Coagulase negative staphylococci distribution in dairy herds with automatic milking system and their crosstalk with Staphylococcus aureus from IMI and teat apex

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**BACKGROUND**

- Longer milking duration and frequent exposure to teat disinfectants may affect the teat apex microbiota.
- Knowledge of epidemiological characteristics of CNS in automatic milking systems (AMS) herds is sparse.
- The role of CNS on the risk to acquire of IMI with *S. aureus* is debated.

**OBJECTIVES**

1. To investigate the distribution of CNS species from aseptically collected quarter milk samples and teat skin in AMS herds.
2. To examine if the isolated CNS influence the expression of *S. aureus* virulence factors controlled by the *agr* quorum sensing system.

**METHODOLOGY**

- **Herd selection:** 8 herds: AMS with ≥3 milking robots and bulk tank PCR Ct-values ≤32 for *S. agalactiae*.
- **Cows selection:** 30-40 cows/herd: SCC: ≥ 200,000 cells/mL, and no antibiotic < 4 weeks prior to sampling.
- **Quarter selection:** RH & LF quarters of cows with odd lab number (1,3,5,..)
- Teat skin swabs (modified wet-dry method) and aseptic milk samples collected for bacterial culture using calf blood agar and SA SELECT™ assay for species identification.
- Interaction between *S. aureus* and CNS investigated with Qualitative Beta-Galactosidase Reporter Plate Assay based on 3 reporter strains of *S. aureus*; *hla* (a-hemolysin), RNAIII (key effector molecule of agr) and *spa* (Protein A).

**RESULTS**

- 80% (228/284) quarters (142 cows) had ≥ 1 CNS species.
- 373 isolates, milk (n=105) and teat skin (n=268).
- 16 CNS species: teat skin (n=15), milk (n=10)
- Coinfections (mixed): 11 quarters from milk samples and 66 quarters from teat samples.
- Downregulation of *S. aureus* by some CNS may be explained by its ability to inhibit *S. aureus* agr system through production of auto-inducing peptide (AIP) molecules.
- Table 1 shows CNS species distribution and Figure 1 shows crosstalk between *S. aureus* and CNS.

**CONCLUSIONS**

- *S. epidermidis* and *S. chromogenes* are milk-associated, while *S. equorum* and *S. cohnii* are teat-associated.
- CNS species, habitat type, and herd factors affect CNS and *S. aureus* crosstalk patterns.
- Downregulation of *S. aureus* by some CNS species could explain possible protective effect.

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