Effect of rumen protected vitamin B complex on metabolic parameters, milk production and d 15 endometrial outcomes

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The aim of this project was to determine the effects of a rumen-protected vitamin B complex supplementation (VIT B) compared with a control diet containing no supplementation (CON) on: milk production and components, concentrations of BHBA, haptoglobin and progesterone in plasma, ovarian dynamics and day 15 endometrial outcomes. Fifty-one multiparous Holstein cows were enrolled into the study 3 weeks prior to parturition and were randomly assigned to one of the two treatments. Biweekly blood samples, weekly milk samples and daily feed intake were collected. Cows were enrolled onto a double-ovsynch protocol at 33±3 days post-partum and inseminated by timed artificial insemination (AI). Ovarian structures were monitored and measured using *per rectum* ultra-sonography. The uterus was flushed on day 15 post AI for conceptus collection and endometrial samples were collected at the same time. Data was analyzed by ANOVA using the GLM procedure of SAS. Overall, 42 cows were flushed and 13 embryos were. Vit B had no affect on the size of the embryo (*P*=0.49), ovulatory follicle size (*P*=0.51) or CL size at embryo collection (*P*=0.51). Milk production, milk fat, BHBA and haptoglobin levels between the two groups were also identical. Analysis of expression levels of genes related to embryo development, immune system, adhesion and regulation of Vitamin B molecules in the endometrium showed that *OXTR* (*P*=0.04) *MUC5B* (*P*=0.05), *MUC1* (*P*=0.02), *IL1β* (*P*=0.05) *SPP1* (*P*=0.03), *TRD* (*P*=0.03), *FZD8* (*P*=0.05) and *FOLR1* (*P*=0.05) genes were significantly upregulated in the VIT B group. *SELL (P*=0.10), *PLAU* (*P*=0.10) and *MYH9* (*P*=0.10) genes showed a tendency to be more upregulated in the VIT B group. In conclusion, benefits of strategic dietary vitamin B supplementation during the transition and early lactation in fertility might potentially be linked to endometrial gene expression.

Implications: The results from this research will improve knowledge on the specifics of vitamin B complex and reproductive efficiency in dairy cows. Canadian dairy producers loose approximately $250 per cow per year due to metabolic disease incidence and poor reproductive performance and strategic protected Vitamin B supplementation might be an innovative tool to improve the reproductive performance of the cows.