Isolation and Characterization of Multidrug Resistant Bacteria from Pig Farms in Ibadan: One Health Approach

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Certification

This is to certify that **Abeeb Adeyemi Samson** with matriculation number LCU/PG/004033, carried out this research work titled "**Isolation and Characterization of Multidrug Resistant Bacteria from Pig Farms in Ibadan: One Health Approach**." in the Department of Biological Science, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo state, for the award of Master of science Degree (MSc.) in Medical Microbiology and that this has not been previously submitted**.**

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Dedication

This research is dedicated to the Almighty God for making its completion possible**.**

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Abstract

Antibiotic resistance occurs when bacteria evolve mechanisms to withstand the antibiotics that could treat infections caused by these bacteria. The unregulated use of antibiotics contributes to the development and dissemination of MDR bacteria. Pig farms are critical in the food production chain, yet they are also potential reservoirs for multidrug resistant (MDR) bacteria. The aim of this study was to isolate and characterize multidrug resistant (MDR) bacteria isolated from samples collected on pig farms in Ibadan, utilizing the One Health approach to understand the prevalence, resistance profiles, and potential transmission pathways of these bacteria. Samples of fecal, soil, water and hand swab of the workers were collected from three pig farms in Ibadan. The analysis of the 38 samples revealed a total of 42 isolates with relatively high prevalence of both *S. aureus* (66%) and *E. coli* (50%) across various sources. The prevalence trends across sample types revealed fecal samples as the dominant source of both bacteria, particularly from farms in Ibadan North West and Egbeda local Government areas in Oyo State. The antimicrobial susceptibility testing in our study revealed high levels of resistance among both *S. aureus* and *E. coli* isolates. Notably, several isolates exhibited multidrug resistance (MDR), with Multiple Antibiotic Resistance (MAR) index values ranging from 0.3 to 0.9. MAR indices above 0.2 typically indicate high-risk sources of contamination where antibiotics are frequently used. There was also the presence of resistance genes such as *bla*, *mecA*, and *qac* from the isolates which were sampled. The findings of this study show the rise of antibiotic-resistant bacteria in both animal and environmental samples. The observed resistance patterns, particularly in Gram-negative and Gram-positive bacteria such as *Escherichia coli* and *Staphylococcus aureus*, have implications for public health, animal welfare, and environmental sustainability.

Keywords: Pig farms, Multi drug resistant bacteria, antimicrobial resistance, Multiple Antibiotic Resistance (MAR) index

Word Count: 290

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List of Acronyms

Abbreviation	Meaning
MDR	Multi Drug Resistance
AMR	Antimicrobial Resistance
WHO	World Health Organization
MRSA	Methicilin Resistant *Staphylococcus aureus*
VRE	Vancomycin-Resistant Enterococci
ESBLs	Extended-spectrum Beta-lactamases
CDC	Centre for Disease Control and Prevention
FAO	Food and Agriculture Organization,
OIE	World Organization for Animal Health
EMB	Eosin Methylene Blue
MSA	Salmonella Shigella Agar
BLAST	Basic Local Alignment Sequence Tool
NCBI	National Center for Biotechnology Information
UTIs	Urinary Tract Infections
PCR	Polymerase Chain Reaction
VFD	Veterinarian Feed Directive
FDA	U.S. Food and Drug Administration