Evaluation of phenotypic and genotypic methods for epidemiological typing of
Staphylococcus aureus isolates from bovine mastitis in Denmark

The value of five different typing methods (antibiogram typing, biotyping, phage typing, plasmid profiling and restriction fragment length polymorphism of the gene encoding 16S and 23S ribosomal RNA (ribotyping)), in discriminating 105 Staphylococcus aureus strains from bovine milk samples obtained from 105 different Danish dairy herds was investigated. A total of 85 strains (81%) proved susceptible to all of the 11 antibiotics tested, and the remaining 20 strains could be divided into 5 different antibiogram patterns. The predominant resistance pattern, penicillin resistance, was observed in 15 (75%) of the 20 antibiotic resistant strains. Biotyping assigned the strains to 14 different types, with the most common type accounting for 25.7% of the strains. Ninety eight (93.3%) strains could be typed by phages, assigning them to 19 different phage types. The predominant phage type accounted for 31.4% of the strains. Eight different plasmid profiles was observed among 24 (23%) strains harbouring plasmids. Ribotyping yielded 30 different types, with the most common accounting for 29.5% of the strains. The single most discriminatory typing method was ribotyping (0.863) followed by biotyping (0.842) and phage typing (0.795). Plasmid profiling (0.395) and antibiogram typing (0.327) had low discriminatory indices. Correspondence among ribotypes and the presence or absence of plasmids were observed, as was some degree of correspondence between ribotype, phage type and biotype. In general the correspondence between phage type and ribotype were stronger than between biotype and ribotype and between biotype and phage type. All combinations of two or more methods led to an improved index of discrimination compared to the individual methods indicating, that some subdivision of types had taken place. The combination of phage, bio- or ribotyping or all three methods in combination are considered to be an efficient combination of typing methods for epidemiological investigation of S. aureus mastitis.

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