

MECHANISMS OF ANTIMICROBIAL RESISTANCE IN BACTERIAL ISOLATES FROM LIVESTOCK

Sophia Peter^a, Muhammad Zaki Zulkiffle^a, Ali Saidu^a, Nurfaizila Latif^a, Juriah Kamaludeen^{a,b}, Bura Paul Thlama^{a,c}, Muhamad Hakim Mohd Ali Hanafiah^a, and Suhaili Mustafa^{a*}

^a*Department of Animal Science and Fisheries, Faculty of Agricultural and Forestry Sciences, Universiti Putra Malaysia Bintulu Sarawak Campus, Nyabau Road, 97008 Bintulu, Sarawak, Malaysia*

^b*Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia*

^c*Veterinary Teaching Hospital, Faculty of Veterinary Medicine, University of Maiduguri, 600230 Bama Road Maiduguri, Borno Nigeria*

*Corresponding author: suhailimustafa@upm.edu.my

ABSTRACT

Antimicrobial resistance (AMR) in bacteria isolated from livestock poses a significant threat to public health. This study aims to elucidate the mechanisms driving AMR in bacterial isolates from livestock, with implications for both animal and human health. A comprehensive literature review was conducted to identify key studies investigating AMR in livestock-associated bacteria. Molecular techniques, including whole-genome sequencing and plasmid analysis, were employed to characterize resistance genes and their mobility among bacterial populations. Selective pressure from antimicrobial usage in agricultural settings was identified as a primary driver of AMR in livestock-associated bacteria. Horizontal gene transfer, facilitated by mobile genetic elements such as plasmids and integrons, plays a crucial role in disseminating resistance genes among bacterial populations. This study underscores the interconnectedness of agricultural and clinical settings in the emergence and dissemination of AMR. Effective antimicrobial stewardship practices, alternative disease prevention strategies, and enhanced surveillance programs are essential for mitigating the spread of AMR in livestock populations and safeguarding public health.

Keywords: Antimicrobial resistance, Livestock, Bacterial isolates, Mechanisms, Public health