

Early mover advantage in Roundtable on Sustainable Palm Oil certification: A panel evidence of plantation companies

ABSTRACT

The occurrence of multi-drug resistant *Staphylococcus aureus* in food product of animal origin has increased the concern about their spread into the food supply chain. Presence of multidrug-resistant *S. aureus* in food products, including ready-to-eat foods imposes potential hazard for consumers. The objective of this research was to investigate the presence of multi-drug resistance of *S. aureus* in sixty ready-to-eat shawarma sandwiches. Agar-disc diffusion assay determined their resistance to 11 antibiotics. The sea and sed enterotoxin genes were detected by polymerase chain reaction method. Biofilm formation potential (BFP) was quantified by microtitre plate assay. The result revealed that thirty-six samples (60%) were positive for *S. aureus*. Majority of the isolates (n = 29; 80.6%) were resistant to at least one antibiotic. The isolates demonstrated highest resistance against ampicillin (69.4%) and penicillin (69.4%), while resistance to ciprofloxacin, tetracycline and kanamycin were 47.2%, 33.3% and 22.2%, respectively. Several isolates were resistant to trimethoprim (5.6%), trimethoprim-sulfamethoxazole- (2.8%), gentamicin (2.8%) and cephalothin (2.8%), while none exhibited resistance to chloramphenicol and nitrofurantoin. Out of the thirty-six isolates, twelve isolates (33.3%) were resistant to three or more classes of antibiotic (multidrug-resistant) and 50% had a Multiple Antibiotic Resistance index value more than 0.25. Of the multi-drug resistant isolates, four were positive for sea genes but no sed genes were present. All multi-drug resistance isolates were biofilm formers with five and six isolates were strong and moderate formers, respectively. Additionally, all the sea gene carrying multi-drug resistance isolates were strong biofilm formers. These findings revealed shawarma as a potential vehicle for the spread of multidrug-resistant *S. aureus*, suggesting more control measures for ready-to-eat food.

Keyword: Financial advantage; Roundtable on sustainable palm oil; Early mover; Plantation company