**2009F039R Advancement of an intravaginal probiotic treatment into a novel technology for prevention of uterine infections in dairy cows**

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Background: Uterine infections after calving cause lower first service per conception rates, longer calving to conception interval, lower submission and pregnancy rates, higher infertility rate, and a higher culling rate. All dairy cows have a contaminated uterus in the 2 wk after calving, in which shifts in the microbiological organisms in the vagina may lead to infection, however only 40 % continue to have infection such as metritis, endometritis or pyometra up to 3 wk post calving. Infertility is the number one reason for culling, therefore reducing uterine infection post calving is important. A previous study by Ambrose found a probiotic treatment improved fertility, enhanced milk production, as well as decreased incidence of laminitis, mastitis, displaced abomasum and culling. This treatment was explored further.

Objective:

1. Validate preliminary findings the probiotic treatments can lower the incidence/severity of uterine infections
2. Establish the optimal number of LAB treatments before and after parturition for prevention of uterine infections
3. Determine the survival of probiotic bacteria in the vagina after application of each treatment as well as during the first week after parturition

Methods: 150 cows were placed in 3 groups; 1) treatment with 10-12 cfu of lactic acid bacteria probiotic once per week on week 2 and 1 before expected calving, 2) ) treatment with 10-12 cfu of lactic acid bacteria probiotic once per week on week 2 and 1 before expected calving and week 1 after calving, 3) control group receiving no probiotic. All cows were monitored for reproductive efficiency, general health, vaginal discharge and pH, uterine cytology, estrus behaviour, and locomotion scored. Calves were also monitored for general health, blood immune markers, and rectal fecal samples for bacteria up to 4 wks of age.

Outcome: Both groups treated with the probiotic had a faster uterine involution than control cows which may be due to the increase in blood prostaglandins in treated cows compared to control cows. Group 1 cows also had a reduced number of days open than group 2 and control cows. The incidence of uterine infection was reduced in both groups treated with probiotics than control cows, which was likely due to the increase in IgA and IgG indicating a stronger immune response in treated cows compared to control cows. Treatment with probiotics also reduced systemic inflammation as indicated by the reduction in lipopolysaccharide binding protein in the blood in comparison to control cows. Group 1 had an increase in beneficial lactic acid bacteria in the vagina 3 wks after calving and a reduction in number of pathogenic bacteria up to 8 wks after calving in comparison to group 2 and control cows. Group 2 cows had a higher number of lactic acid bacteria 8 wks after calving in comparison to group 1 and control cows. There was no difference in retained placenta, mastitis, or lameness between the groups. Calf data has yet to be analyzed.

Recommendations: The probiotic treatment can be used to increase uterine health after calving and improve reproductive efficiency. The use of 2 treatments as opposed to 3 treatments can be used to reduce cost while still achieving benefits.

Benefits to the industry: The probiotic treatment may be used to improve cow health and reproductive efficiency thus reducing infertility and culling.

KTT:

* 1 PDF, 5 phD students, 1 MSc student, 1 visiting scientist, 1 lab technician, 6 undergraduate volunteers
* 10 abstracts presented in conferences
* 3 media publications
* 1 patent submitted