

Fibrolytic enzymes improve growth of steers fed forage-based diets

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Enzymes have been used to improve the nutritive value of feeds for monogastric animals and as silage additives for ruminants. There is limited information regarding the efficacy of including fibrolytic enzymes as direct-fed additives for ruminants. The objectives of this study were to establish whether fibrolytic enzyme additives can enhance performance of growing steers, and to determine optimal enzyme concentrations in forage diets.

Crossbred beef steers (300 kg) were housed in individual feeding pens and offered one of three forage diets (24 animals/diet) for a period of 98 d. Forages were alfalfa hay, timothy hay, and whole crop barley silage. A xylanase (activity measured as International Units ; IU) and a cellulase (activity measured as filter paper units ; FPU) were added at incremental levels/kg DM. Levels (IU, FPU) were : 0) 0, 0 ; 1) 900, 37 ; 2) 1800, 74 ; 3) 3600, 148 ; 4) 7200, 296 ; and 5) 14400, 592. Hays were chopped and cubed (5 x 5 x 3 cm) and enzymes were added during the cubing process whereas for barley silage, enzymes were added immediately prior to feeding. Protein/mineral supplements were added to

each diet to provide a minimum of 12 % crude protein, and adequate rumen undegradable protein, minerals and vitamins. Animals were offered feed once per day at 110 % of voluntary intake and weighed bi-weekly to determine average daily gain (ADG ; kg/d) using a regression approach.

The ADG was enhanced by enzyme addition for alfalfa (P = 0.15) and timothy cubes (P = 0.065), but not (P = 0.67) for barley silage. For alfalfa, ADG increased with low levels of fibrolytic enzymes and declined thereafter, whereas for timothy, maximum ADG occurred at the highest enzyme concentration. Enzyme additives only affected dry matter intake (DMI) of timothy hay (P = 0.03) ; animals receiving the highest enzyme level had higher (P = 0.04) DMI than for other enzyme levels.

This study suggests that fibrolytic enzymes improve animal performance when applied to dry forages but the optimum enzyme level is dependent upon the type of forage. Studies are in progress to explain why responses differed among forages.

Forage	Item	Enzyme Level						SE
		0	1	2	3	4	5	
Alfalfa	ADG	1.03	1.27	1.28	1.34	1.19	1.11	0.09
	DMI	10.2	10.8	10.6	11.5	11.1	10.3	0.7
Timothy	ADG	1.22	1.31	1.12	1.24	1.27	1.66	0.12
	DMI	8.8	8.3	7.5	9.3	8.6	9.4	0.4
Barley silage	ADG	1.11	1.16	0.99	1.03	1.11	1.12	0.08
	DMI	7.4	8.2	6.8	7.9	7.0	7.4	0.4