World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:12, No:02, 2018

Emergence of Fluoroquinolone Resistance in Pigs, Nigeria

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Abstract : A comparison of resistance to quinolones was carried out on isolates of Shiga toxin-producing Escherichia coliO157:H7 from cattle and mecA and nuc genes harbouring Staphylococcus aureus from pigs. The isolates were separately tested in the first and current decades of the 21st century. The objective was to demonstrate the dissemination of resistance to this frontline class of antibiotic by bacteria from food animals and bring to the limelight the spread of antibiotic resistance in Nigeria. A total of 10 isolates of the E. coli O157:H7 and 9 of mecA and nuc genes harbouring S. aureus were obtained following isolation, biochemical testing, and serological identification using the Remel Wellcolex E. coli O157:H7 test. Shiga toxin-production screening in the E. coli O157:H7 using the verotoxin E. coli reverse passive latex agglutination (VTEC-RPLA) test; and molecular identification of the mecA and nuc genes in S. aureus. Detection of the mecA and nuc genes were carried out using the protocol by the Danish Technical University (DTU) using the following primers mecA-1:5'-GGGATCATAGCGTCATTATTC-3', mecA-2: 5'-AACGATTGTGACACGATAGCC-3', nuc-1: 5'-TCAGCAAATGCATCACAAACAG-3', nuc-2: 5'-CGTAAATGCACTTGCTTCAGG-3' for the mecA and nuc genes, respectively. The nuc genes confirm the S. aureus isolates and the mecA genes as being methicillin-resistant and so pathogenic to man. The fluoroquinolones used in the antibiotic resistance testing were norfloxacin (10 µg) and ciprofloxacin (5 µg) in the E. coli O157:H7 isolates and ciprofloxacin (5 µg) in the S. aureus isolates. Susceptibility was tested using the disk diffusion method on Muller-Hinton agar. Fluoroquinolone resistance was not detected from isolates of E. coli O157:H7 from cattle. However, 44% (4/9) of the S. aureus were resistant to ciprofloxacin. Resistance of up to 44% in isolates of mecA and nuc genes harbouring S. aureus is a compelling evidence for the rapid spread of antibiotic resistance from bacteria in food animals from Nigeria. Ciprofloxacin is the drug of choice for the treatment of Typhoid fever, therefore widespread resistance to it in pathogenic bacteria is of great public health significance. The study concludes that antibiotic resistance in bacteria from food animals is on the increase in Nigeria. The National Food and Drug Administration and Control (NAFDAC) agency in Nigeria should implement the World Health Organization (WHO) global action plan on antimicrobial resistance. A good starting point can be coordinating the WHO, Office of International Epizootics (OIE), Food and Agricultural Organization (FAO) tripartite draft antimicrobial resistance monitoring and evaluation (M&E) framework in Nigeria.

Keywords : Fluoroquinolone, Nigeria, resistance, Staphylococcus aureus
Conference Title : ICAAS 2018 : International Conference on Agriculture and Animal Science
Conference Location : London, United Kingdom
Conference Dates : February 15-16, 2018