

THE EFFECT OF A-MAX LIQUID AND A-MAX XTRA ON RUMEN MICROBIAL METABOLISM IN CONTINUOUS CULTURE.

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Introduction: The liquid feed industry adds dried nutrients to their products, including yeast. The original yeast fermentate is liquid. Therefore combining the two liquid materials, thus eliminating drying and the need for a carrier would be beneficial. In addition liquid yeast fermentate would offer the same benefits for inclusion on to dry feeds. We have also developed a unique process to stabilize the liquid fermentate for shipping and storage. Since the liquid fermentate product is not dried, it may provide higher potency than the dried product. A recent study (Hoover and Webster, 2004) showed that one-half the liquid fermentate inclusion rate as in A-MAX™ Xtra was efficacious, however a higher liquid concentration may further improve rumen metabolism.

Objective: To determine the effect of A-MAX Liquid at the same fermentate concentration as dried A-MAX on rumen microbial metabolism in continuous culture.

Materials and Methods: This study was conducted in a continuous-culture system (Hoover et al. 1996, J. Anim. Sci., 43:528). Treatments were control (no yeast) vs. A-MAX Liquid at the same fermentate inclusion as A-MAX Xtra. The system was operated under the following conditions: liquid dilution rate: 12%/h, solid retention time: 22 h, feed intake: 100 g DM/d, feeding frequency: twice daily, fermentation temperature: 39°C.

Results: In this study, total CHO digestibility was higher ($P < .05$) for A-MAX Liquid than control, primarily due to elevated NDF and NSC digestibility. VFA proportions, quantities and ruminal pH were not significantly affected by A-MAX Liquid. A-MAX Liquid increased ($P < .05$) microbial N(g/d) delivered by 7.8% and nutrient utilization efficiency (Mic. N/kg DMD) by 11.7% compared to control in continuous culture.

Conclusion: A-MAX Liquid is an efficacious means of supplementing yeast culture to enhance rumen microbial metabolism.

Results Tables:

Table 1. Digestion Coefficients for Total Carbohydrates, NDF and Nonstructural Carbohydrates ¹ .		
Item	Control	A-MAX™ Liquid
Digestion, %		
Total Carbohydrate	38.9 ^b	41.9 ^a
Neutral Detergent Fiber (NDF)	45.5	46.2
Nonstructural Carbohydrate (NSC)	78.0	79.7

^{ab} Significant differences (P<.05) between treatments

Table 2. Volatile Fatty Acid (VFA) Production, Molar Ratios and Average Daily Fermenter pH ¹ .		
Item	Control	A-MAX Liquid
Total VFA, mmoles/d	433	452
Molar Percentages:		
Acetic	62.5	56.1
Propionic	23.3	25.0
A-P Ratio	2.69	2.27
mmoles/day:		
Acetic	271	254
Propionic	101	114
Average pH	6.16	6.06

Table 3. Nitrogen Partitioning, Microbial Growth and Microbial Efficiency.		
Item	Control	A-MAX Liquid
Ammonia, N, Mg/dl	12.26	12.41
Bypass N, g/d	.31	.17
Microbial N, g/d	2.29 ^b	2.47 ^a
Mic. N/kg DMD ¹	31.4	35.1

^{ab} Significant differences (P<.05) between treatments.

¹ Microbial N produced/kg dry matter digested.

