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Influence of diet type and mixed microbial extract (MME) treatment on intake, digestion, and nitrogen retention in growing ram lambs.

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Yeast and fermentation products have been on the market and have been tested for several years. An increase in dietary IVOMD and soluble Nitrogen was found when Olson et al. (1994) supplemented beef cattle grazing mixed-grass rangeland with a yeast culture. These researchers also concluded that intake, in situ NDF and CP digestion increased at various times through the study. Caton et al. (1993) found intake and digestion measurements to be altered with *Aspergillus oryzae*, a fermentation product, when supplemented to steers on cool season grasses. The mixed microbial extract (Cilk; Enviro Consultants Service, Evergreen, CO) in this trial may be similar to other yeast and fermentation products, yet as a new product little information is available. The goal of this study was to examine MME and its results in the areas of intake, digestion and nitrogen retention.

Four diets were fed ad libitum to crossbred growing ram lambs. Two diets were forage-based and two diets were concentrate-based. One of each, forage and concentrate, included MME at company recommendations (0.125% of diet dry matter). Mixed microbial extract was found to have no effect on nitrogen intake or DM digestibility, but affected fecal DM and ADF digestion. Additional research seems warranted to follow up on these results.

Sixteen crossbred ram lambs (112.2 3.3 lbs BW) were used in a completely randomized design. Lambs were housed at NDSU Ruminant Nutrition Research Center. There were four lambs per treatment. Lambs on the forage-based diet were fed alfalfa pellets and a corn-based supplement. The concentrate-based diet was 59% ground corn with beet pulp pellets, alfalfa pellets, and a premix supplement. MME was included in the totally mixed ration for the concentrate diet and as a component of the corn-based supplement for the forage-based diet. Forage-based lambs received their supplement daily just prior to receiving fresh alfalfa pellets daily at 0700. Concentrate-based lambs received fresh feed at 0700. Lambs were adapted to diets for 14 days followed by seven days of total fecal, urine and intake collections. Samples were analyzed for dry matter, ash, organic matter, crude protein, NDF, ADF, and starch by standard laboratory procedures. Data was analyzed by analysis of variance and P-values < 0.1 are considered significant.

As shown in table 1, DMI was higher (4.07 vs 3.04 lbs/d; 3.6 vs 2.7 % of BW; $P < 0.02$) and DM digestibility lower (47.6 vs 81%; $P < 0.01$) in lambs fed alfalfa pellets compared with concentrate. The low digestion coefficients associated with alfalfa pellets are likely due to high intakes and high rates of passage. Mixed microbial extract did not affect DMI or DM digestion ($P > 0.60$). Mixed microbial extract increased ($P < 0.01$; 31.2 vs 26.1 %) fecal DM and resulted in less ($P=0.09$) total fecal water excretion (4.94 vs 3.23 lbs/d for MME and control, respectively). Dry fecal output was not affected ($P=0.64$) by MME. Mixed microbial extract increased ADF Digestion (48 vs 53%; $P =0.05$) when included in the diet. Diet type increased ($P<0.01$) both NDF (37 vs 64% for forage and concentrate respectively) and ADF digestion (31 vs 54% for forage and concentrate respectively). Table 2 indicates nitrogen intake (61.8 vs 34.4 g/d) was greater ($P < 0.01$) in alfalfa-compared with concentrate-fed lambs. Feeding MME had no influence ($P > 0.30$) on nitrogen intake or

digestibility.

These data suggest that form of diet alters intake and DM digestion while MME does not. However, ADF digestion was improved with MME. In addition, MME did increase fecal DM, which may have waste management implications.

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Olson, K. C., J. S. Caton, D. R. Kirby, and P. L. Norton. 1994. Influence of Yeast Culture Supplementation and Advancing Season on Steers Grazing Mixed-Grass Prairie in the Northern Great Plains: I. Dietary Composition, Intake and In Situ Nutrient Disappearance. J. Anim. Sci. 72:2149-2157.

Table 1: Influence of diet type and MME on intake and digestion in growing ram lambs.

	Diet		Cilk			P-Values		
Item	Alfalfa	Conc	Without	With	SE	Diet	Cilk	Diet + Cilk
Body wt, lbs	112.2	112.2	110.0	116..6	3.3	0.98	0.17	0.72
DMI, lbs	4.07	3.04	3.66	3.46	0.26	0.02	0.59	0.74
DMI, % BW	3.6	2.7	3.4	2.7	0.22	0.02	0.23	0.80
Digestion								
DM	48	81	63	65	2.3	0.01	0.42	0.69
NDF	37	64	48	53	2.4	0.01	0.15	0.88
ADF	31	54	38	46	2.6	0.01	0.05	0.40
Starch	90	99	94	95	0.4	0.01	0.21	0.57
Fecal DM, %	25	32	26.1	31.2	0.01	0.01	0.01	0.45
Fecal Output DM, lbs	2.14	0.60	1.44	1.30	0.13	0.01	0.48	0.64
Fecal Output Water, lbs	6.81	1.36	4.94	3.23	0.67	0.01	0.09	0.21

Table 2: Influence of diet type and MME on Nitrogen metabolism in growing ram lambs.

	Diet		Cilk			P-Values		
Item	Alfalfa	Conc	Without	With	SE	Diet	Cilk	Diet + Cilk
N Intake, g	62	34	49	47	3.8	0.01	0.72	0.57
Fecal N, g	27	11	20	18	1.7	0.01	0.48	0.53
Apparent N Digestion, %	56	69	62	63	1.3	0.01	0.48	0.78
Urine N, g	25	15	19	21	1.4	0.01	0.30	0.21
N balance, g	10	9.0	10.4	8.0	2.4	0.86	0.49	0.22
N balance, % N Digestion	24	38	35	28	5.9	0.13	0.41	0.17
N retention, % N intake	14	25.9	21	18	3.4	0.03	0.55	0.16