1974

Effect of Fungus-Fermented Soybeans on the Life Cycle Performance of Japanese Quail

C. C. Chah
South Dakota State University

R. A. Nelson

C. W. Carlson

G. Semeniuk

South Dakota State University
Brookings, South Dakota
Department of Animal Science
Poultry Section

A.S. Series 74-22

Effect of Fungus-Fermented Soybeans on the Life Cycle Performance of Japanese Quail

C. C. Chah[1], R. A. Nelson[1], C. W. Carlson[1], G. Semeniuk[1], I. S. Palmer[1] and C. W. Hesseltine[2]

Earlier studies at our laboratory have demonstrated that feeding full-fat soybeans fermented by certain Aspergillus cultures resulted in significantly improved broiler growth and feed utilization. In conjunction with these findings, the effect of two Aspergillus species on the life cycle performance of Japanese quail (Coturnix coturnix japanica) has been investigated and will be reported herein.

Day-old quail chicks were fed a regular starter diet for 10 days. They were then randomly assigned to five replicate groups of 20 chicks per group and placed on an experimental diet containing either control or fermented soybeans at 50% of the diet. The diets were formulated on an isocaloric (3192 Kcal ME/kg) and isonitrogenous (24% protein) basis. At 4 weeks of age, each group was sexed and realloted as 8 females and 2 males and fed a layer diet made with the same soybeans (35% of the diet).

The average body weights and feed efficiency data are summarized in Table 1. The results of feeding the fermented soybeans to quail chicks indicated significantly superior weight gains ($P<0.01$) and feed efficiency ($P<0.05$) after the 2- and 4-week growth periods, thus confirming previous observations made with similar cultures in broiler studies.

The data for hen-day egg production and egg weight (Table 2) from seven consecutive 28-day periods revealed, however, that diets made with fermented soybeans failed to exert significant effects on these parameters. On the other hand, improved fertility and hatchability (Table 3) were evident in the groups receiving fermented soybeans. Subsequent progeny growth (Table 4) revealed that quail from dams receiving diets containing fermented soybeans were no heavier than those from hens fed the control diets at 10 days of age, but again responded significantly ($P<0.01$) to the fermented soybean diets through 2 and 4 weeks of age.

---

[1]Graduate Assistant; Superintendent, Poultry Research Center; Professor and Leader, Poultry Research and Extension; Professor and Associate Professor, Departments of Animal Science, Plant Science and Station Biochemistry, respectively.

[2]Chief, Fermentation Laboratory, Northern Regional Research Laboratory, U.S.D.A., Peoria, Illinois, 61604.

Table 1. Effect of Feeding Fermented Soybeans on Quail Chick Weight Gains and Feed Efficiency Responses[1]

Treatment	Initial	2 weeks	4 weeks
		Avg. body weight (gm)[2]	
Control	30.5[a]	57.5[a]	90.3[a]
19. A. oryzae 451	30.0[a]	63.4[b]	101.2[b]
22. A. oryzae 506	30.4[a]	65.6[b]	102.1[b]
		Feed/gain ratio[3]	
Control		4.40[a]	4.76[a]
19. A. oryzae 451		3.36[b]	3.87[b]
22. A. oryzae 506		3.12[b]	3.90[b]

[1]Ten days old at start of study.
[2]Weights having the different superscript are statistically different ($P<0.01$).
[3]Ratios having the same superscript are not statistically different ($P<0.05$).

Table 2. Performance of Laying Quail Fed Fermented Soybeans

Period (age)	Treatment	Production (H.D.B.) %	Average egg wt. gm	Feed consumption (gm/bird/day)	Body wt. gm	Gain in weight gm
First (7-10 wk)	Control	68.9	9.7	21.2	127.4	+11.2
	19	73.4	9.8	19.3	129.7	+8.6
	22	77.2	9.9	19.4	132.3	+9.5
Second (11-14 wk)	Control	83.3	10.5	22.2	138.9	+11.5
	19	78.7	10.4	20.3	140.2	+10.5
	22	81.8	10.5	20.3	141.6	+9.3
Third (15-18 wk)	Control	84.9	10.5	21.3	140.5	+1.6
	19	76.8	10.5	20.9	141.8	+1.6
	22	76.8	10.7	20.8	141.8	+0.2
Fourth (19-22 wk)	Control	76.6	10.3	21.9	140.8	+0.3
	19	71.9	10.4	23.0	143.8	+2.0
	22	74.0	10.3	22.6	140.4	-1.4
Fifth (23-26 wk)	Control	68.8	10.2	20.1	140.2	-0.6
	19	65.9	10.2	20.5	145.1	+1.3
	22	68.3	10.3	19.7	141.2	+0.8
Sixth (27-30 wk)	Control	58.1	9.9	19.9	136.8	-3.4
	19	57.3	10.3	19.8	140.2	-4.9
	22	54.5	10.1	19.8	137.8	-3.4
Seventh (31-34 wk)	Control	49.5	9.9	19.0	132.1	-4.7
	19	46.4	10.3	18.9	136.1	-4.1
	22	40.1	10.0	18.6	134.2	-3.6
Total (Experimental average)	Control	70.0	10.1	20.8	136.7	+15.9
	19	67.2	10.3	20.4	139.6	+15.0
	22	67.6	10.3	20.2	138.5	+11.4

Table 3. Effect of Fermented Soybeans Upon Fertility and Hatchability[1]

Treatment	Eggs set	Fertility	Hatchability[2]
		%	%
Control	238	41.3	30.1
19. A. oryzae 451	231	48.8	35.3
22. A. oryzae 506	228	47.9	36.1

[1]Each value represents the mean from four separate trials.
[2]Hatch of all eggs set.

Table 4. Effect of Fermented Soybeans Upon Progeny Growth[1]

Treatment	Avg. body weight (gm)		
	Initial	2 weeks	4 weeks
Control	34.1[a][2]	62.6[a]	99.1[a]
19. A. oryzae 451	35.2[a]	73.7[b]	107.2[b]
22. A. oryzae 506	36.0[a]	74.7[b]	109.8[b]

[1]Ten days old at start of study.
[2]Weights having the same superscript are not statistically different ($P<0.01$).