

# Effects of the timing of the introduction of cellooligosaccharides on growth performance of weaned calves on pasture

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## *Introduction*

Improving energy acquisition in grazing calves by implementing a measure to conventional grazing system is crucial for successful rearing and satisfactory growth in their postweaning period. Feeding cellooligosaccharides (CE), which are derived from enzymatic digestion of plant cellulose, may be a good supplement for stocker calves since it is suggested that CE affects the rumen fermentation pattern and as a consequence, improvement of feeding efficiency caused by its administration can be expected. The aim of this study was to evaluate whether CE promotes growth of grazing beef calves and to analyze changes in the rumen microbial community of calves provided CE. We also evaluated the prebiotic use to the calves from their suckling period in respect to exhibiting any advantageous effect on growth performance.

## *Materials and methods*

Female Japanese Black calves were used for two feeding experiments: Experiment 1 used eight calves weaned at 3.9 months old and Experiment 2 used nine calves weaned at 2.9 months old. Calves were introduced to grazing with their mothers at the age of two months prior to weaning and were assigned to either a control group (CON) or an experimental group (CEL) fed CE at a rate of 10 g/day mixed with concentrate, which were fed at a daily maximum of 2,000 g. The timing of the CE introduction was at weaning in Experiment 1 or at one month prior to weaning in Experiment 2. Calves were stocked in fields in which Kentucky bluegrass was dominant. Experiments lasted 13 weeks (Experiment 1) and 17 weeks (Experiment 2) after weaning. Body weight was measured weekly and blood parameters were measured monthly. Ruminal samples were corrected monthly and were analyzed for determination of bacterial community composition by an RNA-based method (sequence-specific SSU rRNA cleavage method).

## *Results and discussion*

In Experiment 1, average daily gain tended to be greater in CEL than in CON especially in a late stage of the experiment. Significant difference in daily gain was observed in Experiment 2 (CEL,  $0.79 \pm 0.04$  kg/d; CON,  $0.67 \pm 0.05$  kg/d;  $P < 0.05$ ). Data on blood parameters did not give any significant difference. In both experiments relative populations of fibrolytic bacteria and methanogenic archaea in rumen microbial community tended to be greater as they grew. Overall microbial community composition was similar between CON and CEL, which may indicate that CE influences the rumen community nonspecifically rather than target-specifically. Our results suggested that CE supplementation for more than two months may improve growth performance in stocking calves. Furthermore, the supplementation from an early (suckling) period may be more advantageous to deserve the effect.