

Effect of a Novel Salmonella Vaccine on Performance in a Large Expansion Dairy

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Introduction

A novel subunit vaccine, consisting of a highly purified composition of Siderophore Receptor Proteins (SRPs) and Porins derived from *Salmonella dublin* and *Salmonella typhimurium* was administered to two groups of lactating cows in a large expansion dairy under controlled conditions.

Materials and Methods

The dairy consisted of 500 cows separated into five large freestall corrals (100 cows/corral) based on days in milk (DIM) or period of lactation. Two groups of cows were chosen for the study: fresh cows (30-90 days postpartum) and high-producing heifers (cows in first lactation). Fifty percent of the cows in each group received two intramuscular vaccinations, 28 days apart. The remaining cows in each group remained as non-vaccinated controls. Based on milk production and somatic cells between control and vaccinated groups, the experimental trial examined the safety of the immunizing composition, shedding prevalence of *Salmonella* and the effect of vaccination on performance. Data was collected on performance and physiological status from individual cows.

Results

Milk production and somatic cells were dramatically affected through vaccination. There was no statistical difference in yield of milk between vaccinated and non-vaccinated cows in the first lactation group. However, in the fresh-cow group milk production statistically increased in the vaccinated cows after each vaccination compared to the non-vaccinated group. The degree of significance from the first vaccination to the second vaccination was $p=.006$, and dramatically increased from the second vaccination to the 16th week of production ($p=.000000067$). Sixteen weeks after the first vaccination, average milk production per cow in the vaccinated group was 60.3 lb (27.4 kg), up 3.9 lb (1.7 kg) or 6.5%, compared to 56.4 lb (25.6 kg) in the non-vaccinated controls.

Somatic cell counts were also positively affected through vaccination in both fresh cows and cows in first lactation. Beginning with the first vaccination through 16 weeks of production, the vaccinated group had a 30% difference in average somatic cell count with a degree of significance of $p=0.036$, compared to the non-vaccinated control group. This somatic cell count reduction was dramatically pronounced in the vaccinated fresh cows. The level of somatic cells decreased by 58.8% ($p=0.02$) in the vaccinated cows, compared to the non-vaccinated group. These and other results will be discussed in greater detail.