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Editors



Emerging Strategies in Antibacterial Drug Resistance Management

Mechanisms, Challenges,
and Novel Interventions

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Chapter 17

Influence of Poultry Farming on Antimicrobial Drug Resistance

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Abstract

Poultry farming goes beyond just providing food for populations; it also plays a significant role in influencing antimicrobial resistance (AMR), which poses a growing threat to the health of both humans and animals. The chapter delves into the multifaceted relationship between these two domains. It analyzes the extensive use of antibiotics in poultry production for growth promotion, disease prevention, and treatment, which creates selective pressures fostering the emergence of drug-resistant bacteria. This endangers animal welfare and raises the risk of transmitting resistance to humans via food. The disposal of poultry waste contaminates soil and water with antibiotics and resistant bacteria, worsening the spread of resistance genes. Strategies to mitigate AMR include improving biosecurity, vaccination, and management practices. The chapter underscores the necessity of collaborative efforts among stakeholders to combat AMR effectively, emphasizing interdisciplinary research to comprehend the complex factors driving its emergence and dissemination. This chapter provides an inclusive analysis of how poultry farming influences AMR, laying the groundwork for sustainable solutions to protect food security and public health.

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Keywords: poultry farming, antimicrobial drug resistance, AMR, antibiotic usage

Abbreviations

AGPs	Antimicrobial Growth Promoters
AMR	Antimicrobial resistance
EU	European Union
FAO	Food and Agriculture Organization
GHGs	Green House Gas
HGT	Horizontal Gene Transfer
VGT	Vertical Gene Transfer.

Introduction

As the global population grows, ensuring food security becomes a significant worry. Therefore, it is crucial to ensure that our food production systems can efficiently accommodate the increasing population (United Nations Department of Economic and Social Affairs, Population Division 2022). Animal-based food products such as meat play a vital role in the human diet. The request for these products is escalating and there has been a more than fourfold surge in meat consumption over the past half-century (Ritchie et al., 2017). Following pork, poultry is the second largest produced and consumed meat within the European Union (EU). Over the years, there has been a gradual growth in worldwide meat production (Ritchie et al., 2017). On a global scale, according to the FAO, poultry meat production constituted nearly 40% of the total global meat production in the year 2020. As a result, a global trend has emerged towards adopting intensive farming methods, making the transmission of infections, including zoonotic diseases. This results in the implications for animal health and productivity (Nazeer et al., 2021). As animals are increasingly concentrated within intensive farming systems and traditional antibiotics are employed to protect animal health and products, AMR emergence and diffusion have become a worldwide public health issue. This chapter concentrates on how poultry production contributes to AMR development and the primary bacterial agents impacting poultry. It also intends to examine the potential of novel antimicrobial substances as supplementary or alternative approaches to conventional antibiotics. This, in consequence, could aid in reducing and averting the transmission of AMR among animals, humans, and the ecosystem, by implementing a comprehensive one health strategy (Abreu et al., 2023a).

Antibiotics in Poultry Production

For more than five decades, antibiotics have been utilized in animal farming for therapeutic purposes, as well as for metaphylactic/prophylactic purposes, and even growth enhancers (Al Sattar et al., 2023). The widespread application of most of these substances resulted from their effectiveness and economic feasibility, without much discrimination (Joerger 2003). The incorrect and excessive application of these antimicrobial agents facilitated the development of

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