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EFFECT OF VACCINATION AGAINST BIOFILM-PRODUCING STAPHYLOCOCCI ON MILK PRODUCTION AND INDIVIDUAL AND BULK TANK SOMATIC CELL COUNTS IN ASSAF SHEEP IN SPAIN

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INTRODUCTION

Staphylococci are the main pathogens causing subclinical mastitis in sheep. Their primary pathogenic factor is the biofilm produced inside the udder.

This study assesses the efficacy of vaccination against staphylococci biofilm (VIMCO®, HIPRA) by measuring reductions in somatic cell count (iSCC and bSCC) and gains in production.

MATERIALS AND METHODS

This study was conducted in an Assaf sheep flock with approximately 2,000 female breeding animals located in Torres del Carrizal (Zamora, Spain).

Vaccination (VIMCO®) began in March 2020: animals received a 2 ml dose twice, 5 and 2 weeks before the expected lambing date. In March 2021, all animals in production had been vaccinated at least once. Data was collected within 3 years: one year before vaccination (2019) and 1st and 2nd year of vaccination (2020 and 2021). Individual production and iSCC were collected monthly, and total production and bSCC daily.

Data was analysed in R statistical software using a linear mixed model with period of vaccination as a fixed effect and days in milk, season, and number of lactations as covariates. The outcomes of the study were log iSCC, milk yield and percentage of fat and protein. In the bSCC the covariate was the month. The percentage of sheep with SCC higher than a million was analysed through a logistic mixed model with binomial distribution and the same covariates.

RESULTS

A population of 1,097 dairy sheep ewes in lactation was included for the analysis during the year before vaccination (2019), and 947 and 895 ewes in lactation for the 1st and 2nd years of vaccination, respectively.

Regarding iSCC, the pre-vaccinated group had a geometric mean of 204,000; the 1st year of vaccination iSCC were improved to 200,000 (p=0.013), and the 2nd year they were improved to 170,000 (p<0.001).

Vaccination improved the probability of SCC higher than 1 million in the 2nd year in the entire population (OR:0.81, p<0.001) but not in the 1st year (OR: 1.015, p=0.68).

Regarding bSCC, the pre-vaccinated group had a mean of 967,050 while in the 1st year 1020,72 (+5.55%, p=0.01), but an improvement was seen in the 2nd year, rising to 823,760 (-14.81%, p<0.001). It is important to mention that, in the 1st year of vaccination, not all the lactating animals were vaccinated. It was not until the 2nd year (March 2021) when all the animals in lactation had been vaccinated at least once.

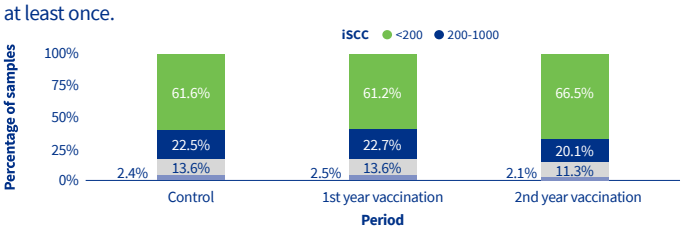

Figure 1. Percentage of animals with iSCC <200, iSCC 200-1,000, iSCC 1000 – 10,000 and iSCC > 10,000 in the previous year of vaccination and 1st and 2nd year of vaccination.

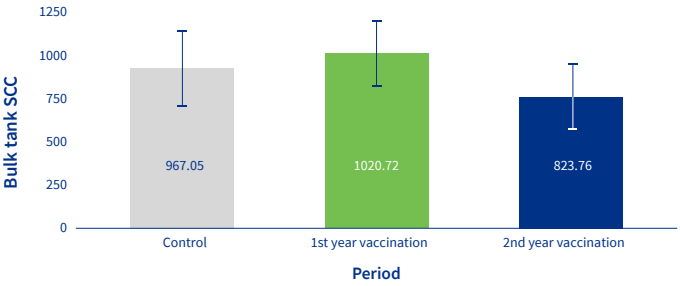

Figure 2. Bulk tank SCC in the year before vaccination and 1st and 2nd year of vaccination.

Regarding milk yield, controls had a mean of 2.52 kg, and this was improved after vaccination, reaching 2.6 kg (3.2%, p<0.001) for the 1st year and 2.71 kg (7.5%, p<0.001) for the 2nd year.

Protein plus fat in pre-vaccinated group was 11.05%; in the 1st year of vaccination this increased by 0.5% (p<0.001) and the 2nd year by 1.9% (p<0.001).

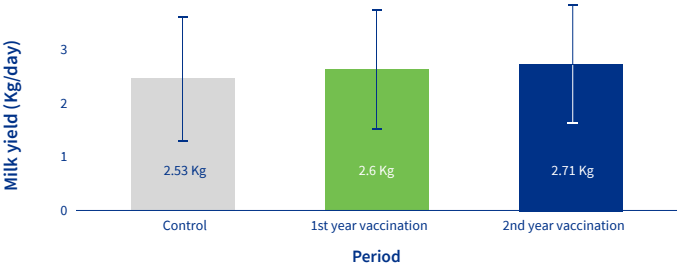

Figure 3. Milk yield (Kg/day) in the year before vaccination and 1st and 2nd year of vaccination.

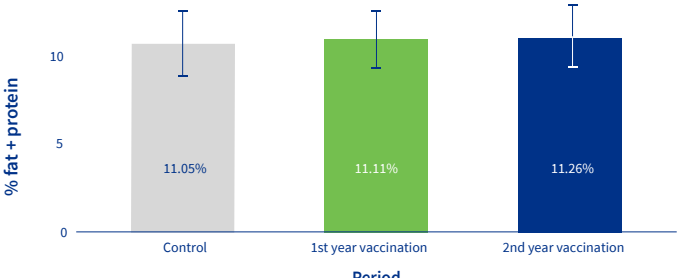

Figure 4. Percentage of fat plus protein in the year before vaccination and 1st and 2nd year of vaccination.

CONCLUSIONS

Vaccination against staphylococci biofilm contributed to decrease iSCC, bSCC and increase milk production once the hole herd has been immunized.

Vaccination is an effective tool in controlling subclinical mastitis caused by staphylococci and improve the profitability of dairy sheep farms.