Study Title

Nutritional Equivalency of *B.t.* Cry1F Maize – Poultry Feeding Study

Data Requirements

None

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Sponsor Study Number

PHI99-010

PARC Trial Number

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Nutritional Equivalency of *B.t.* Cry1F Maize – Poultry Feeding Study

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Penny Hunst
Regulatory Manager

Date: 10/12/01

STATEMENT OF COMPLIANCE WITH GOOD LABORATORY PRACTICE STANDARDS

This study was not conducted under Good Laboratory Practice regulations.

Study Director Signature — Date: 06/Nov/00

Sponsor Signature — Date: 11/6/2000

QUALITY ASSURANCE STATEMENT

Study Title: Nutritional Equivalency of Insect Resistant/Glufosinate Tolerant Maize - Poultry Feeding Study

Study Initiation Date: October 13, 1999

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NON-GLP STUDY

SIGNATURE PAGE

Study Title: Nutritional Equivalency of *B.t.* Cry1F Maize – Poultry Feeding Study

James L. McNaughton, Study Director — 06/Nov/00 Date

Larry Zeph, Author and Sponsor — 11/6/2000 Date

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SUMMARY

The purpose of this study was to determine the effect of diets containing maize grain from *B.t.* Cry1F line 1507 and *B.t.* Cry1F line 1360 on the performance of commercial broiler chickens between 0-42 days of age.

This study was conducted at PARC Institute's Poultry Facility in Queen Anne, MD. The test system for this study was a male commercial type broiler chicken (Cobb x Cobb). Broilers were fed diets *ad libitum* containing one of the following reference (1-4), control (5), and test (6-7) substances:

1. Yellow dent corn Bin #1
2. Yellow dent corn Bin #2
3. Yellow dent corn Bin #3
4. Yellow dent corn Bin #4
5. Control maize hybrid (Mycogen Seeds Hybrid 7250)
6. *B.t.* Cry1F maize 1507 hybrid
7. *B.t.* Cry1F maize 1360 hybrid

No test substance related mortality or effects on body weight or feed conversion were observed between chickens fed a diet containing maize grain from *B.t.* Cry1F line 1507 or *B.t.* Cry1F line 1360 and a diet containing maize grain from the non-transgenic control line or a standard diet containing yellow dent corn. Maize grain from *B.t.* Cry1F lines 1507 and 1360 was considered nutritionally equivalent to maize grain from commercial hybrids when fed to commercial broiler chickens.

I. INTRODUCTION

A. Background

Two maize lines have been modified to express both the Cry1F protein from *Bacillus thuringiensis* subsp. *aizawai* and the phosphinothricin-N-acetyltransferase (PAT) protein. The resultant maize lines will be referred to as *B.t.* Cry1F maize line 1507 and *B.t.* Cry1F maize line 1360 throughout the remainder of this document. Expression of the Cry1F and PAT proteins provides control of European corn borer (ECB) and certain other lepidopteran pests as well as conferring tolerance to glufosinate-ammonium herbicides. The corresponding negative control hybrid possesses the background genetics representative of the modified maize lines, but is not genetically modified and does not express the Cry1F or PAT proteins.

B. Purpose

The purpose of this study was to determine the effect of diets containing maize from transgenic Cry1F lines on the performance of commercial broiler chickens between 0-42 days of age.

II. MATERIALS AND METHODS

A. Study Dates

Study initiation date: 13 October, 1999
Experimental start date : 23 December, 1999
Experimental completion date: 03 February, 2000
Study completion date: 06 November, 2000

B. Study Personnel

- Study Director: James L. McNaughton, PARC Institute, Inc.
- Study Contributors:
  - Study Veterinarian and Pathologist --Ed Odor, PARC Institute, Inc.
  - Study Assistants -- William J. Graves, Operations Manager, PARC Institute, Inc.
    -- Cliff Harris, PARC Institute, Inc.
    -- Rick Slater, PARC Institute, Inc.
    -- Cheryl Graves, PARC Institute, Inc.
    -- John Clark, PARC Institute, Inc.
  - Quality Assurance -- Michael S. Roberts, PARC Institute, Inc.

C. Test Substances

The test substances used in this study were as follows:

- Hybrid maize kernels from *B.t.* Cry1F line 1507
- Hybrid maize kernels from *B.t.* Cry1F line 1360

D. Control Substance

The control substance used in this study was maize from a non-transgenic hybrid (Mycogen Seeds Hybrid 7250) which possessed the background genetics representative of the test substances, but was not genetically modified and does not express the Cry1F or PAT proteins.

E. Reference Substances

The reference substances used in this study were as follows:

- Yellow dent corn Bin #1
- Yellow dent corn Bin #2
- Yellow dent corn Bin #3
- Yellow dent corn Bin #4

Reference substances were grain from commercial hybrids provided by PARC Institute, Inc.

F. Test System

- Breed: Cobb x Cobb chicken
- Source: Mountaire Hatchery, Princess Anne, MD 21853
- Number of test animals used: 245 (35/treatment)
- Gender: Male
- Age on trial day 0: 0 (= day of hatch)

G. Experimental Design

On trial day 0, 245 healthy male broilers were randomly assigned to eight treatment groups. Each treatment consisted of 7 pens (replicates), each containing 5 chickens (see Table 1 for pen assignments). All birds were uniquely identified with a wingband. Table 2 summarizes the experimental design. No replacements were made during the course of this study.

Table 2. Experimental Design

Treatment Number	Treatment Description	Number Of Reps	Number Of Birds Per Rep	Total Number of Birds On Trial
1	Yellow dent corn Bin #1	7	5 males	35
2	Yellow dent corn Bin #2	7	5 males	35
3	Yellow dent corn Bin #3	7	5 males	35
4	Yellow dent corn Bin #4	7	5 males	35
5	Control hybrid 7250	7	5 males	35
6	*B.t.* Cry1F maize 1507 hybrid	7	5 males	35
7	*B.t.* Cry1F maize 1360 hybrid	7	5 males	35
TOTAL		**7/trt**	5 per cage	**245**

H. Duration of Trial

Starter period: trial day 0 to 20.
Grower period: trial day 21 to 42.

I. Diet Preparation

Diets were formulated with each test, control and reference substance (consisting of a commercial, corn-soy type ration) and were designed to either meet or exceed the National Research Council Nutrient Recommendations for Chickens (NRC, 1994- 9th edition). The raw materials used to prepare starter and grower diets are shown in Table 3. The incorporation of maize was 54.21% for starter diets across all treatments and 57.03% for grower diets across all treatments.

The test, control, and reference substance diet mixtures were fed continuously for 42 days:
- Trial days 0-20: starter feed
- Trial days 21-42: grower feed

Subsamples of the test substances (hybrid maize kernels from *B.t.* Cry1F lines 1507 and 1360) and the control substance were analyzed for expression of the Cry1F protein using a specific Enzyme Linked Immunosorbent Assay (ELISA). Cry1F protein was present in both test substances. No Cry1F protein was detected in the control substance. The results of the expression analysis are shown in Table 4.

Samples of whole maize grain, starter and grower diets for each treatment were analyzed at Woodson-Tenent Laboratories, Inc. for nutrient composition. The nutrient composition of whole maize grain, starter and grower diets for each treatment is shown in Tables 5-7.

Starter and grower diets were available *ad libitum*. No medication was administered during the study.

J. Housing and Environmental Conditions

- Research site: PARC Farm #1, House B: Wood/cinder block structure with metal roof and low ceiling insulated to R value of 19 and 12 for the roof and side walls, respectively.
- Ventilation: Cross-house ventilation system and ceiling fans spaced evenly.
- Heat source: Forced-air heat and individual cage heat lamps. Ambient temperature (at bird height) was recorded three times per day in three house locations.
- Cage dimensions: 18" x 24". Cages were separated by a wire partition in order to prevent cross-contamination.
- Number of cages: 49.
- Lighting: Continuous (24 hours per day).
- Sanitation procedures: Cages, aisles, feeders and waterers were sanitized prior to bird placement on trial day 0.
- Water: Drinking water was provided *ad libitum*.

K. Performance Measurements

Mortality

Mortality was recorded daily between trial days 0-42.

Body weight and weight gain

Individual body weight was recorded on trial days 0 and 42.

Body weight gain was calculated by subtracting the day 0 body weight from the day 42 body weight followed by division of the product by the number of days on trial.

Feed conversion

Feed conversion was evaluated for each cage for the periods: 0-20 and 21-42 trial days. Feed conversion data is reported for the period of 0-42 trial days and is corrected for body weight.

Any feed that may have been inadvertently spilled during the course of the study was noted on a daily observation sheet. Spilled feed was weighed (weights recorded on appropriate forms) and discarded (not used for further consumption).

L. Statistical Methods

Data generated during the study was subjected to the following statistical tests:
For all parameters, a multi-factorial procedure was used to compare the means of treatment groups, using Analysis Of Variance (ANOVA). Treatment means were compared for Least Significant Difference. Significant differences were reported at the $p \leq 0.05$ level.

Parameters: Mortality (trial days 0-42)
Body weight (trial days 0 and 42)
Body weight gain (trial days 0-42)
Feed conversion (trial days 0-42, corrected for body weight)

M. Records and Final Report Archival

All original data records generated during the course of this study have been archived at PARC, Inc.

III. RESULTS AND CONCLUSIONS

Table 8 summarizes treatment means for all performance measures (mortality, body weight on trial days 0 and 42, daily gain, feed conversion).

Table 8. Summary of Performance Measures

Parameter	Treatment						
	#1	#2	#3	#4	#5	#6	#7
Mortality %	5.71	5.71	2.86	5.71	2.86	5.71	2.86
Stats.[1]	a	a	a	a	a	a	a
Body Weight (kg) Day 0	0.044	0.043	0.043	0.043	0.044	0.043	0.043
Stats.[1]	a	a	a	a	a	a	a
Body Weight (kg) Day 42	1.730	1.739	1.738	1.728	1.739	1.757	1.761
Stats.[1]	a	a	a	a	a	a	a
Daily Gain (g per bird per day)	0.040	0.040	0.040	0.040	0.040	0.041	0.041
Stats.[1]	a	a	a	a	a	a	a
Feed Conversion (BW corrected)	1.797	1.806	1.808	1.804	1.802	1.775	1.786
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$).

Mortality

The percent mortality for each treatment is summarized in Table 8. Individual percent mortalities (by replicate within treatment) are shown in Table 9.

There were no statistically significant differences in mean percent mortality among any of the seven treatments.

Body weight and weight gain

The mean body weights on trial days 0 and 42 and the mean daily weight gain for each treatment are summarized in Table 8.

Individual mean body weights (by replicate within treatment) on trial day 0 are shown in Table 10.

There were no statistically significant differences in mean body weight on trial day 0 among any of the seven treatments.

Table 11 summarizes the individual mean body weights (by replicate within treatment) on trial day 42.

There were no statistically significant differences in mean body weight among any of the seven treatments.

Table 12 summarizes the individual mean daily weight gain for each broiler (by replicate within treatment) during study days 0-42.

There were no statistically significant differences in mean daily weight gain among any of the seven treatments.

Feed conversion

The mean feed conversion, corrected for body weight, for each treatment is summarized in Table 8. Individual mean feed conversion (by replicate within treatment) is shown in Table 13.

There were no statistically significant differences in mean feed conversion corrected for body weight among any of the seven treatments.

Conclusions

Based on the results from this study, no test substance related mortality or effects on body weight or feed conversion were observed between chickens fed a diet containing maize grain from *B.t.* Cry1F line 1507 or *B.t.* Cry1F line 1360 and a diet containing maize grain from the non-transgenic control line or a standard diet containing yellow dent corn. Maize grain from *B.t.* Cry1F lines 1507 and 1360 was considered nutritionally equivalent to maize grain from commercial hybrids when fed to commercial broiler chickens.

IV. PROTOCOL AMENDMENTS AND DEVIATIONS

Amendments

1. The protocol was amended to indicate that the study would not be conducted under Good Laboratory Practice regulations. Groups 1-7 listed in the protocol as test materials were identified in the amendment as either reference substances (Groups 1-4), the control substance (Group 5) or, test substances (Group 6 and 7).

Deviations

None.

TABLES

Table 1. Pen Assignments

	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7
Treatment 1	6[a]	10	17	25	29	42	48
Treatment 2	2	11	16	28	34	36	46
Treatment 3	1	8	20	26	32	39	45
Treatment 4	7	14	15	23	35	40	49
Treatment 5	4	12	21	27	30	37	47
Treatment 6	3	9	19	24	31	41	43
Treatment 7	5	13	18	22	33	38	44

a _ pen number

Table 3. Starter and Grower Diet Raw Materials

MAJOR INGREDIENTS	Starter Diet (%)	Grower Diet (%)
Corn Source (#1-7) [a]	54.21	57.03
Soybean meal (48%)	34.10	31.42
Animal & Veg. Blend	5.65	5.87
Meat Blend (58%)	3.00	3.00
Minor Ingredients	3.05	2.68
Total	100.00	100.00
MINOR INGREDIENTS		
Salt	0.394	0.345
L-Lysine-HCL	0.030	0.017
Dicalcium Phosphate	1.309	1.158
Limestone	0.877	0.822
Vitamin Premix (M/A)	0.025	0.025
Trace Mineral Premix (M/A)	0.075	0.075
DL-Methionine	0.316	0.238
Choline Chl. (70%)	0.027	0.000
Subtotal	3.053	2.680

a_ Each test, control and reference substance was added to starter and grower diet mixtures as outlined in section G. Experimental Design for treatments #1-7.

Table 4. Cry1F protein expression analysis of test and control substances

Test or control substance	Cry1F expression[a]
B.t. Cry1F line 1507	2.8 ng/mg
B.t. Cry1F line 1360	3.2 ng/mg
Control line 7250	0 ng/mg

a _ values were calculated on a dry weight basis.

Table 5. Nutrient composition of whole maize grain sources for treatments #1 - 7

Whole Maize Grain							
	Treatments #1- 7						
Nutrient	**#1** **Bin #1**	**#2** **Bin #2**	**#3** **Bin #3**	**#4** **Bin #4**	**#5** **Control Hybrid**	**#6** **Test *B.t.* Cry1F maize 1507 hybrid**	**#7** **Test *B.t.* Cry1F maize 1360 hybrid**
Moisture	12.99[a]	13.44	13.57	13.42	11.10	12.22	10.20
Crude Fat/Oil	3.48	3.40	3.53	3.42	3.82	3.49	3.70
Protein	8.74	9.10	9.15	8.79	7.25	8.68	8.90
Fiber, Crude	1.9	1.8	2.0	1.9	1.7	1.5	2.0
Ash	1.37	1.28	1.33	1.33	1.25	1.38	1.42
Tryptophan	0.06	0.07	0.06	0.06	0.06	0.07	0.06
Aspartic Acid	0.59	0.58	0.60	0.59	0.52	0.64	0.64
Threonine	0.31	0.31	0.32	0.32	0.26	0.32	0.32
Serine	0.41	0.40	0.41	0.41	0.34	0.42	0.43
Glutamic Acid	1.54	1.46	1.54	1.54	1.24	1.58	1.64
Proline	0.74	0.71	0.74	0.74	0.65	0.77	0.78
Glycine	0.33	0.33	0.34	0.33	0.30	0.34	0.33
Alanine	0.60	0.58	0.60	0.59	0.48	0.61	0.63
Cysteine	0.18	0.18	0.19	0.18	0.16	0.18	0.18
Valine	0.39	0.38	0.39	0.38	0.32	0.39	0.39
Methionine	0.19	0.18	0.18	0.18	0.15	0.16	0.16
Isoleucine	0.28	0.27	0.28	0.28	0.23	0.29	0.30
Leucine	0.96	0.91	0.96	0.96	0.74	0.98	1.03
Tyrosine	0.14	0.15	0.13	0.14	0.11	0.15	0.14
Phenylalanine	0.39	0.38	0.39	0.39	0.31	0.41	0.42
Lysine, Total	0.28	0.25	0.28	0.25	0.25	0.28	0.26
Histidine	0.24	0.24	0.24	0.24	0.21	0.24	0.24
Arginine	0.36	0.38	0.36	0.37	0.32	0.38	0.38
Calcium	0.006	0.007	0.006	0.006	0.006	0.006	0.006
Phosphorus	0.25	0.26	0.24	0.25	0.26	0.27	0.28

a_ values are based on the analysis of a single sample.

Table 6. Nutrient composition of starter feed diet mixtures for treatments #1 - 7

Starter Feed							
	Treatments #1- 7 (corn source)						
Nutrient	**#1** **Bin #1**	**#2** **Bin #2**	**#3** **Bin #3**	**#4** **Bin #4**	**#5** **Control Hybrid**	**#6** **Test *B.t.* Cry1F maize 1507 hybrid**	**#7** **Test *B.t.* Cry1F maize 1360 hybrid**
Moisture	12.60[a]	12.68	12.61	12.55	10.61	11.28	10.30
Crude Fat/Oil	5.09	5.15	5.02	5.01	5.96	5.73	5.58
Protein	20.88	20.96	21.04	21.08	22.96	24.80	24.83
Fiber, Crude	2.5	2.6	2.5	2.6	2.7	3.0	2.8
Ash	5.01	4.84	4.87	4.78	5.75	5.60	5.68
Tryptophan	0.23	0.26	0.28	0.25	0.29	0.28	0.28
Aspartic Acid	2.12	1.93	1.98	2.05	2.58	2.62	2.51
Threonine	0.79	0.74	0.74	0.77	0.93	0.95	0.91
Serine	1.04	0.99	0.96	1.02	1.23	1.26	1.21
Glutamic Acid	3.59	3.34	3.38	3.50	4.17	4.35	4.16
Proline	1.24	1.18	1.14	1.22	1.39	1.44	1.38
Glycine	0.92	0.86	0.91	0.89	1.07	1.09	1.06
Alanine	1.03	0.97	1.04	1.00	1.12	1.19	1.17
Cysteine	0.30	0.29	0.30	0.30	0.35	0.34	0.36
Valine	0.95	0.87	0.93	0.91	1.09	1.13	1.10
Methionine	0.51	0.55	0.51	0.50	0.59	0.59	0.65
Isoleucine	0.82	0.75	0.79	0.78	0.95	0.99	0.96
Leucine	1.68	1.59	1.63	1.63	1.83	1.94	1.91
Tyrosine	0.41	0.39	0.36	0.34	0.47	0.43	0.49
Phenylalanine	0.95	0.89	0.90	0.91	1.09	1.13	1.10
Lysine, Total	1.03	0.99	1.00	1.08	1.30	1.37	1.24
Histidine	0.51	0.49	0.54	0.50	0.58	0.61	0.58
Arginine	1.23	1.18	1.13	1.15	1.47	1.46	1.46
Calcium	0.66	0.66	0.65	0.73	0.85	0.82	0.88
Phosphorus	0.59	0.61	0.60	0.63	0.69	0.70	0.70

a_ values are based on the analysis of a single sample.

Table 7. Nutrient composition of grower feed diet mixtures for treatments #1 - 7

Grower Feed							
Nutrient	Treatments #1- 7 (corn source)						
	#1 Bin #1	#2 Bin #2	#3 Bin #3	#4 Bin #4	#5 Control Hybrid	#6 Test *B.t.* Cry1F maize 1507 hybrid	#7 Test *B.t.* Cry1F maize 1360 hybrid
Moisture	12.63[a]	12.62	12.65	12.60	10.67	11.26	10.13
Crude Fat/Oil	4.83	5.07	4.74	4.72	5.42	5.30	5.76
Protein	21.59	19.89	20.31	20.51	25.73	22.96	23.99
Fiber, Crude	2.8	2.5	2.6	2.6	2.8	2.9	2.7
Ash	4.69	4.63	4.34	4.59	5.94	5.50	5.48
Tryptophan	0.26	0.21	0.27	0.22	0.27	0.25	0.25
Aspartic Acid	1.96	2.08	1.83	2.15	2.47	2.35	2.58
Threonine	0.74	0.78	0.70	0.80	0.90	0.86	3.90
Serine	0.99	1.03	0.91	1.06	1.19	1.13	1.26
Glutamic Acid	3.36	3.53	3.11	3.68	4.02	3.96	4.33
Proline	1.18	1.20	1.11	1.26	1.37	1.35	1.46
Glycine	0.87	0.89	0.82	0.91	1.07	1.05	1.07
Alanine	0.98	1.00	0.92	1.04	1.10	1.14	1.19
Cysteine	0.29	0.29	0.28	0.29	0.33	0.32	0.34
Valine	0.89	0.91	0.85	0.94	1.07	1.08	1.11
Methionine	0.52	0.47	0.47	0.49	0.61	0.58	0.58
Isoleucine	0.76	0.79	0.71	0.82	0.93	0.93	0.97
Leucine	1.58	1.64	1.46	1.69	1.77	1.81	1.96
Tyrosine	0.39	0.34	0.33	0.36	0.47	0.46	0.51
Phenylalanine	0.89	0.92	0.82	0.95	1.06	1.04	1.13
Lysine, Total	1.00	1.09	1.01	1.16	1.40	1.39	1.32
Histidine	0.48	0.50	0.45	0.52	0.58	0.55	0.60
Arginine	1.15	1.15	1.07	1.21	1.45	1.40	1.49
Calcium	0.64	0.69	0.65	0.71	0.98	0.88	0.91
Phosphorus	0.56	0.60	0.59	0.60	0.73	0.71	0.71

a_ values are based on the analysis of a single sample.

Table 9. Mortality (%)

Rep#	Treatment						
	#1	#2	#3	#4	#5	#6	#7
1	0.00	0.00	0.00	0.00	0.00	20.00	0.00
2	20.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	20.00	0.00	20.00	0.00	0.00	0.00
4	0.00	20.00	0.00	0.00	0.00	0.00	20.00
5	20.00	0.00	20.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	20.00	20.00	20.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	**5.714**	**5.714**	**2.857**	**5.714**	**2.857**	**5.714**	**2.857**
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$) as determined by Least Significant Difference.

Table 10. Mean body weight on trial day 0 (kg)

Rep#	Treatment						
	#1	#2	#3	#4	#5	#6	#7
1	0.045	0.042	0.044	0.042	0.044	0.042	0.044
2	0.043	0.042	0.043	0.045	0.043	0.044	0.046
3	0.045	0.044	0.041	0.044	0.046	0.041	0.041
4	0.044	0.045	0.041	0.041	0.042	0.046	0.040
5	0.044	0.042	0.046	0.042	0.042	0.045	0.045
6	0.043	0.041	0.044	0.045	0.044	0.042	0.042
7	0.046	0.045	0.041	0.044	0.045	0.042	0.045
Mean	**0.044**	**0.043**	**0.043**	**0.043**	**0.044**	**0.043**	**0.043**
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$) as determined by Least Significant Difference.

Table 11. Mean body weight on trial day 42 (kg)

Rep#	Treatment						
	#1	#2	#3	#4	#5	#6	#7
1	1.769	1.770	1.730	1.730	1.792	1.692	1.784
2	1.724	1.724	1.741	1.705	1.733	1.713	1.743
3	1.697	1.708	1.693	1.788	1.717	1.801	1.717
4	1.720	1.752	1.778	1.730	1.723	1.792	1.719
5	1.800	1.767	1.719	1.667	1.742	1.760	1.779
6	1.711	1.715	1.733	1.751	1.737	1.771	1.797
7	1.686	1.734	1.770	1.724	1.730	1.768	1.785
Mean	**1.730**	**1.739**	**1.738**	**1.728**	**1.739**	**1.757**	**1.761**
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$) as determined by Least Significant Difference.

Table 12. Mean daily gain (g per bird per day)

Rep#	Treatment						
	#1	#2	#3	#4	#5	#6	#7
1	0.041	0.041	0.040	0.040	0.042	0.039	0.041
2	0.040	0.040	0.040	0.040	0.040	0.040	0.040
3	0.039	0.039	0.039	0.041	0.040	0.042	0.040
4	0.040	0.040	0.041	0.040	0.040	0.042	0.040
5	0.042	0.041	0.040	0.039	0.040	0.041	0.041
6	0.040	0.040	0.040	0.040	0.040	0.041	0.042
7	0.039	0.040	0.041	0.040	0.040	0.041	0.041
Mean	**0.040**	**0.040**	**0.040**	**0.040**	**0.040**	**0.041**	**0.041**
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$) as determined by Least Significant Difference.

Table 13. Mean feed conversion (body weight corrected)

Rep#	Treatment						
	#1	#2	#3	#4	#5	#6	#7
1	1.755	1.785	1.759	1.813	1.799	1.778	1.822
2	1.734	1.771	1.853	1.776	1.767	1.749	1.753
3	1.740	1.862	1.806	1.741	1.883	1.827	1.857
4	1.827	1.886	1.811	1.841	1.740	1.799	1.734
5	1.768	1.756	1.785	1.807	1.742	1.792	1.718
6	1.873	1.727	1.888	1.844	1.826	1.745	1.781
7	1.882	1.858	1.752	1.806	1.860	1.733	1.838
Mean	**1.797**	**1.806**	**1.808**	**1.804**	**1.802**	**1.775**	**1.786**
Stats.[1]	a	a	a	a	a	a	a

1_ Means within a row without a common letter are significantly different ($p < 0.05$) as determined by Least Significant Difference.