

Growth and Feed Efficiency of Early-weaned Lambs Fed Diets With and Without Bio-Mos

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Abstract

The objective of this experiment was to determine whether the feed additive Bio-Mos would enhance the health and growth rates of early-weaned lambs. Forty lambs were assigned pens at random with half of the pens being fed the standard Cornell Sheep Farm diet and the other half fed the same diet with Bio-Mos (mannan oligosaccharide) included at 0.08% of the diet. Daily feed intake was recorded and the lambs were weighed weekly. Lambs fed the Bio-Mos diet gained 9.5% faster than the lambs fed the standard diet. The feeding trial lasted approximately four weeks and at the end of the trial no significant difference was observed between lambs fed the normal diet and those fed the Bio-Mos diet.

Introduction

Performance and health are key factors to a lamb's early stages in life. Many farmers and breeders of livestock use antibiotics and steroids to enhance the performance, or growth rate, of their animals. An alternative to steroids and antibiotics has been discovered. Nutraceuticals, specifically manna oligosaccharides, MOS, are complex carbohydrates that maintain balance of health by all-natural measures.

One factor that ultimately inhibits the growth rate of animals is bacteria. There are many types of bacteria such as *E. coli* that attach to the gut wall of animals. Maintaining the animal's health has a lot to do with discouraging the colonization of bacteria, and Bio-Mos was created to do this. Bio-Mos works by releasing oligosaccharides into the digestive tract where pathogens colonize. The oligosaccharides bind to the receptor site on the pathogens where the carbohydrate would normally bind. Because bacterial pathogens are not able to bind to cells of the digestive tract, they flushed out. This improves the animal's health, consequently enhancing the animal's growth. In this feeding trial, we attempted to determine whether the addition of Bio-Mos to a normal lamb mix would increase growth rate and improve feed efficiency.

Methods

This experiment was conducted at the Cornell Sheep Farm at the Teaching and Research Center near Harford, NY in May 2002. Forty Finn x Dorset lambs were assigned to 20 pens with 10 pens fed the control diet and 10 pens fed the experimental diet. The lambs consisted of seven artificially-reared lambs and 33 were either one or two lambs from sets of triplets. The lambs were chosen based on a weaning age of approximately one and a half months. The lambs were moved into elevated pens with expanded metal floors with one ram lamb and one ewe lamb picked randomly for each pen. Pens were assigned at random to the diets.

A 2-ton batch of the standard diet and a 476 kg (1050 lb) batch of the diet with the Bio-Mos additive was mixed (Table 1). The amount of Bio-Mos added was based on an estimated 10 kg average weight of the lambs. Half of the pens received the normal diet while Bio-Mos replaced a slight amount of barley in the Bio-Mos diet. Both diets contained 17% crude protein in the dry matter and both diets were finely ground to enhance the intake of the early-weaned lambs.

Lambs had ad libitum access to feed at all times. A set amount of feed was added each day that the feed remaining would be consumed by the next day. All of the 2 kg of feed offered on the first day was consumed. Therefore, the amount added was increased to 3 kg to maintain free-choice intake. Throughout the experiment, many of the pens feed intake increased some increasing to nearly 6kg of feed per day. Lambs had free access to fresh water. The lambs were weighed weekly through the 4-week trial. Feed intake was recorded daily and analyzed at the end of the trial.

Table 1. Composition of experimental diets.

Ingredient	As-fed, %	
	Bio-Mos diet	Standard diet
Barley	67.07	67.15
Soy hulls	14.96	14.96
Soybean meal	12.97	12.97
Limestone	1.36	1.36
Agway sheep salt	0.91	0.91
Ammonium chloride	0.45	0.45
Sheep unit vitamin premix	0.11	0.11
Bio-Mos	0.083	
Deccox, 0.5% (2 lb/ton)	0.09	0.09
Vegetable oil	1.99	1.99
Total	100.00	100.00

The growth curve for each lamb was graphically displayed to ensure that the data were consistent. Beginning and final weights were determined from the quadratic regression of weight on experimental day for each lamb. Weight gains for the lambs in each pen were averaged and total pen feed intake was halved so that the experimental observations were the data for pens expressed on a per lamb basis. The data were analyzed by one-way analysis of variance.

Results

Although the lambs fed the Bio-Mos diet were slightly lighter at the start of the experiment and slightly heavier at the end of the experiment the differences were not statistically significant (Table 2). The average daily gain of the lambs fed the Bio-Mos diet was 9.5% greater ($P < 0.115$) than that of the lambs fed the standard diet. Although the lambs fed the Bio-Mos diet consumed slightly greater amounts of feed and gained more efficiently, the differences were not statistically significant.

Table 2. Growth and feed intake of lambs fed diets with or without Bio-Mos for 24 days.

Item	Diet with Bio-Mos	Standard diet	SE	<i>P</i> -value ^a
Initial weight, kg	11.3	11.5	0.57	ns
Final weight, kg	19.6	19.1	0.76	ns
Average weight, kg	15.4	15.3	0.66	ns
Average daily gain, g	345	315	13.1	0.115
Daily feed intake, kg	1.27	1.23	0.06	ns
Feed intake, % of body weight	8.2	8.1	0.19	ns
Feed/gain	3.7	3.9	0.13	ns
Gain/feed, g/kg	275	258	9.8	ns

^aProbability that the difference between the diets was due to chance. ns = nonsignificant.

Discussion

The experiment unexpectedly had to be ended on day 24, rather than day 28, because the Bio-Mos diet was used up. The amount of feed mixed was based on an estimated intake of 4% of body weight per day when the actual intakes were higher than 8% of body weight per day.

As a reflection of their high levels of feed intake, the lambs were very healthy with the exception of pink eye, which ran its course through several of the pens and was treated with two doses of LA 200. The number pens with pink eye-infected lambs was about the same for the Bio-Mos and standard diets.

This preliminary study of the Bio-Mos additive showed that it may improve growth rate and feed efficiency of early weaned lambs. While control lambs grew fast and efficiently, lambs fed the Bio-Mos diet grew faster and more efficiently. With a longer feeding trial, the differences between lambs fed the two diets might result in significant differences.