

The Interaction of Level of Concentrate And Supplementary Nitrogen Source on Performance of Growing-Finishing Lambs

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Story in Brief

To study the performance of growing-finishing lambs fed various levels of concentrate supplemented with different nitrogen sources eighty young lambs were allotted to 16 different ration combinations and fed for 98 days. The rations consisted of cottonseed hulls as the roughage source and contained 20, 40, 60 and 80 percent ground corn. All levels of corn were fed with either soybean meal, urea or biuret as supplementary nitrogen sources.

Average daily gains for the lambs were increased to a maximum at 0 percent corn and no further improvement was demonstrated at 80 percent corn. Soybean meal proved to be a superior source of supplementary nitrogen at the 20 and 40 percent concentrate levels but there were no significant differences due to nitrogen sources at the 60 and 80 percent concentrate levels. Much of the poor performance of animals fed the 20 and 40 percent concentrate levels supplemented with urea and biuret was due to decreased feed consumption.

Introduction

Continued efforts are being made to evaluate non-protein nitrogen sources as supplements to rations for ruminant animals. Although natural protein sources such as soybean meal (SBM) have generally been superior non-protein nitrogen sources, they are considerably more expensive unit of nitrogen. On the other hand, the non-protein nitrogen sources possess certain disadvantages which prevent their exploitation in all cases. Urea, for example, has not been found to be as useful in high roughage rations as it has in high concentrate rations. Biuret, another nitrogen source which is presently under intensive investigation, has been reported as being more useful for high roughage rations than urea because of its slower breakdown in the rumen.

Few reports exist, however, where both of these non-protein nitrogen sources have been compared to soybean meal as the supplementary nitrogen source at different concentrate levels. The objectives of the study reported here were to compare these three nitrogen sources as

supplements to rations containing variable levels of concentrate when fed to growing-finishing lambs.

Materials and Methods

Eighty fall born wether lambs weighing approximately 53 pounds were allotted by weight to 16 groups represented by the rations illustrated in Table 1. The lambs were randomly assigned by location to the pens in the lamb feeding area and were housed and fed individually throughout the entire feeding period. All lambs were allowed to consume their rations *ad libitum* and were allowed water free choice. Lamb weights were taken at 2 week intervals for a 98 day feeding period.

The rations consisted basically of cottonseed hulls as the roughage source and were formulated with either 20, 40, 60 or 80 percent corn. Rations 1-4 were designed to be low but equal protein rations. The 80 percent corn ration had over 5 percent digestible protein as a result of the corn contribution; thus SBM was added to rations 1, 2 and 3 to provide 5 percent digestible protein. As a result, these rations were not greatly lower in protein than rations 5-8. SBM, urea, and biuret provided the major portion of the supplementary nitrogen in rations 5-8, 9-12 and 13-16, respectively.

At two different times during the feeding period four lambs each on rations 5, 6, 7, 8, 13, 14, 15 and 16 were equipped with feces collection harnesses. Total feces collections were made for a 7 day period in each case for purposes of calculating digestibility. Routine methods were utilized for compositing the feces, drying, grinding and analyzing in the laboratory as well as for analyzing the feed.

Results and Discussion

The average daily gains, average daily feed consumptions and feed required per unit of gain values are reported in Table 2. Over all nitrogen sources the performance of the lambs improved as the level of concentrate was increased from 20 to 60 percent. However, there were no differences between the performance at 60 or 80 percent concentrate. At the 20 and 40 percent corn levels soybean meal as a supplementary nitrogen source supported much better gains than either urea or biuret.

Although there were some differences due to nitrogen source at the 60 and 80 percent corn levels, these differences were not statistically significant. In reviewing the formulation of the ration, however, it should be kept in mind that at the higher concentrate levels the supplementary nitrogen sources contributed only a very small portion of the total digestible protein because most of the requirement was supplied by the

Table 1. Composition of Rations — Level of Concentrate and N-Source Trial

Ingredient	Percentage, air dry basis															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ground corn	20.00	40.00	60.00	80.00	20.00	40.00	60.00	80.00	20.00	40.00	60.00	80.00	20.00	40.00	60.00	80.00
Cottonseed hulls	64.90	48.00	31.20	13.00	62.80	45.30	28.50	11.70	70.20	51.00	31.90	12.70	71.00	51.60	32.20	12.80
Soybean meal	8.14	4.96	1.78	-----	10.80	7.65	4.47	1.29	1.38	0.98	0.57	0.17	-----	-----	-----	-----
Urea	-----	-----	-----	-----	-----	-----	-----	-----	1.38	0.98	0.57	0.17	-----	-----	-----	-----
Biuret ¹	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1.93	1.36	0.80	0.23
Dried molasses	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Limestone	0.27	0.35	0.45	0.52	0.25	0.34	0.42	0.51	0.14	0.38	0.45	0.52	0.11	0.37	0.45	0.53
Dicalcium phosphate	0.02	-----	-----	-----	-----	-----	-----	-----	0.26	0.02	-----	-----	0.3	0.05	-----	-----
T.M. salt	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Vitamins A & D	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

¹ 'Pure' biuret containing 36% N of which over 95% came from biuret.