

414 Use of feed enzymes to improve feed utilization

by ruminants. K. A. Beauchemin^{*1}, D. Colombatto¹, W. Z. Yang¹, and D. P. Morgaviz, ¹*Agriculture and Agri-Food Canada, Research Centre, Lethbridge, Alberta, Canada*, ²*INRA Centre Clermont-Theix, Saint-Genes-Champanelle, France*.

Research has demonstrated that supplementing dairy cow and feedlot cattle diets with fiber-degrading enzymes has significant potential to improve feed utilization and animal performance. Ruminant feed enzyme additives are concentrated fermentation products with specific enzyme activities, primarily xylanases and cellulases. Improvements in animal performance through enzyme supplementation can be attributed mainly to improvements in ruminal fiber digestion resulting in increased digestible energy intake. Animal responses are greatest when fiber digestion is compromised and when energy is the first limiting nutrient in the diet. When viewed across a variety of enzyme products and experimental conditions the response to feed enzymes by ruminants has been variable. This variation can be attributed to experimental conditions in which energy is not the limiting nutrient, as well as the activities and characteristics of the enzymes supplied, under or over-supplementation of enzyme activity, and inappropriate method of adding the enzyme to the diet. A limited number of ruminant enzyme products are now commercially available and this list of products is expected to grow. However, random use of enzymes on feeds, without consideration for specific situations and substrate targets, will only discourage or delay on-farm adoption of enzyme technology. Research is needed to understand the mode of action of feed enzymes so that efficacy can be assured. While much progress has been made in advancing enzyme technology for ruminants, considerable research is still required to reduce the variability of response. With increasing consumer concern about the use of growth promoters and antibiotics in livestock production, and the magnitude of increased animal performance obtainable using feed enzymes, there is no doubt that these products will play an increasingly important role in the future. This paper reviews the research on enzyme selection, the animal responses to feed enzymes and the mechanisms by which these products improve nutrient utilization.

Key Words: Feed Enzymes, Fiber Digestion, Nutrient Utilization