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J. B. Carey
South Dakota State University

C. W. Carlson

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PERFORMANCE OF LAYING HENS FED INCREASING AMOUNTS OF LYSINE IN LOW PROTEIN DIETS

J.B. Carey and C.W. Carlson¹

Department of Animal Science
Poultry-Meats Section

South Dakota State University
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The current N.R.C. (1977) recommendations for lysine content of laying hen rations is 0.60%. This level of lysine is recommended along with 15% protein. The influence of protein level or protein quality on this requirement is not known. This experiment examined laying hen performance over a range (0.55% to 0.80%) of lysine levels in 10% and 12% protein diets to determine optimum lysine intake. Also, the influence of the addition of the amino acids isoleucine and tryptophan to the 10% protein diet was studied. The laying type hens in cages (Babcock-300) were 40 weeks old at the beginning of the experiment and the diets were fed for six 28-day periods. They had been on 10% protein layer diets from 24 weeks of age. Thirty-six hens were fed each experimental treatment. Methionine and cystine content of all diets was 0.55%. Diet formulations are provided in Table 1.

Table 1. Diet Formulations for Lysine Study

	10% protein ^a	12% protein
Yellow corn	84.2	79.2
Soybean meal (47%)	4.0	9.0
Dehy. alfalfa meal (17%)	3.0	2.0
Dicalcium phosphate	1.5	2.0
Ground limestone	5.0	5.0
Salt mix	0.5	0.5
Vitamin mix	0.5	0.5
Crude protein, %	10.1	11.9
Methionine + cystine, %	0.55	0.55
Calcium, %	2.25	2.40

^a To this diet 0.075% L-tryptophan and 0.25% DL-isoleucine were added for another series.

From the performance data seen in Table 2, protein level and/or quality of the diet influenced production to the greatest extent. The 12% protein diet supported production approximately 17% above that attained on either 10% protein diet. With this diet, the lysine requirement would appear to be about 0.65%. Within the 10% diet groups, no consistent influence was observed due to the addition of lysine or isoleucine and tryptophan. As shown in Table 3, the 12% protein level also increased feed consumption. On the other hand, the

¹ Graduate Assistant and Professor and Leader, Poultry Research and Extension.

influence of the addition of the amino acids to the 10% diet was to reduce consumption. Apparently an imbalance was created and increasing amounts of lysine only created a greater imbalance.

Analysis of blood plasma of these hens is now under way to study more closely the influences of these diets. Further work is necessary to explain the apparent amino acid imbalances observed with the 10% protein diets.

Table 2. Percent Hen-day Production on Low Protein Diets With Increasing Levels of Lysine

Lysine level	Protein level		
	10%	10% + amino acids	12%
	%		
0.55%	55.0	54.3	59.5
0.60%	54.1	52.5	64.2
0.65%	59.0	52.6	69.3
0.70%	54.7	49.4	70.5
0.75%	50.8	51.6	67.6
0.80%	53.6	53.1	70.3
Average	54.5B	52.2B	66.9A

Means identified with the same letter do not differ significantly ($P < 0.01$). Without any such identification, there were no significant differences.

Table 3. Feed Consumption of Low Protein Diets With Increasing Levels of Lysine

Lysine level	Protein level		
	10%	10% + amino acids	12%
	grams/HD		
0.55%	95.3	95.1	105.8
0.60%	99.0	92.8	106.1
0.65%	99.9	89.0	103.5
0.70%	97.0	89.3	107.5
0.75%	93.3	88.3	104.5
0.80%	95.3	89.0	107.2
Average	96.6B	90.6A	105.8C

Means identified with the same letter do not differ significantly ($P < 0.01$).