THE EFFECTS OF A-MAX AND DIAMOND V ON FEEDSTUFF DIGESTION AND RUMINAL FERMENTATION

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Introduction: Yeast culture additives have been used in ruminant nutrition to manipulate rumen fermentation and, therefore, production response. Many commercial yeast based products are currently being used for this purpose. In this study two such products are compared.

Objective: An *in vitro* simulated rumen model was used to determine the effects of feeding A-MAX™ and Diamond V® to ruminants fed a low or high roughage diet.

Materials and Methods: Ruminal fluid was collected from a cannulated multi-parous Holstein cow fed a 60% roughage diet. A ruminal digestion model was set up. Test ruminal fluid media contained 20 mL of strained ruminal fluid, 3 mL of distilled water and one of two diet types (low vs. high roughage). The diet of a high producing dairy herd or finishing beef cattle was simulated in the low roughage model, which was composed of corn silage (40%), haylage (20%), and HMC (40%). A high roughage model, which included haylage (70%) and HMC (30%), was used to simulate the diets of lower producing dairy herd and stocker beef cattle. Quadruplicate rumen digestion tubes were inoculated with A-MAX high (2 oz/cow), A-MAX low (0.5 oz/cow) or Diamond V treatments. Tubes were incubated at 39ºC for 12 h and gas production was monitored as a measure of digestibility. A rumen simulation model was set up which contained ruminal fluid (100 mL), 50 mL distilled water, one of two types of diet (low or high roughage) and yeast treatments. Flasks were incubated at 39ºC for 48 h during which sampling at different times was done to moniter pH and analyze VFAs. Microbiological analysis was done to enumerate total facultative bacteria, total lactic acid producing bacteria, and total lactic acid utilizing bacteria.

Results: In the ruminal digestion model total gas production was higher with A-MAX verses Diamond V (Fig 01 and Fig 02). This suggests that A-MAX improved apparent digestibility of a low and high roughage diet compared to Diamond V. No differences in pH or volatile fatty acid production were detected between A-MAX and Diamond V in low or high roughage diets using an *in vitro* ruminal model. The yeast treatments did not have any effect on the lactic acid producing and facultative bacterial populations (data not shown). A-MAX did appear to stimulate lactic acid utilizing bacteria in the low roughage model (Fig 03).

Conclusion: Inclusion of A-MAX led to beneficial changes in ruminal metabolism which may result in increased production efficiency in beef and dairy cattle. Particularly, simulation of the lactic acid utilizing bacteria by A-MAX would be a significant benefit for the ruminants consuming diets with high levels of cereal grains to alleviate lactic acidosis.

Figure 1. The Effect of A-MAX™ on Gas Production in a Low Roughage Ruminal Digestibility Model

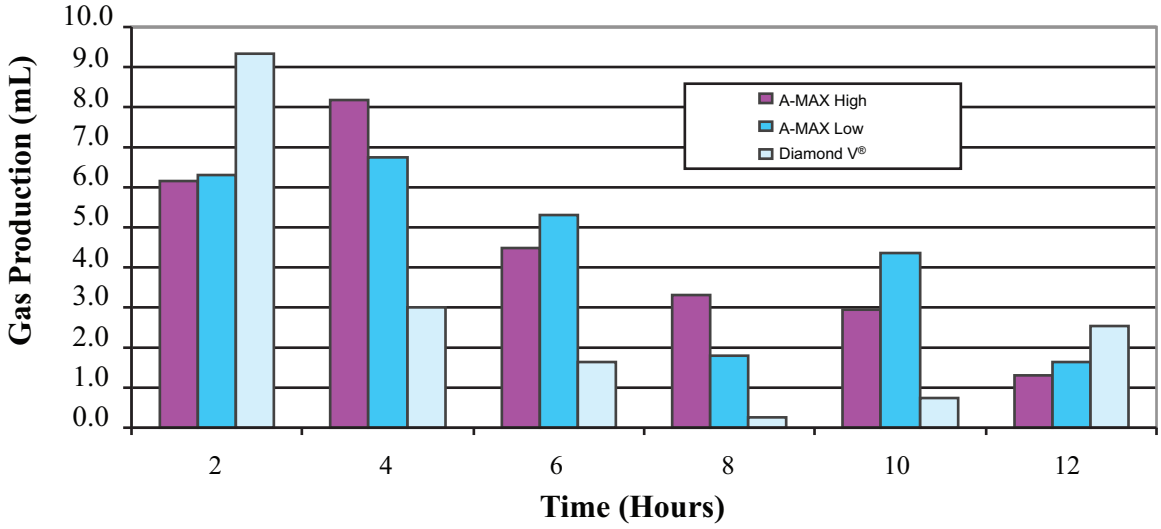
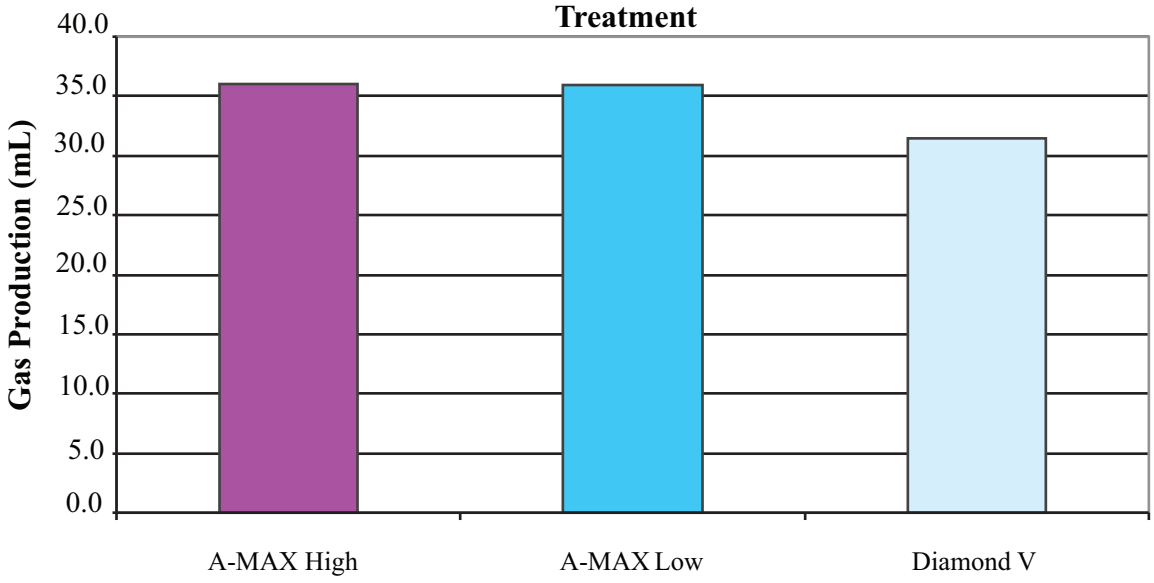
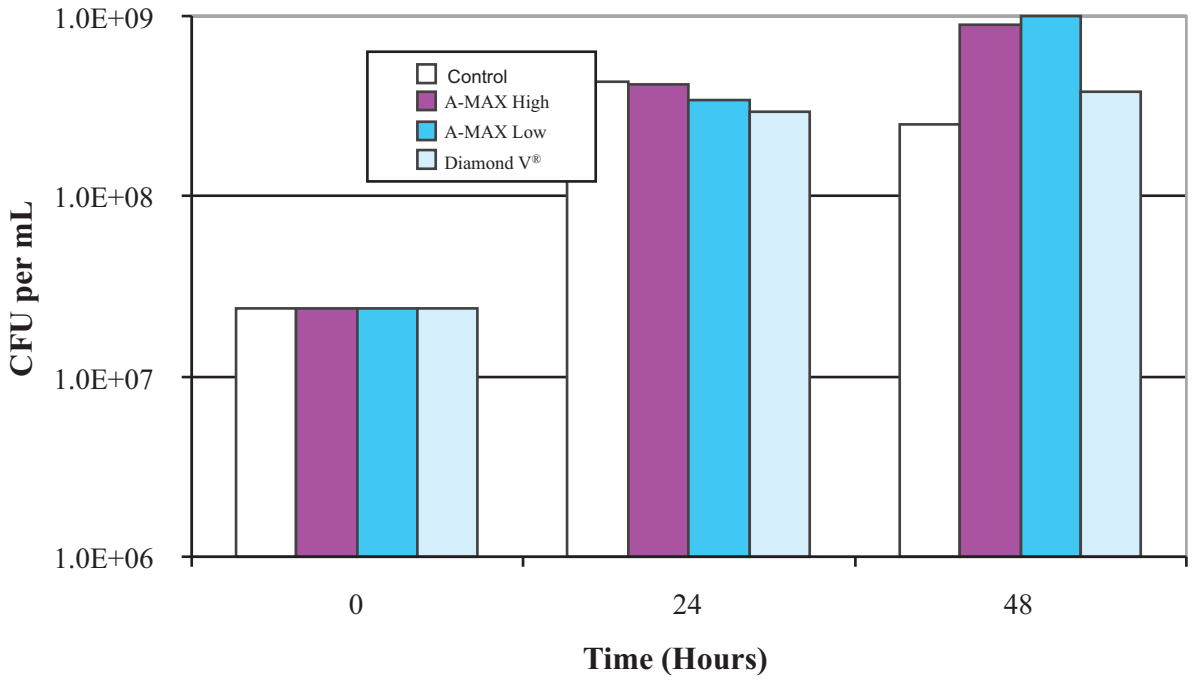


Figure 2. The Effect of A-MAX on Total Gas Production in a High Roughage Ruminal Digestibility Model



[1] Microbial N produced per kg dry matter digested.
[2] Microbial N produced per kg total carbohydrate digested. NS = P>.10

Figure 3. The Effect of A-MAX™ on Lactic Acid Utilizing Bacteria Populations in a Low Roughage Ruminal Model



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