

Use of chitosan microparticles to prevent metritis in lactating dairy cows

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The objective was to determine the efficacy of CM in preventing metritis in dairy cows. Holstein cows (n=101) from a 4,500-cow commercial herd that had risk factors for metritis (dystocia, twins, stillbirth, retained placenta) were randomly assigned to one of two treatments 1 d (24 h) postpartum (DPP): CM (n = 51) = intrauterine (i.u.) infusion of 8 g of chitosan microparticles dissolved in 40 mL of sterile water for 5 days; Control (n = 50) = i.u. infusion of 40 mL of sterile saline solution for 5 days. Metritis prevalence was analyzed by logistic regression using the LOGISTIC procedure of SAS using a one-side test in accordance with sample size calculation for reduction in metritis prevalence using CM. Continuous outcomes were analyzed by ANOVA for repeated measures using the MIXED procedure of SAS. Models included the effects of treatment, parity, specific risk factor, body condition score at enrollment and interaction between treatment and other covariates. The effect of time and interaction between treatment and time was also included in repeated measures analyses. Treatment with CM resulted in decreased incidence of metritis at 7 DPP compared with Control (45.1 vs. 64.0%; P = 0.03); however, there were only numerical differences at 4 (11.8 vs. 18%; P = 0.23), 10 (60.1 vs. 72%; P = 0.12), and 14 (62.7 vs. 72.0%; P = 0.16). Treatment with CM resulted in decreased NEFA plasma concentrations at 10 DPP (464.2 ± 57.2 vs. 639.5 ± 57.2 $\mu\text{Eq/L}$; P = 0.04); however, there were no differences at 4 (813.8 ± 56.7 vs. 780.4 ± 56.7 $\mu\text{Eq/L}$; P = 0.67), 7 (669.9 ± 56.7 vs. 692.9 ± 56.7 $\mu\text{Eq/L}$; P = 0.77), and 14 (527.6 ± 57.7 vs. 420.7 ± 57.7 $\mu\text{Eq/L}$; P = 0.18). The uterine discharge pH was lower in Control than in CM cows (6.84 ± 0.03 vs. 6.93 ± 0.03 ; P = 0.02). BHBA (647.4 ± 30.0 vs. 589.3 ± 30.0 $\mu\text{mol/L}$; P = 0.36), temperature (39.2 ± 0.04 vs. 39.1 ± 0.04 °C; P = 0.62) and milk production (29.3 ± 1.0 vs. 28.8 ± 1.0 L/day; P = 0.69) were not different between CM and Control groups. In conclusion, CM may be a viable alternative for treatment of metritis; however, the duration of treatment may have to be extended in order to maintain differences in the incidence of metritis.