THE EFFECT OF LOWERING MOISTURE (LM) CONTENT OF A-MAX FERMENTATE ON RUMEN MICROBIAL METABOLISM IN CONTINUOUS CULTURE.

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Introduction: In many manufacturing processes, water is necessary, however, expensive to handle. This is particularly true for the cost of drying. The fermentation process requires water and the resulting fermentate contains water. However, the question that remains is can less water be used in the manufacturing process of the fermentate, and while maintaining the same amount of dry fermentation nutrients and still be efficacious?

Objective: To determine the effect of reducing fermentate moisture level 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 as follows: Control (no yeast) vs. lower moisture
(LM or higher DM) fermentate dried onto carrier to yield a 1oz/hd/d feeding rate product. 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. The data was subjected to ANOV analysis.

Results: Non-structural and total carbohydrate digestibility's were higher (P<.05) for A-MAX™ lower moisture compared to control. Because of this, acetic acid percentage and concentration were lower (P<.05) and propionic acid tended to be higher for the A-MAX lower moisture product, whereas pH was higher (P<.05) for the lower moisture product compared to control. Non-ammonia N was higher (P<.05) and Ammonia N tended to be lower for the A-MAX lower moisture product. This contributed to improving (P<.05) Microbial N delivery by 5.7% and increased (P<.05) efficiency of nutrient utilization (Microbial N/kg DMD) by microbes receiving A-MAX lower moisture by 16.8% compared to control.

Conclusion: Lowering the moisture content of the A-MAX fermentate liquid fraction while still maintaining fermentate nutrient concentration on carrier enhanced microbial metabolism in continuous culture compared to no yeast culture control.

Results Tables:

Table 1. Digestion Coefficients for Total Carbohydrates, NDF and Nonstructural Carbohydrates[1].		
Item	**Control**	**A-MAX™ LM**
Digestion, %		
Total Carbohydrate	38.9[b]	42.0[a]
Neutral Detergent Fiber (NDF)	45.5	43.5
Nonstructural Carbohydrate	78.0[b]	82.9[a]

Table 2. Volatile Fatty Acid (VFA) Production, Molar Ratios and Average Daily Fermenter pH[1].		
Item	**Control**	**A-MAX LM**
Total VFA, mmoles/d	433	416
Molar Percentages:		
Acetic	62.5[a]	55.7[b]
Propionic	23.3	27.5
A-P Ratio	2.69	2.05
mmoles/day:		
Acetic	271[a]	232[b]
Propionic	101	114
Average pH	6.16[b]	6.30[a]

Table 3. Nitrogen partitioning, Microbial Growth and Microbial Efficiency[1].		
Item	**Control**	**A-MAX LM**
Non-Ammonia N, g/d	2.60[b]	2.72[a]
Ammonia, N, Mg/dl	12.26	10.57
Microbial N, g/d	2.29[b]	2.42[a]
Microbial N/kg DMD	31.4[b]	36.7[a]

[1,] ab Significant differences (P<.05) between treatments

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