

Using a composite enzyme supplement as feed additive in growing diets of young Holstein calves

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Enzymes are used to improve the nutritive value of feeds for non-ruminants, particularly broilers, and as silage additives, but they are not routinely used in the diets of adult ruminants. As was recently reviewed by Beauchemin and Rode (1996), a number of studies in the 1960s involving cattle and sheep showed that enzymes substantially improved feed digestibility and animal performance, but results were often inconsistent. Given the relatively high cost of feed enzymes, the inconsistency of responses, and the potential of improving animal performance with the use of other emerging technologies, the use of enzymes in ruminant diets was, until recently, abandoned. High costs of livestock production combined with the availability of newer enzyme preparations have prompted a renewed interest in the potential of feed enzymes for ruminants.

In order to investigate effects of enzyme supplements to young calf diet and its effects on their performance, eighteen female Holstein calves (birth weight 39.5 ± 5.1 kg) were placed in different treatments after weaning: 1) control, 2) 0.5% enzyme and 3) 1% enzyme. The commercial enzyme, NATUZYME (Bioproton, Au) elicits activities of cellulase, xylanase, β -glucanase, α -amylase, protease, pectinase and phytase and was used for non-ruminants up to now. Calves were fed milk up to 10% birth weight until weaning at 60 days of age and they had free access to water and feed. Diets were formulated according to NRC (2001) to meet calves' requirement. Calves were

weighed and body measurements (withers height, hip height, body length, pin width, hip width, stomach size, heart girth, metacarpus size and metatarsus size) were taken periodically (60, 80, 100 and 120 days old). Feed intake of calves was measured daily. Feed to gain ratio was determined. Rumen pH, blood glucose and blood urea nitrogen (BUN) were measured at sampling dates. Data were analyzed using completely randomized design with SAS 6.12. Means were compared using Duncan's test.

Results showed that daily dry matter intake was reduced ($P < 0.01$) with the enzyme additive but daily gain of calves was increased non-significantly ($P > 0.05$) so that feed to gain ratio was improved with enzyme inclusion up to 1%. Body measurements were improved with enzyme addition to calf diet, this being significant ($P < 0.01$) in the case of some variables like withers height at 120 days old and body length increase over 60 days of trial. Rumen pH, blood glucose and BUN were not affected by enzyme supplementation. Data showed that increasing level of enzyme up to 1% could improve performance of calves without side effects on rumen characteristics and blood metabolites during weaning to 4 months of age.

Beauchemin, K.A. and Rode, L.M. (1996). Use of feed enzymes in ruminant nutrition. In: *Animal Science Research and Development—Meeting Future Challenges*, pp. 103–130L (ed. M. Rode). Minister Supply and Services Canada, Ottawa, ON.

Table 1 Comparison of performance traits between calves during experiment.

Items	Control	0.5% Enzyme	1% Enzyme	SEM
DMI kg/d	3.66 ^a	3.59 ^{ab}	3.51 ^b	0.022
ADG	1.15	1.25	1.24	0.049
Feed : gain	3.20	2.90	2.85	0.115
Withers height at 120 day	97.75 ^b	100.0 ^a	98.25 ^{ab}	0.435