



## Research Paper

### Prevalence of Methicillin Resistant *Staphylococcus aureus* in Poultry Meat

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## Extended Abstract

**Introduction** The emergence of antibiotic-resistant bacteria in food products has become a critical global public health concern, with methicillin-resistant *Staphylococcus aureus* (MRSA) being one of the most notorious pathogens. MRSA is responsible for a wide range of infections in both humans and animals and is known for its ability to resist many commonly used antibiotics. Poultry meat, due to its high consumption and susceptibility to contamination during slaughtering and handling processes, has been identified as a significant reservoir for MRSA strains. The widespread use of antibiotics in animal husbandry, both for therapeutic and growth-promoting purposes, contributes to the development and dissemination of resistant bacteria. Consequently, contaminated meat can serve as a vehicle for the transmission of resistant strains to humans, posing serious therapeutic challenges and increasing the burden on healthcare systems. This study was conducted to investigate the prevalence of MRSA in poultry meat (chicken, turkey, and duck), determine the antibiotic resistance patterns of isolated strains, and confirm the presence of the *mecA* gene responsible for methicillin resistance using molecular techniques.

**Methods** This descriptive cross-sectional study was performed on a total of 150 raw poultry meat samples (50 samples each from chicken, turkey, and duck) collected randomly from traditional markets in the Yazd region of Iran. All samples were transported under sterile and cold-chain conditions to the Food Hygiene Laboratory at Islamic Azad University, Shahrekord branch. Isolation and identification of *S. aureus* were carried out based on national standards using cultural, morphological, and biochemical tests, including catalase, oxidase, urease, phosphatase, coagulase, DNase, and mannitol fermentation. Antibiotic susceptibility of the isolates was determined using the disk diffusion method, according to the guidelines set by the Clinical and Laboratory Standards Institute (CLSI). The antibiotics tested included oxacillin, gentamicin, ciprofloxacin, furazolidone, tetracycline, azithromycin, erythromycin, clindamycin, and vancomycin. The *mecA* gene was detected through polymerase chain reaction (PCR), using DNA extracted from the bacterial colonies.

**Results and Discussion** Out of the 150 poultry meat samples, 24 (16%) were contaminated with *S. aureus*. Among these, 13 (8.66%) were identified as MRSA strains based on phenotypic resistance to oxacillin and the presence of the *mecA* gene. Chicken meat showed the highest contamination rate with *S. aureus* (20%), followed by turkey (16%) and duck (12%). Similarly, chicken meat had the highest MRSA occurrence (14%), while turkey and duck each had 6% MRSA contamination. Antibigram results indicated variable resistance patterns among the MRSA isolates. In chicken meat, the highest resistance was observed against oxacillin (84.53%), erythromycin (76.30%), and tetracycline (69.23%), while the lowest resistance was found for vancomycin (15.38%) and furazolidone. In turkey meat, MRSA strains showed the highest resistance to erythromycin (38.46%) and tetracycline (46.15%), and the least resistance to furazolidone and vancomycin (7.69%). Duck-derived isolates displayed high resistance to tetracycline (30.78%) and erythromycin (23.07%), with no observed resistance to gentamicin and vancomycin. All MRSA isolates tested positive for the *mecA* gene via PCR, with gel electrophoresis confirming the expected ~500 bp product size. Statistical analysis using SPSS software (Chi-square and Fisher's exact tests) revealed a significant difference in the contamination rates among different poultry types ( $p < 0.05$ ). Notably, traditional and poorly regulated methods of meat handling and retail may have contributed to the higher contamination rates, especially in chicken. The findings of this study highlight the presence of MRSA in raw poultry meat, posing a potential risk for the transmission of antibiotic-resistant bacteria to humans. This is particularly concerning considering the ability of MRSA to produce heat-stable enterotoxins, which can cause foodborne illness even after cooking if improper food handling occurs. Comparison with national and international studies reveals a similar trend of MRSA prevalence in poultry meat, with contamination rates varying widely depending on geographic region, animal species, and hygienic practices during processing. Reports from Iran and other countries have documented high rates of resistance to erythromycin and beta-lactam antibiotics in MRSA isolates, supporting the findings of this study. The widespread use of antibiotics such as erythromycin and Spiramycin as growth promoters in animal feed may be contributing to the development of resistance. Previous studies in Iran also indicate persistent contamination and the transmission potential of MRSA from farm to consumer, emphasizing the need for surveillance and regulation. Molecular detection methods such as PCR offer higher sensitivity and specificity for identifying resistance genes like *mecA* compared to traditional methods, making them essential tools for food safety monitoring. The observed high prevalence of MRSA, along with its multidrug resistance profile, underscores the need for improved biosecurity, and stricter antibiotic usage policies on food hygiene practices.

**Conclusion** This study demonstrates that a notable proportion of poultry meat sold in local Iranian markets is contaminated with *S. aureus*, including MRSA strains carrying the *mecA* gene. Chicken meat showed the highest contamination levels, and MRSA strains exhibited significant resistance to commonly used antibiotics, particularly oxacillin and erythromycin. The presence of MRSA in the food chain highlights the urgent need for routine screening programs, responsible antibiotic stewardship in veterinary practices, and enforcement of hygienic handling regulations in poultry production and distribution. PCR-based detection of resistance genes should be incorporated into standard food safety protocols to facilitate early detection and intervention.

**Keywords:** *Staphylococcus aureus*, methicillin, antibiotic, poultry meat

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