

## Effect of peripartal administration of mycobacterium cell wall fraction on health and fertility of Holstein cows under organic-certified management

Gilberto Solano-Suárez, Luciano S Caixeta, Alexander Masic, Diego Manríquez, Luciana Hatamoto-Zervoudakis, Sushil Paudyal, Ana Velasquez-Munoz, Juan Velez, Pablo J Pinedo

Journal of Animal Science, Volume 99, Issue 9, September 2021,

<https://doi.org/10.1093/jas/skab191>

Published: 01 September 2021

### Abstract

The main objective of this study was to evaluate the effect of peripartal administration of a commercially available nonspecific immune stimulant (mycobacterium cell wall fraction; **MCWF** [Amplimune, NovaVive Inc., Napanee, ON, Canada]) on the incidence of disease during early lactation and subsequent fertility of dairy cows. A second objective was to characterize the dynamics of circulating white blood cells (**WBC**) and metabolic markers following treatment administration. Cows in a United States Department of Agriculture (USDA) organic-certified dairy herd were blocked by parity and, based on sequential calving dates, randomly assigned to receive two injections (5 mL s.c.) of either a placebo (saline solution) as a control (**CON**;  $n = 71$ ) or MCWF ( $n = 65$ ) at enrollment (7 d before expected calving) and within 24 h after calving. Blood samples were collected from a subsample of the study population (MCWF = 16; CON = 18) for WBC count at enrollment, at day 2 post enrollment, and at days 1, 3, 7, and 14 after calving. Serum fatty acids, beta-hydroxybutyrate, and Ca concentrations were determined at days 1 and 7 postpartum (MCWF = 21; CON = 21). Main outcome variables included incidence risk of peripartal and early lactation health disorders and pregnancy at first artificial insemination (**AI**), at 100, and at 150 days in milk (**DIM**). In addition, the average daily milk yield up to 90 DIM and death and live culling before 305 DIM were compared. Treatment effects were assessed using multivariable logistic regression, time-to-event analyses, and repeated measures analysis of variance (ANOVA). A treatment effect on the incidence risk of some of the health disorders in the study was established. Incidence risk of metritis and clinical mastitis

<28 DIM was smaller in MCWF than in CON cows (36.9% vs. 50.7% and 6.3% vs. 19.7%, respectively). On the contrary, the incidence risk of respiratory disease <28 DIM was smaller in CON (0%) than in MCWF (7.7%). Reproductive performance of multiparous cows was affected by MCWF administration: pregnancy at first AI and pregnancy at 100 and 150 DIM were greater in MCWF than in CON (35.6% vs. 19.2%; 51.1% vs. 25.0%; and 64.4% vs. 40.4%, respectively). Overall, median intervals from calving to pregnancy were 90 vs. 121 d in MCWF and CON cows, respectively. No treatment effects on the dynamics of circulating WBC or in postpartum metabolic status were established. No differences for milk yield or for the proportion of cows that survived up to 305 DIM were determined, although cows in MCWF left the herd earlier than cows in CON. In conclusion, incidence risks of metritis and mastitis in early lactation were smaller in cows receiving MCWF, whereas the incidence risk of respiratory disease was smaller in CON. Fertility significantly improved in MCWF compared with CON cows. As this study was performed in an organic-certified dairy, specific health and reproductive management practices may affect the external validity of the current findings.