



### THE EFFECT OF A-MAX YEAST CULTURE AND DIAMOND V YEAST CULTURE ON MICROBIAL METABOLISM IN CONTINUOUS CULTURE.

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**Introduction:** Dietary inclusion of yeast culture has been shown to improve DMI and milk production in early-lactation dairy cattle. Although, these production responses are cited, the specific mode of action remains elusive. There are several yeast products on the market with nuances in their manufacturing process that may have an influence on performance; however, very few studies have been conducted to compare yeast culture in the same experimental environment.

**Objective:** To determine the effect of nutrient digestion on metabolism of rumen microbes in continuous culture when fed either a ration with A-MAX™ Concentrate or Diamond V® XP™ Yeast Culture.

**Materials and Methods:** This study was conducted in a continuous culture system. 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 temp: 39°C, pH. Data was subjected to ANOV where contrasts were control vs. trt, and A-MAX vs. Diamond V. A-MAX, and Diamond V were fed at 2 oz/d.

**Results:** A-MAX increased ADF digestion by 22 and 11.5% compared to control and Diamond V (Table 1). Total VFA (mmoles) were higher ( $P < .04$ ) for Diamond V compared to A-MAX. The proportion of acetic acid was higher for A-MAX and propionic acid higher for Diamond V (Table 2). Mean pH was higher for A-MAX compared to Diamond V. In particular, the 2 and 4 h pH values were higher for A-MAX compared to Diamond V. Both products demonstrated higher ammonium N and less bypass N with a numerical trend for a greater microbial N/day. A-MAX increased microbial N efficiency ( $P < .10$ ). When fed A-MAX, microbes were higher in nitrogen concentration, suggesting a greater amino acid content with less ash than microbes grown on Diamond V (Table 3).

**Conclusion:** A higher pH at critical times after feeding (i.e.2h) promotes a healthier rumen. The higher protein content in microbes fed A-MAX indicates these bacteria would be of greater nutritional value to the host than those from Diamond V. In a lactating cow diet (DMI:54lb/d), A-MAX supplemented diets would produce 256 g more microbial protein than Diamond V supplemented diets, which would be equivalent to approximately .7 lb of fishmeal/cow/d or \$.32/cow/d assuming a \$900/ton value for fish meal.

## Results Tables:

Table 1. Digestion Coefficients for Dry and Organic Matter, Fiber and Nonstructural Carbohydrates.					
Item	Control	A-MAX™	Diamond V®	Control vs. Trt.	A-MAX vs. Diamond V
Digestion, %					
Dry Matter	66.6	69.0	71.6	.10	NS
Neutral Detergent Fiber	44.5	46.6	44.8	NS	NS
Acid Detergent Fiber	39.5	48.3	43.3	NS	NS
Nonstructural Carbohydrate <sup>1</sup>	79.3	80.1	82.1	NS	NS

<sup>1</sup> Includes sugar and starch.

Table 2. Volatile Fatty Acid (VFA) Production, Molar Ratios and Average Daily Fermenter pH.					
Item	Control	A-MAX	Diamond V	Control vs. Trt.	A-MAX vs. Diamond V
Total VFA, mmoles/d	370	398	426	.004	.04
Molar Percentages:					
Acetic	57.3	53.2	47.1	.02	.05
Propionic	20.4	23.6	32.0	.03	.04
A-P Ratio	2.82	2.36	1.48	.03	.05
mmoles/day:					
Acetic	212	212	200	NS	NS
Propionic	75	93	137	.01	.01
Average pH	6.30	6.37	6.17	NS	.04
2 h	6.31	6.38	6.04	NS	.05
4 h	6.09	6.20	6.04	NS	NS

Table 3. Nitrogen Partitioning, Microbial Growth and Microbial Efficiency.					
Item	Control	A-MAX	Diamond V	Control vs. Trt.	A-MAX vs. Diamond V
Non-ammonia N, g/d	2.85	2.76	2.78	.07	NS
Ammonia N, mg/dl	5.53	8.27	7.46	.08	NS
ByPass N, g/d	1.09	0.89	.94	.04	NS
Microbial N, g/d	1.77	1.87	1.83	NS	NS
Efficiencies:					
Mic. N/kg DMD1	26.5	27.1	25.6	NS	.10
Mic. N/kg CHOD2	42.5	44.1	42.9	NS	NS
Nitrogen, %	8.98	9.54	8.35	NS	.004
Ash, %	12.24	11.42	18.52	NS	.03

<sup>1</sup> Microbial N produced per kg dry matter digested.

<sup>2</sup> Microbial N produced per kg total carbohydrate digested.

To learn more contact your nutritionist, veterinarian or Arm & Hammer Animal Nutrition representative.

