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Microbiological and molecular investigations of bacterial contaminants of fresh red meat in Al Muthanna Governorate

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Abstract

Red meat is one of the essential foods and sources of protein, fats, and salts for humans worldwide. Meat is a suitable medium for bacterial growth that cause significant economic loss due to rapid spoilage, deadly toxins production, and food poisoning. This study intends to evaluate the microbial contamination in fresh red meat in butcher shops and abattoirs in Samawah city/ Al Muthanna governorate/Iraq and assess their resistance to antimicrobial agents, and determine the presence of tetA resistance genes. Moreover, to determine their resistance or sensitivity to antimicrobial agents and to investigate oxytetracycline resistance gene tet (A) in vitro antibiotic resistance *E. Coli*. Sixteen and five meat samples were collected randomly from butcher shops and abattoir. Samples were cultured on selective media. The isolated bacteria were identified by routine biochemical tests and rapid API tools. At the same time, the disk diffusion method (Kirby-Bauer) was used to determine antimicrobial sensitivity. Additionally, antibiotic-resistant *E.coli* were tested by multiplex PCR to determine the prevalence of tetracycline resistance genes tet (A). Twenty-one microorganisms were isolated from meat samples, and the isolation rate was 100%. The percentages of isolated bacteria were 57.14%, 14.285%, 4.76% , 4.76% , 4.76% , 4.76%, 4.76% and 4.76% for *E. coli*, *Salmonella typhimurium*, *Salmonella typhi*, *Salmonella enteritidis*, other *Salmonella spp*., *Citrobacter freundii*, *Shigella flexneri, and Porteous Vulgaris, respectively*. Multiple drug resistance was observed for the tested antibiotic Tetracycline (TE - 10 µg), Amoxicillin/ Clavulanic (AMC-30 µg), Levofloxacin (LEV-5 µg), Gentamicin (CN-10 µg), ceftazidime (CAZ- 30 µg), and Sulfamethhazol /Trimethoprim (SXT-25 µg). Multiplex PCR revealed the prevalence of tetracycline resistance genes tet (A) in the isolated *E. Coli* (12/12, 100 %). In conclusion, this study approved the presence of various bacterial contaminants in fresh meat sold in butcher shops and the abattoir in Al Muthanna governorate/ Iraq. *Escherichia coli* was isolated at a high percentage, followed by *Salmonella typhimurium*. Most of these isolates revealed multiple drug resistance, and 100 % of isolated *E. Coli* carried tetA resistance genes. Health precautions must be taken during the slaughtering of animals, meat transportation, and displaying meat in butcher shops.

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