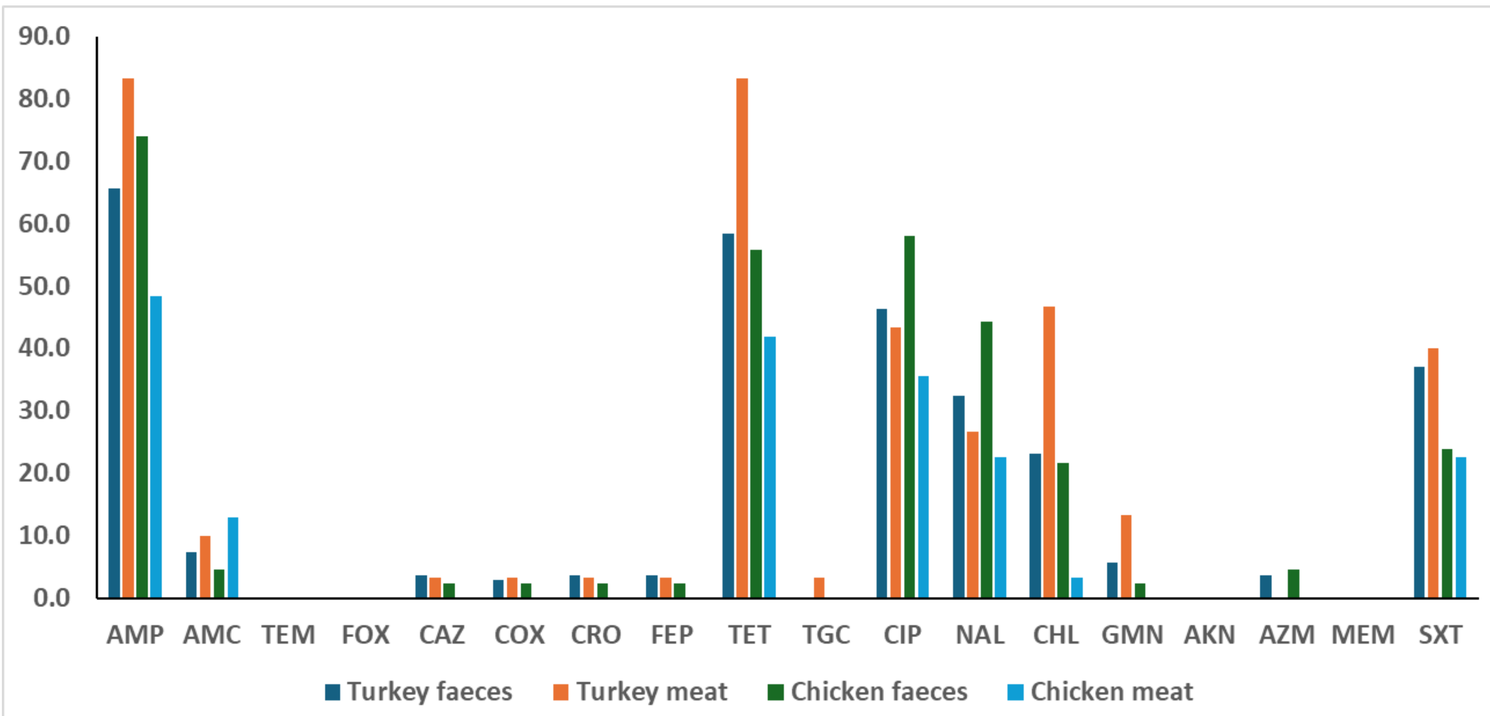


Figure 1. Antimicrobial resistance profiles of *E. coli* isolates from turkey and chicken samples.

CONCLUSIONS

This study highlights the role of poultry slaughtered for human consumption and poultry meat as potential sources of human contamination with pathogenic and/or MDR isolates, and the importance of a One Health approach to ensure food safety and to promote public health.

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