Association of vaccination with a biofilm-embedded bacteria-based vaccine against staphylococcal mastitis in sheep with lower somatic cell counts in bulk milk and lower frequency of biofilm-forming staphylococci in milking-machine clusters

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Objectives of the work were to investigate bacterial counts, somatic cell counts and presence of biofilm-forming staphylococci in milk in sheep farms, where vaccination against mastitis was performed using a vaccine with staphylococcal antigen based on a bacterin of S. aureus strain, expressing the exopolysaccharide poly-N-acetylglucosamine (Vimco®). Bulk milk samples were collected from 120 sheep farms (38 where vaccination was performed and 82 where it was not) in Greece, for bacteriological examination and somatic cell counting. In farms, where machine-milking was performed (n=74; 26 and 48, respectively), rubber clusters were also swabbed for culturing. All staphylococcal isolates recovered were subsequently evaluated for biofilm-formation by culturing on Congo red agar. Somatic cell counts in farms where vaccination was performed, were significantly lower than in farms where it was not: 572,000 ± 54,133 versus 740,015 ± 59,801 cells mL-1 (P = 0.02). There were no significant differences between the two clusters of farms in the total bacterial counts and in the frequency of isolation of biofilm-forming staphylococci from bulk milk. Frequency of isolation of biofilm-forming staphylococci from milking machine clusters was significantly lower in farms where vaccination was applied; such strains were recovered from 12% of total clusters sampled in 31% of vaccinated farms versus 21% of clusters sampled in 60% of non-vaccinated farms (P=0.009 and P=0.022, respectively). It is concluded that vaccination against biofilm-forming staphylococci led to reduced staphylococcal presence in milking machine clusters. This can contribute to the reduced incidence of staphylococcal mastitis in vaccinated sheep farms, as documented in previous studies, which herewith is evidenced by the lower somatic cell counts in bulk milk in the same farms.