

Investigation of Class 1 Integrons in Bacterial Isolates from Conventional and Antibiotic-Free Chicken Production Systems

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Considering the growing global threat posed by the emergence of antimicrobial-resistant pathogens and the serious implications for food safety and public health, this research aimed to investigate the presence of class 1 integrons. These genetic elements, known for harboring antibiotic resistance genes, play a crucial role as markers in identifying and understanding the spread of antimicrobial resistance. The research collected samples from slaughterhouses under federal inspection, comparing two poultry production systems: one conventional and the other certified as antibiotic-free. Samples were collected at various stages of the production process, including bird housing, slaughterhouse environment, and final products. Several collection methods were used, including cloacal swabs, surface swabs, and carcass rinses. The samples were transferred to APT broth and incubated at 36 °C for 18 to 20 hours, followed by inoculation onto MacConkey Agar. Lactose-fermenting (Lac +) and non-lactose-fermenting (Lac -) colonies were selected from each plate and stored in TSB with glycerol at -20°C, for a total of 154 isolates. The extraction of isolates was performed using a boiling method, based on previous studies. PCR reactions were prepared in a final volume of 25 µL, containing DNA, GoTaq® enzyme, nuclease-free water, and specific primers. Amplification was performed by thermocycling, and the product was visualized on 1.5% agarose gel with UV transillumination. The overall positivity rate was 55.19% (85/154). All positive samples were from conventional poultry chain, being 61.15% (85/139), while the antibiotic-free chain samples showed 0% (0/15) positivity (fisher test $p < 0.0001$). These preliminary results demonstrate that the presence of the Integron 1 gene in a portion of the isolates, both lactose-fermenting and non-fermenting, suggests that antimicrobial resistance may be spread among different types of bacteria. The preliminary results obtained highlight a concerning dissemination of antimicrobial resistance, particularly in the conventional production system. These data underscore the significant impact of antimicrobial use on the selection and propagation of resistance genes, reinforcing the urgency of formulating stringent control and regulatory policies in the food industry. It is crucial to ensure that poultry products meet the highest quality standards, safeguarding public health against potential risks.

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me lessons that I will use in every aspect of my life



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