

Prevalence and classification of high antimicrobial resistant *Staphylococcus aureus* in wastewater eluted from poultry slaughterhouse

ABSTRACT

The continued and increasing development of antimicrobial resistant bacteria among the foodborne pathogens had caused worldwide to be alarmed. Being the earliest to develop antimicrobial resistance, *Staphylococcus aureus* is constantly monitored for any new resistance development. The resistance development is often linked to wastewater and the treatment plants where the pressure of antibiotic is the highest. Hence, this study investigated on the prevalence of high antimicrobial resistant *S. aureus* in the wastewater eluted from a poultry slaughterhouse. A total of thirty wastewater samples were collected from a poultry slaughterhouse in Semenyih, Selangor. Most probable number (MPN)-plating method was employed to enumerate the *S. aureus* count in the wastewater. The results indicated that *S. aureus* was highly present whereby all samples (100%) were positive and the concentration ranged between 11 – 2.1 x 10⁴ MPN/ml. Isolated *S. aureus* strains were screened for their antimicrobial susceptibility using the Kirby-Bauer Disk Diffusion Test method to classify their antimicrobial resistance eleven antibiotics. The MAR index measured was between 0.18 and 0.91, inferring that the strains are highly antimicrobial resistance. All *S. aureus* strains were 100% resistant to ampicillin (25 µg) and cefazolin (30 µg). 94.1% of the strains were resistant to penicillin (10 µg) which phenotypically indicated these strains are Methicillin-resistant *S. aureus* (MRSA). Notably, 17.6% of the strains developed resistance to vancomycin and was categorized as Vancomycin-resistant *S. aureus* (VRSA). There is a need to take drastic preventive measures to control the resistance development in *S. aureus* to conserve public health.

Keyword: *Staphylococcus aureus*; MRSA; Antimicrobial resistance wastewater; Poultry slaughterhouse