

Effect of Fibrolytic Enzyme on Lactational Performance, Feeding Behavior, Rumen Fermentation and Nutrient Digestibility in Dairy Cows Fed Whole Plant Faba Bean Silage Based-Diet

Jenchieh Yang¹, David Christensen¹, Herbert (Bart) Lardner¹, Víctor H. Guevara-Oquendo¹, Basim Refat¹, Ousama AlZahal², and Peiqiang Yu^{1*}

¹University of Saskatchewan, Canada, ²AB Vista, United Kingdom; *Email: peiqiang.yu@usask.ca

The objectives of this study were to evaluate the effects of pre-treating whole plant faba bean silage based-diet with exogenous fibrolytic enzyme derived from *Trichoderma reesei* (FE, mixture of xylanase and cellulase) on lactational performance, digestibility, rumen fermentation characteristics and feeding behavior in lactational dairy cows. The animal trial was conducted using eight Holstein dairy cows with four enzyme treatments (0, 0.5, 0.75 and 1 ml of FE /kg dry matter of silage) in a double Latin square design. The enzyme treatments used in this trial were selected from previous *in situ* and *in vitro* studies which showed positive responses on whole plant faba bean silage. Orthogonal polynomial statistical analyses were performed using PROC MIXED of SAS 9.4 with significance declared at $P < 0.05$. The application of FE linearly ($P < 0.05$) affected NDF digestibility with highest for the group treated with 0.5 ml FE. There was linear response observed for milk fat percentage, milk fat yield and fat corrected milk. The control milk averaged 41.2 kg/d with 4.35 percent fat. Feed efficiency of FCM and ECM were also linearly ($P < 0.05$) affected by FE. The treatments group spent more time on ruminating when compare to the control group ($P < 0.05$). Implications: Dairy cows fed pre-treated whole plant faba bean silage with fibrolytic enzyme improved dairy cow performance during early to mid-lactation phase. Applying a low dosage of enzyme on faba bean silage tended to have a greater response and could be more cost efficient. It is important to select the optimal dosage for the diet in order to avoid negative associative effect of enzyme application.