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C. W. Carlson
South Dakota State University

E. Guenther

R. A. Nelson

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Probiotics for Broilers and Turkeys (II)

C. W. Carlson, E. Guenther and R. A. Nelson¹

The term probiotic implies "in favor of life." Probiotics are defined by some scientists as materials which favor the development of certain types of microorganisms in the gastrointestinal tract of animals. Such changes might be expected to improve performance.

At this laboratory, probiotics have been utilized in diets for broilers and growing turkeys. Previous studies (A.S. Series 76-10) showed no responses with broilers but indicated a response in turkeys that became most evident at 10 to 14 weeks of age. Additional studies have been conducted and the results will be presented here.

Male broilers were grown in cages as well as floor pens to 8 weeks of age. They were fed typical normal protein and low protein broiler diets supplemented with three different probiotics at the recommended levels. Similarly, tom turkeys were grown on typical normal protein and low protein series of diets with the three different probiotic-type supplements.

The results with the broiler studies are summarized in Table 1. In both experiments, there was no significant improvement in growth obtained from supplements to the normal protein diets for the broilers in either cages or floor pens; but for the low protein groups in cages a marked response was obtained with all the probiotics, evident in both experiments. For these same groups, an improvement in feed utilization was obtained. Apparently, the pressure of cage housing plus a marginal protein intake stressed the birds such that the probiotics were effective in improving performance.

For the turkey studies, there was no response with strain 1 in Experiment 3 (Table 2), but the strain 2 turkeys showed a marked response at 14 weeks of age. A trend was evident earlier, at least by 12 weeks of age. No differences in feed utilization were noted. In Experiment 4 (Table 3), each of the three probiotics failed to elicit a positive response for either growth or feed utilization. A small growth response was somewhat evident at 4 weeks of age, but this disappeared by 12 weeks of age. Although the weights were numerically smaller for all treatment groups at 24 weeks of age as compared to the control groups, the differences were not significant.

These studies suggest that periods of stress may occur among growing poultry to allow for a positive growth response to probiotics. Improvement in feed utilization may or may not occur concurrently. Under conditions of limited or little stress, probiotics may not be beneficial.

¹Professor and Leader, Poultry Research and Extension; Assistant Professor (retired) and Superintendent, Poultry Research Center, respectively.

Table 1. Effect of Probiotics on Growth of Broilers

	8-week wt. grams		Feed/gain	
<u>Experiment 1 (All Cages)</u>				
Normal protein				
Basal ¹		2316		2.01
Probiotic 4 ²		2332		2.12
Low protein				
Basal ³		1949		2.40
Probiotic 4		2039		2.33
<u>Experiment 2</u>				
	<u>Floor</u>	<u>Cages</u>	<u>Floor</u>	<u>Cages</u>
Normal protein				
Basal ¹	2191	2079	2.19	2.21
Probiotic 1 ⁴	2186	2078	2.13	2.21
Probiotic 2 ⁵	2214	2002	2.17	2.24
Probiotic 4	2204	1997	2.29	2.22
Low protein				
Basal ³	1911	1826	2.20	2.68
Probiotic 1	1896	1983	2.17	2.34
Probiotic 2	1931	1912	2.20	2.45
Probiotic 4	1904	1920	2.25	2.36

¹ Twenty-three percent protein corn-soy basal, reduced to 20% protein at 6 weeks of age.

² One hundred thirty p.p.m. in feed (liquid).

³ Sixteen percent protein corn-soy basal, reduced to 14% protein at 6 weeks of age.

⁴ Three hundred twenty-seven p.p.m. in feed (liquid).

⁵ Three hundred sixty-nine p.p.m. in feed (dry).

Table 2. Growth and Feed Conversion of Turkeys as Affected by Strain and Probiotics

Age-Treatment	Strain 1		Strain 2	
	Weight kg	Feed/gain Cumulative	Weight kg	Feed/gain Cumulative
3 weeks				
Control (30-29) ¹	.54	1.19	.57	1.26
Probiotic 2 ²	.55	1.22	.59	1.21
7 weeks				
Control (26)	2.35	1.53	2.57	1.53
Probiotic 2	2.40	1.54	2.61	1.51
10 weeks				
Control (23)	4.14	1.64	4.61	1.61
Probiotic 2	4.22	1.63	4.64	1.58
12 weeks				
Control (22)	5.53	1.85	6.01	1.83
Probiotic 2	5.58	1.84	6.12	1.81
14 weeks				
Control (20)	6.97	2.04	7.41	2.02
Probiotic 2	6.98	2.03	7.64*	2.01

¹ Level of protein in the typical corn-soy type diet prior to the period indicated (30%, 0-1 week; 29%, 1-3 weeks).

² One thousand p.p.m. in the feed (dry).

* Differs from the corresponding control at the 95% confidence limit.

Table 3. Effect of Probiotics on Growth of Turkeys
(Strain 2 Only)

Age-Criteria	Treatments			
	Basal ¹	Probiotic 1 ²	Probiotic 2 ³	Probiotic 4 ⁴
	<u>Treatment 4</u>			
4 weeks (23) ¹				
Wt., kg.	.66	.70	.68	.69
Feed/gain	1.4	1.5	1.4	1.5
8 weeks (20)				
Wt., kg.	2.68	2.70	2.68	2.65
Feed/gain	1.8	1.9	1.8	1.8
12 weeks (18)				
Wt., kg.	5.66	5.63	5.67	5.69
Feed/gain	2.1	2.2	2.2	2.2
16 weeks (16)				
Wt., kg.	8.83	8.61	8.67	8.68
Feed/gain	2.5	2.6	2.5	2.6
20 weeks (14)				
Wt., kg.	11.58	11.57	11.34	11.61
Feed/gain	2.9	2.9	2.9	2.8
24 weeks (12)				
Wt., kg.	14.24	14.00	13.73	13.84
Feed/gain	3.1	3.1	3.1	3.1

¹ Low protein series of corn-soy type diets, starting at 23% and ending at 12%. Numbers in parenthesis indicate protein level.

² Probiotic No. 1 (liquid) at 327 p.p.m. in the diets.

³ Probiotic No. 2 (dry) at 369 p.p.m. in the diets.

⁴ Probiotic No. 4 (liquid) at 130 p.p.m. in the diets.