Genotypes and Phenotypes of *Staphylococcus aureus* from Bulk Tank Milk on Organic Dairy Farms in Vermont

**ABSTRACT**

The objective of this study was to determine the association between *Staphylococcus aureus* multilocus sequence types and *in vitro* biofilm formation ability or antibiotic susceptibility phenotypes and genotypes. 90 *S. aureus* isolates were obtained from bulk tank milk of 43 organic dairy farms in Vermont. MLST had a typeability of 100%, a total of 20 strain types, 10 of which were novel. The novel strains included ST963 (n=1), ST3020 (n=1), ST3021 (n=2), ST3022 (n=1), ST3023 (n=1), ST3024 (n=1), ST3025 (n=1), ST3026 (n=1), ST3027 (n=1), and ST3028 (n=13). Apart from ST3023, the other novel strains were single locus variants of known bovine associated STs in clonal complexes (CC) CC97, CC151 or CC705. The novel and known strain types were distributed in 8 clonal complexes, CC1, CC8, CC30, CC45, CC59, CC97, CC151 and CC705. However, the 90 isolates were dominated by strain types in CC8 (n=7), CC97 (n=55), CC151 (n=19), which are known to cause bovine mastitis. The 10 novel STs show the diverse nature of the population structure of *S. aureus* on these organic dairy farms. Biofilm formation was positively associated with CC97. 100% of the isolates in CC8 and 5.45 % of isolates in CC97 were resistant to ampicillin and penicillin, while 100% of isolates in CC151 and CC705 were susceptible to all beta-lactam antibiotics. Positive associations between CC and biofilm formation ability or antimicrobial susceptibility provide for support for future research on genetic factors underlying host-adaptation and virulence.