ULST Timisoara

**Multidisciplinary Conference on Sustainable Development**

*21-22 May 2026*

2026 MULTIDISCIPLINARY CONFERENCE ON SUSTAINABLE DEVELOPMENT

# Prevalence and Persistence of Antibiotic Resistance Genes in Commercially Available Poultry Products: A One Health Approach


Oana Maria BOLDURA, Daiana-Ionela COCOŞ, Simona MARC, Jelena SAVICI, Mihaela Doina PETCU

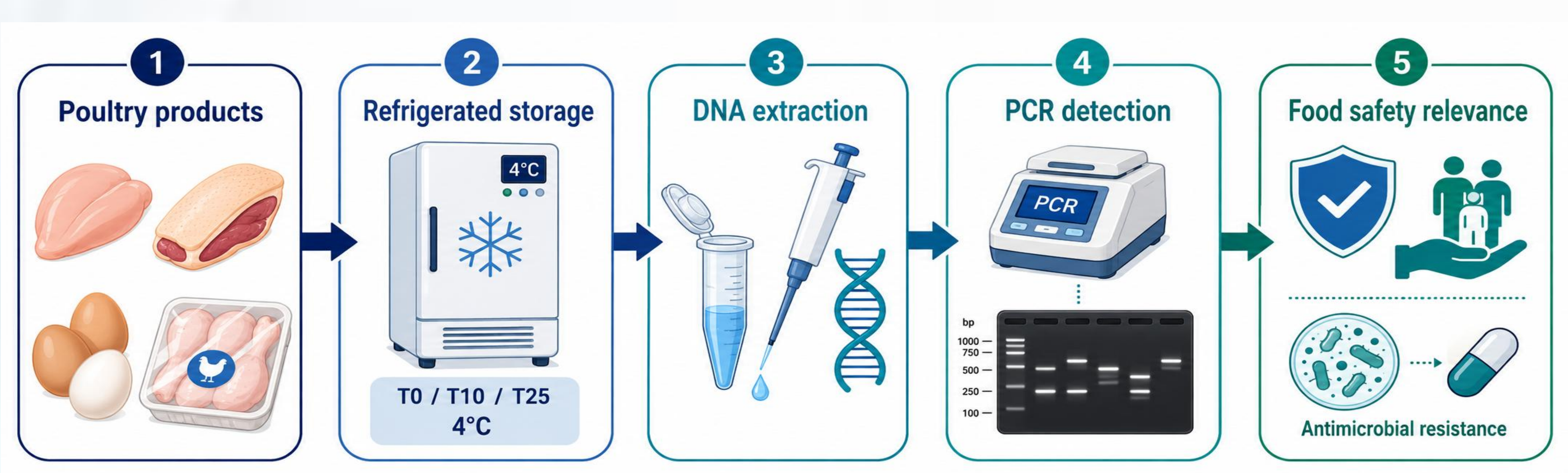
*University of Life Sciences "King Mihai I" Timisoara, Faculty of Veterinary Medicine,*



**Abstract**: *Poultry-derived products may act as carriers of bacterial contamination and antimicrobial resistance determinants. This study evaluated bacterial DNA, selected foodborne pathogens and antibiotic resistance genes in commercially available poultry products during refrigerated storage. Six product categories, including meat and egg matrices, were analysed at three time points: immediately after purchase, after 10 days, and after 25 days of refrigeration, yielding 18 analytical samples. PCR assays targeted universal bacterial 16S rRNA, pathogenic Escherichia coli, Salmonella spp., Staphylococcus aureus and the resistance genes mecA, blaZ and aac(6')-IV. Bacterial DNA was detected in all samples. S. aureus was present in all analysed products, pathogenic E. coli was detected only in refrigerated chicken meat at later storage points, and Salmonella spp. was not detected. Resistance genes were frequently identified, suggesting that poultry products may carry antimicrobial resistance determinants even after refrigerated storage.*


## • Introduction

Poultry meat and eggs are widely consumed animal-derived foods, but they may become contaminated during production, processing, handling or storage. Bacteria associated with poultry products can also harbour antimicrobial resistance genes, further underscoring food products as potential vehicles for resistance determinants. In this context, molecular screening can provide useful information on the presence of bacterial DNA, selected foodborne pathogens and resistance markers in products intended for consumption. This study focused on *Escherichia coli*, *Salmonella* spp., *Staphylococcus aureus* and three resistance genes: *mecA*, *blaZ* and *aac(6')-IV*.




## • Material and method

The biological material consisted of six categories of commercially available poultry-derived products: duck meat, free-range eggs, farm-raised eggs, commercial chicken meat, refrigerated chicken meat and duck eggs. Each category was analysed at three storage time points: T0, immediately after purchase; T10, after 10 days of refrigeration; and T25, after 25 days of refrigeration. This generated 18 analytical samples.Genomic DNA was extracted from 200 mg of biological material using a magnetic DNA purification system. DNA concentration and purity were assessed spectrophotometrically. PCR assays were performed for universal bacterial 16S rRNA, pathogenic *E. coli, Salmonella* spp., *S. aureus* and the antibiotic resistance genes *mecA*, *blaZ* and *aac(6')-IV*. PCR products were visualised by agarose gel electrophoresis.

***Biological material and experimental design***

| Product category | Matrix | Time points | Sample codes |
|---|---|---|---|
| Duck meat | Meat | T0, T10, T25 | 1, 7, 13 |
| Free-range egg | Egg | T0, T10, T25 | 2, 8, 14 |
| Farm-raised egg | Egg | T0, T10, T25 | 3, 9, 15 |
| Commercial chicken meat | Meat | T0, T10, T25 | 4, 10, 16 |
| Refrigerated chicken meat | Meat | T0, T10, T25 | 5, 11, 17 |
| Duck egg | Egg | T0, T10, T25 | 6, 12, 18 |

## • Results and discussions

Universal bacterial 16S rRNA amplification was positive in all 18 samples, confirming the presence of bacterial DNA in all analysed poultry products. This result also confirmed that the extracted DNA was suitable for further pathogen-specific and resistance gene screening. Pathogen-specific PCR showed different contamination patterns. *S. aureus* was detected in all samples, regardless of product type or storage duration. Pathogenic *E. coli* was detected only in refrigerated chicken meat after 10 and 25 days of storage. *Salmonella* spp. was not detected in any of the analysed samples. Antibiotic resistance genes were frequently detected. The *mecA* gene was identified in 14/18 samples, *blaZ* in 15/18 samples and *aac(6')-IV* in 10/18 samples. The co-detection of several resistance genes, especially in refrigerated chicken meat and duck meat, suggests that some poultry products may carry multiple antimicrobial resistance determinants during storage.

| Target | Positive samples | Main finding |
|---|---|---|
| 16S rRNA | 18/18 | Bacterial DNA detected in all samples |
| Pathogenic E. coli | 2/18 | Detected only in refrigerated chicken meat at T10 and T25 |
| Salmonella spp. | 0/18 | Not detected |
| Staphylococcus aureus | 18/18 | Detected in all samples |
| mecA | 14/18 | Frequent β-lactam resistance marker |
| blaZ | 15/18 | Most frequently detected resistance gene |
| aac(6')-IV | 10/18 | Mainly detected in meat samples and farm eggs |

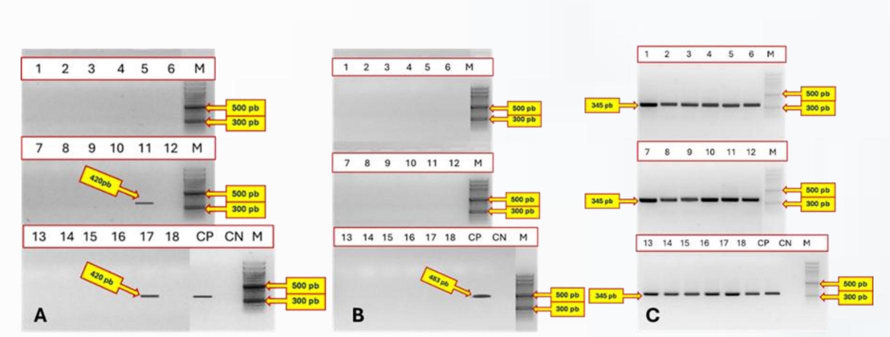


**Figure 1. Pathogen-specific PCR detection in poultry-derived samples.** Expected amplicons: *E. coli* 420 bp, *Salmonella* spp. 483 bp and *S. aureus* 345 bp. Lanes 1–18 correspond to the analysed samples; M: molecular marker; PC: positive control; NC: negative control.

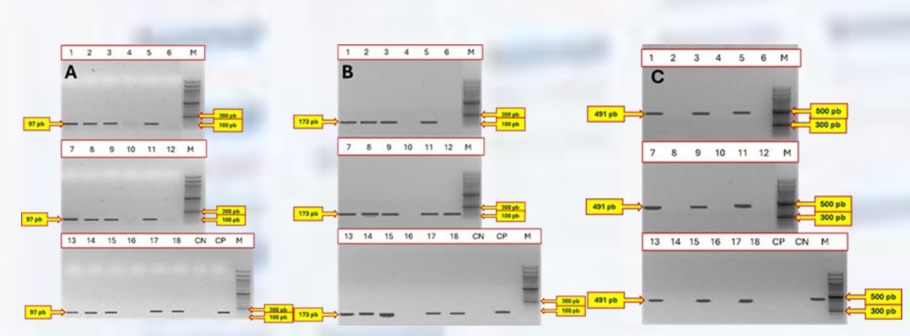


Figure 2. PCR detection of antibiotic resistance genes in poultry-derived samples. Expected amplicons: mecA 497 bp, blaZ 108 bp and aac(6')-IV 491 bp. Lanes 1–18 correspond to the analysed samples; M: molecular marker; PC: positive control; NC: negative control.

## • Conclusions

All analysed poultry-derived samples contained bacterial DNA, as confirmed by universal 16S rRNA amplification. Staphylococcus aureus was detected in all samples, while pathogenic E. coli was detected only in refrigerated chicken meat after prolonged storage. Salmonella spp. was not detected.The resistance genes mecA, blaZ and aac(6')-IV were frequently identified, indicating that poultry products may carry antimicrobial resistance determinants even after refrigerated storage. PCR-based detection does not confirm bacterial viability, but it highlights the relevance of molecular screening for food safety monitoring. These findings support improved hygiene practices, correct cold-chain management and continued surveillance of antimicrobial resistance markers in foods of animal origin.