Establishing Streptomycin Epidemiological Cut-Off Values for Salmonella and Escherichia coli

This study was conducted to elucidate the accuracy of the current streptomycin epidemiological cut-off value (ECOFF) for Escherichia coli and Salmonella spp. A total of 236 Salmonella enterica and 208 E. coli isolates exhibiting MICs between 4 and 32 mg/L were selected from 12 countries. Isolates were investigated by polymerase chain reaction for aadA, strA, and strB streptomycin resistance genes. Out of 236 Salmonella isolates, 32 (13.5%) yielded amplicons for aadA (n = 23), strA (n = 9), and strB (n = 11). None of the 60 Salmonella isolates exhibiting MIC 4 mg/L harbored resistance genes. Out of the Salmonella isolates exhibiting MICs 8 mg/L, 16 mg/L, and 32 mg/L, 1.6%, 15%, and 39%, respectively, tested positive for one or more genes. For most monitoring programs, the streptomycin ECOFF for Salmonella is wild type (WT) ≤32 or ≤16 mg/L. A cut-off value of WT ≤32 mg/L would have misclassified 13.5% of the strains as belonging to the WT population, since this proportion of strains harbored resistance genes and exhibited MICs ≤32 mg/L. Out of 208 E. coli strains, 80 (38.5%) tested positive for aadA (n = 69), strA (n = 18), and strB (n = 31). Of the E. coli isolates exhibiting MICs of 4 mg/L, 8 mg/L, 16 mg/L, and 32 mg/L, 3.6%, 17.6%, 53%, and 82.3%, respectively, harbored any of the three genes. Based on the European Committee on Antimicrobial Susceptibility Testing guidelines (ECOFF ≤16 mg/L), 25% of the E. coli strains presenting MIC ≤16 mg/L would have been incorrectly categorized as belonging to the WT population. The authors recommend an ECOFF value of WT ≤16 mg/L for Salmonella and WT ≤8 mg/L for E. coli.

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