



**MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE
ÚSTRAŠICE**

státní podnik

390 02 Tábor 2

Česká republika

BROILER FEEDING TEST No. 8/2021

**Coccidial challenge
in broiler chicks**



14 April – 18 May 2021

**Study Investigator:
Associate Investigator:**

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Aim of the project

The objective of this study was to evaluate the effects of tested products and their dose effect on oocyst shedding, lesion scores and health performance parameters of *Eimeria acervulina*, *Eimeria tenella* and *Eimeria maxima* challenged broiler chicks.

Basic tests information

The basic dates

Beginning of the test: 14 April 2021

End of the test: 18 May 2021

Location of the test

Mezinárodní testování drůbeže s.p., Ústrašice

Material and methods

Material

In total there were 800 day old chicks of [REDACTED]. Day old chicks were randomly distributed into 5 treatments (4 pens for sample).

Experimental treatments

Treat. No.	Treatment	Description	Coccidiosis challenge	No. of pen	Birds per pen	No. of chick
1	T1	[REDACTED]	YES	4	40	160
2	T2	[REDACTED]	YES	4	40	160
3	T3	[REDACTED]	YES	4	40	160
4	T4	[REDACTED]	YES	4	40	160
5	T5	[REDACTED]	YES	4	40	160

Origin 1-day old chicks:

breeder company – [REDACTED]

parent flock – [REDACTED]

age of the breeding flock - 49 weeks

Housing system

Chickens were kept in the windowless chicken house with full climatic control, on deep litter. Drinking water was supplied ad libitum by nipple drinkers. Each pen was equipped with manually filled tube feeders. Bedding material was wood shaving.

Lighting programme

Day 1 - 7	23 hours of light + 1 hour of darkness
Day 8 - 31	18 hours of light + 6 hours of darkness
Day 32 – 35	23 hours of light + 1 hour of darkness

Veterinary precautions

The chicken house was disinfected by [REDACTED] before the chick placement. On days 1 chickens were vaccinated [REDACTED].

Feed

Feed was produced in Mezinárodní testování drůbeže, s.p.

Day 1 – 14	Starter (BR1)
Day 15 – 28	Grower (BR2)
Day 29 – 35	Finisher (BR3)

Diet formulas

Components (%)	Starter BR1	Grower BR2	Finisher BR3
Wheat	10.000	11.722	10.000
Maize	29.617	30.000	37.062
Soybean meal	37.391	33.707	28.397
Barley	15.000	15.000	15.000
Soybean oil	4.000	5.800	6.000
L-lysine HCl	0.330	0.280	0.300
DL-methionine	0.070	0.050	0.060
L-threonine	0.020	0.020	0.020
Limestone	1.460	1.300	1.150
Salt	0.261	0.270	0.260
MCP	1.200	1.200	1.100
Na ₂ CO ₃	0.150	0.150	0.150
██████████	0.500	-	-
██████████	-	0.500	-
██████████	-	-	0.500
Nutrient content			
Crude protein (g/kg)	230.000	215.000	195.000
ME (MJ/kg)	11.820	12.317	12.529
Lysine (g/kg)	14.830	13.460	12.230
Methionine (g/kg)	6.270	5.470	5.030
Met.+Cys. (g/kg)	9.990	8.980	8.280
Ca (g/kg)	9.578	8.807	7.892
P (g/kg)	6.918	6.748	6.312
Na (g/kg)	1.485	1.516	1.473
Dry matter (g/kg)	900.800	901.600	901.100
Fat (g/kg)	57.995	76.048	79.496
Crude fibre (g/kg)	48.780	47.770	47.280

Feed analyses for nutrient contents were performed at the laboratory of [REDACTED]
[REDACTED]

Nutrient content	Starter BR1	Grower BR2	Finisher BR3
Crude protein (g/kg)	218.00	190.00	179.00
ME (MJ/kg)	11.50	12.80	12.30
Starch (g/kg)	324.00	380.00	380.00
Ca (g/kg)	10.40	9.53	8.73
P (g/kg)	6.79	6.46	6.31
Dry matter (%)	89.30	90.00	89.70
Fat (g/kg)	56.40	85.00	77.50
Crude fibre (g/kg)	33.20	33.30	39.20

Parameters recorded and methods applied

Live weight

Live weight was measured on days 1 (all the birds in each pen were weighed altogether). On day 3 each chicken was marked with a wing mark. Chick were individual weighed on days 3, 14, 21, 28 and 35.

Weight gain

Weight gain per phase and average daily weight gains were calculated for the periods 3 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and for the overall experiment (3 – 35 days).

Feed conversion ratio

Feed consumption and feed conversion ratio to gain ratio were calculated for the periods 1 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and for the overall experiment (1 – 35 days). The calculation was included weight of deaths.

Feed consumption

Feed consumption was measured per pen for the feed – starter (1 – 14 days), grower (15 – 21 days and 22 – 28 days) and finisher (29 – 35 days).

Mortality

All pens were checked twice a day to see if there were any dead or ill birds. Dead chickens were registered by date and reason of mortality on the day of death. Mortality was recorded for the periods 1 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and 1 – 35 days.

Foot pad lesions

At the end of the trial the animals were recorded according the scale.

Statistical analyses

Performance results of live weight (on days 1, 3, 14, 21, 28 and 35), daily weight gain and feed conversion ratio were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

Results

Tab. No.

1 Hatchability

2 Performance results:

2a Body weight

2b Weight gain

2c Feed conversion ratio per 1 kg of live weight

2d Feed consumption per 1 kg of weight gain

2e Feed consumption

3 Mortality

4 Foot pad lesions

5 Statistical analysis of body weight at the age of 35 days

(average body weight, standard deviation, coefficient of variation)

6 - 9 Statistical analyses of performance results

10 Performance results per pen:

10a Body weight

10b Weight gain

10c Feed conversion ratio per 1 kg of live weight

10d Feed consumption per 1 kg of weight gain

10e Feed consumption

10f Foot pad lesions

Results of incubation and hatching

Tab. No. 1

Treatment	Tr. No.	Fertility	Hatchability		Birds housed	Average weight	
			Set eggs	Fertile eggs		Hatching eggs	Day old chicks
		%	%	%		g	g
T1	1	84.26	75.00	89.01	160	67.02	45.75
T2	2				160		45.63
T3	3				160		45.31
T4	4				160		45.94
T5	5				160		45.94

Body weight per phases

Tab. No. 2a

Treatment	Tr. No.	Day 1		Day 3		Day 14		Day 21		Day 28		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g		g		g
T1	1	160	45.75	160	82.74	106	379.51	106	803.57	82	1408.80	82	2115.21
T2	2	160	45.63	160	82.77	105	377.05	104	804.40	79	1423.09	78	2102.83
T3	3	160	45.31	160	81.63	111	375.54	106	812.06	81	1427.16	79	2168.61
T4	4	160	45.94	160	84.07	109	384.39	108	816.15	84	1412.08	83	2148.58
T5	5	160	45.94	160	82.47	100	472.02	100	969.00	76	1598.61	76	2336.96

Weight gain per phases**Tab. No. 2b**

Treatment	Tr. No.	Day 3 - 14	Day 15 - 21	Day 22 - 28	Day 29 - 35	Day 3 - 35
		Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
		g	g	g	g	g
T1	1	295.75	424.06	619.68	706.40	2031.39
T2	2	293.48	427.32	624.77	679.62	2019.31
T3	3	293.22	433.39	621.69	723.09	2086.15
T4	4	299.42	431.32	605.29	733.27	2063.88
T5	5	388.05	496.98	637.64	738.36	2253.22

Feed conversion ratio (Feed consumption per 1 kg of live weight)

Tab. No. 2c

Treatment	Tr. No.	Feed conversion ratio			
		Day 14	Day 21	Day 28	Day 35
		g/kg LW	g/kg LW	g/kg LW	g/kg LW
T1	1	1478.23	1586.41	1638.79	1778.29
T2	2	1439.84	1603.44	1713.43	1832.93
T3	3	1549.02	1549.64	1631.28	1747.92
T4	4	1543.64	1624.90	1677.82	1750.57
T5	5	1293.81	1375.07	1521.61	1646.83

Feed consumption per 1 kg of weight gain (WG)**Tab. No. 2d**

Treatment	Tr. No.	Feed consumption per 1 kg of weight gain				
		1-14 days	15-21 days	22-28 days	29-35 days	1-35 days
		g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	1728.40	1708.12	1733.02	2136.21	1843.63
T2	2	1681.86	1798.45	1916.19	2164.56	1902.09
T3	3	1800.82	1550.33	1784.98	2054.19	1811.48
T4	4	1796.24	1715.94	1776.41	1932.27	1813.17
T5	5	1480.25	1470.48	1833.51	2001.25	1705.14

Feed consumption per phases

Tab. No. 2e

Treatment	Tr. No.	Feed consumption				
		Starter (1-14 days)	Grower (15-21 days)	Grower (22-28 days)	Finisher (29-35 days)	Total
		kg	kg	kg	kg	kg
T1	1	74.76	76.78	92.02	123.74	367.30
T2	2	73.04	80.38	99.46	115.12	368.00
T3	3	80.32	71.12	92.66	117.06	361.16
T4	4	80.68	80.04	94.32	117.60	372.64
T5	5	75.50	73.08	93.08	112.30	353.96

Mortality

Tab. No. 3

Treatment	Tr. No.	Mortality in the period											Mortality according causes														
		Day 1 – 14		Day 15 - 21		Day 22 - 28		Day 29 - 35		Day 1 - 35			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		birds	g	birds	g	birds	g	birds	g	birds	g	%															
T1	1	6	542	0	0	0	0	0	0	6	542	3.75									1			5		72	
T2	2	7	798	1	626	1	1146	1	1587	10	4157	6.25									2	2		6		72	
T3	3	1	86	5	1481	1	180	2	1266	9	3013	5.63									7	1		1		72	
T4	4	3	287	1	399	0	0	1	1144	5	1830	3.13									2			3		72	
T5	5	12	1231	0	0	0	0	0	0	12	1231	7.50									2				10	72	

- | | | | |
|---------|-------------------------|------------------------------------|---|
| Causes: | 1 – Viral diseases | 6 – Wounds | 11 – Sudden death syndrome |
| | 2 – Bacterial diseases | 7 – Digestive track diseases | 12 – Cannibalism |
| | 3 – Moulds diseases | 8 – Respiratory tract diseases | 13 – Yolk sac. infam. |
| | 4 – Parasitary diseases | 9 – Reproduction tract diseases | 14 – Culling and other causes |
| | 5 – Tumors | 10 – Locomotion apparatus diseases | 15 – Sampling (excluded of calculation) |

Foot pad lesions

Tab. No. 4

Treatment	Tr. No.	Evaluation	
		right foot	left foot
T1	1	0.87	0.93
T2	2	0.27	0.23
T3	3	0.49	0.51
T4	4	0.13	0.16
T5	5	1.12	1.11

Statistical analysis - Body weight at 35 days of age**Tab. No. 5**

Treatment	Tr. No.	Cocks			
		Number of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%
T1	1	82	2115.21	283.61	13.41
T2	2	78	2102.83	257.40	12.24
T3	3	79	2168.61	275.36	12.70
T4	4	83	2148.58	330.41	15.38
T5	5	76	2336.96	315.44	13.50

Statistical analyses of performance results

Performance results were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

The following symbols are used for levels of significance:

- $p \leq 0,001$ * * * - differences are very high significant
- $p \leq 0,01$ * * - differences are high significant
- $p \leq 0,05$ * - differences are significant
- $p > 0,05$ o - differences are not significant

Body weight - day 1

Tab. No. 6a

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	45.75	0.89		o	o	o	o
T2	2	4	45.63	0.72	0.805518		o	o	o
T3	3	4	45.31	0.63	0.418689	0.540263		o	o
T4	4	4	45.94	0.63	0.726928	0.572479	0.273583		o
T5	5	4	45.94	0.63	0.712189	0.561688	0.265794	1.000000	

Body weight - day 3

Tab. No. 6b

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	160	82.74	6.83		o	o	o	o
T2	2	160	82.77	6.81	0.965810		o	o	o
T3	3	160	81.63	6.26	0.150656	0.154908		**	o
T4	4	160	84.07	6.33	0.084041	0.074535	0.001800		*
T5	5	160	82.47	6.34	0.712387	0.701477	0.247091	0.043392	

Body weight - day 14

Tab. No. 6c

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	106	379.51	61.68		o	o	o	***
T2	2	105	377.05	61.61	0.999169		o	o	***
T3	3	111	375.54	59.18	0.994337	0.999876		o	***
T4	4	109	384.39	65.38	0.987780	0.945794	0.892487		***
T5	5	100	472.02	63.32	0.000000	0.000000	0.000000	0.000000	

Body weight - day 21

Tab. No. 6d

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	106	803.57	131.76		o	o	o	***
T2	2	104	804.40	129.55	0.999999		o	o	***
T3	3	106	812.06	120.20	0.993786	0.995915		o	***
T4	4	108	816.15	135.37	0.972179	0.978801	0.999638		***
T5	5	100	969.00	124.85	0.000000	0.000000	0.000000	0.000000	

Body weight - day 28

Tab. No. 6e

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	82	1408.80	228.56		o	o	o	***
T2	2	79	1423.09	194.75	0.996377		o	o	***
T3	3	81	1427.16	212.71	0.990256	0.999975		o	***
T4	4	84	1412.08	240.42	0.999989	0.998662	0.995315		***
T5	5	76	1598.61	200.99	0.000007	0.000058	0.000084	0.000009	

Body weight - day 35

Tab. No. 6f

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	82	2115.21	283.61		o	o	o	***
T2	2	78	2102.83	257.40	0.999384		o	o	***
T3	3	79	2168.61	275.36	0.856353	0.742028		o	*
T4	4	83	2148.58	330.41	0.970230	0.913493	0.995831		**
T5	5	76	2336.96	315.44	0.000211	0.000089	0.013750	0.003004	

Statistical analyses of performance results

Performance results were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method Kruskal-Wallis test.

The following symbols are used for levels of significance:

$p \leq 0,001$ * * * - differences are very high significant

$p \leq 0,01$ * * - differences are high significant

$p \leq 0,05$ * - differences are significant

$p > 0,05$ o - differences are not significant

Average weight gain (day 3-14)

Tab. No. 7a

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	106	295.75	59.08		o	o	o	***
T2	2	105	293.48	59.27	0.999308		o	o	***
T3	3	111	293.22	58.31	0.998880	1.000000		o	***
T4	4	109	299.42	63.55	0.995253	0.971097	0.964471		***
T5	5	100	388.05	60.11	0.000000	0.000000	0.000000	0.000000	

Average weight gain (day 15-21)

Tab. No. 7b

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	106	424.06	76.63		o	o	o	***
T2	2	104	427.32	79.23	0.998981		o	o	***
T3	3	106	433.39	81.11	0.944087	0.988655		o	***
T4	4	108	431.32	79.19	0.976923	0.997672	0.999827		***
T5	5	100	496.98	73.94	0.000000	0.000000	0.000001	0.000000	

Average weight gain (day 22-28)

Tab. No. 7c

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	82	619.68	111.39		o	o	o	o
T2	2	79	624.77	87.62	0.999174		o	o	o
T3	3	81	621.69	132.08	0.999979	0.999888		o	o
T4	4	84	605.29	121.34	0.953794	0.874617	0.927833		o
T5	5	76	637.64	103.90	0.908973	0.972772	0.939960	0.510283	

Average weight gain (day 29-35)

Tab. No. 7d

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test				
					T1	T2	T3	T4	T5
T1	1	82	706.40	101.22		o	o	o	o
T2	2	78	679.62	121.66	0.351998		*	**	***
T3	3	79	723.09	137.34	1.000000	0.014252		o	o
T4	4	83	733.27	127.02	0.653386	0.001025	1.000000		o
T5	5	76	738.36	175.98	0.700305	0.000797	1.000000	1.000000	

Average weight gain (day 3-35)

Tab. No. 7e

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test				
					T1	T2	T3	T4	T5
T1	1	82	2031.39	281.48		o	o	o	***
T2	2	78	2019.31	255.23	0.999426		o	o	***
T3	3	79	2086.15	275.52	0.841635	0.725745		o	*
T4	4	83	2063.88	328.64	0.972414	0.919165	0.993575		**
T5	5	76	2253.22	312.69	0.000186	0.000080	0.014000	0.002570	

FCR 14**Tab. No. 8a**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1480.32	94.57		o	o	o	o
T2	2	4	1441.59	173.87	0.811628		o	o	o
T3	3	4	1552.10	347.72	0.676358	0.533343		o	o
T4	4	4	1544.89	298.98	0.691563	0.549128	0.964637		o
T5	5	4	1297.42	71.53	0.294189	0.380704	0.168350	0.172805	

FCR 21**Tab. No. 8b**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1584.84	59.05		o	o	o	o
T2	2	4	1605.29	158.74	0.836405		o	o	*
T3	3	4	1551.33	184.72	0.735343	0.607164		o	o
T4	4	4	1624.85	162.33	0.702646	0.843478	0.497118		*
T5	5	4	1376.30	73.74	0.058939	0.045247	0.092196	0.034242	

FCR 28**Tab. No. 8c**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1640.94	71.56		o	o	o	o
T2	2	4	1720.52	220.72	0.503022		o	o	o
T3	3	4	1633.04	154.52	0.943706	0.474538		o	o
T4	4	4	1678.16	145.55	0.739482	0.705187	0.702949		o
T5	5	4	1536.44	147.20	0.381402	0.149174	0.393061	0.252569	

FCR 35

Tab. No. 8d

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1780.60	74.41		o	o	o	o
T2	2	4	1838.77	157.87	0.580472		o	o	o
T3	3	4	1751.41	179.95	0.780732	0.433952		o	o
T4	4	4	1751.03	109.07	0.789620	0.444681	0.997165		o
T5	5	4	1667.23	176.59	0.326215	0.151401	0.450500	0.428429	

FCR weight gain - day 1-14

Tab. No. 9a

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1731.15	114.88		o	o	o	o
T2	2	4	1684.79	210.65	0.809886		o	o	o
T3	3	4	1805.06	407.87	0.716954	0.567276		o	o
T4	4	4	1798.33	351.50	0.727655	0.578450	0.972257		o
T5	5	4	1487.23	103.05	0.240175	0.313181	0.148476	0.149785	

FCR weight gain - day 15-21

Tab. No. 9b

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test				
					T1	T2	T3	T4	T5
T1	1	4	1697.90	207.70		o	o	o	o
T2	2	4	1799.78	364.44	1.000000		o	o	o
T3	3	4	1550.27	14.64	1.000000	0.639391		o	o
T4	4	4	1714.13	71.62	1.000000	1.000000	0.314437		o
T5	5	4	1468.74	110.66	0.485951	0.142769	1.000000	0.059773	

FCR weight gain - day 22-28

Tab. No. 9c

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1743.25	235.88		o	o	o	o
T2	2	4	1942.23	436.41	0.443808		o	o	o
T3	3	4	1793.31	174.72	0.839324	0.547855		o	o
T4	4	4	1779.59	167.77	0.876297	0.523654	0.953180		o
T5	5	4	1906.32	470.04	0.522554	0.877771	0.629359	0.608517	

FCR weight gain - day 29-35

Tab. No. 9d

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	2139.97	229.09		o	o	o	o
T2	2	4	2161.58	88.54	0.904072		o	o	o
T3	3	4	2076.34	374.37	0.723090	0.653526		o	o
T4	4	4	1936.16	136.96	0.303136	0.264177	0.462626		o
T5	5	4	2052.56	301.63	0.645390	0.577339	0.894541	0.518866	

FCR weight gain - day 1-35

Tab. No. 9e

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test				
					T1	T2	T3	T4	T5
T1	1	4	1846.14	78.78		o	o	o	o
T2	2	4	1908.52	167.27	0.578973		o	o	o
T3	3	4	1815.34	188.71	0.783340	0.434594		o	o
T4	4	4	1813.67	113.19	0.783955	0.439339	0.988198		o
T5	5	4	1728.62	195.59	0.340344	0.158525	0.466564	0.451350	

Body weight (BW) per box

Tab. No. 10a

Treatment	Tr. No.	Box No.	Day 1		Day 3		Day 14		Day 21		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g				
T1	1	1	40	45.00	40	79.98	26	370.19	26	786.88	20	1340.15	20	2054.40
		6	40	45.00	40	80.95	25	382.20	25	804.36	19	1459.79	19	2198.63
		12	40	46.25	40	84.65	27	383.56	27	839.00	21	1456.38	21	2141.05
		16	40	46.75	40	85.38	28	381.86	28	784.18	22	1381.77	22	2073.77
T2	2	2	40	45.00	40	81.85	27	387.41	27	820.78	21	1447.19	21	2129.24
		7	40	46.25	40	83.18	27	375.15	27	774.15	21	1400.33	21	2084.00
		11	40	45.00	40	80.35	26	358.31	25	789.48	18	1352.39	17	2036.71
		17	40	46.25	40	85.70	25	387.40	25	834.32	19	1488.58	19	2153.63
T3	3	3	40	45.00	40	83.30	27	380.07	25	842.72	19	1485.11	19	2246.53
		8	40	45.00	40	77.70	28	385.89	27	825.59	20	1475.80	20	2236.85
		15	40	45.00	40	83.23	28	358.96	27	773.30	21	1424.76	21	2126.95
		19	40	46.25	40	82.28	28	377.39	27	808.89	21	1330.81	19	2064.89
T4	4	4	40	46.25	40	85.23	26	391.85	26	836.73	20	1467.90	20	2215.35
		10	40	46.25	40	81.98	28	366.46	28	764.57	22	1301.18	22	2024.86
		13	40	45.00	40	85.38	28	387.25	27	834.93	21	1430.29	20	2162.45
		18	40	46.25	40	83.70	27	392.81	27	831.04	21	1456.90	21	2201.38
T5	5	5	40	46.25	40	84.03	19	486.89	19	1014.37	13	1653.23	13	2423.23
		9	40	46.25	40	80.45	26	486.42	26	988.69	20	1602.35	20	2229.35
		14	40	45.00	40	82.63	27	443.56	27	928.22	21	1526.57	21	2310.90
		20	40	46.25	40	82.78	28	476.00	28	959.25	22	1631.68	22	2408.68

Weight gain per phases per box

Tab. No. 10b

Treatment	Tr. No.	Box No.	Day 3 - 14	Day 15 - 21	Day 22 - 28	Day 29 - 35	Day 3 - 35
			Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
			g	g	g	g	g
T1	1	1	290.73	416.69	592.05	714.25	1976.05
		6	299.84	422.16	635.53	738.84	2114.79
		12	297.52	455.44	634.24	684.67	2055.10
		16	295.04	402.32	617.23	692.00	1987.05
T2	2	2	305.26	433.37	630.24	682.05	2046.14
		7	290.37	399.00	612.48	683.67	1999.05
		11	277.77	431.76	584.89	687.88	1957.94
		17	300.44	446.92	670.11	665.05	2066.95
T3	3	3	295.41	451.04	650.53	761.42	2161.00
		8	307.79	435.96	627.95	761.05	2159.25
		15	275.14	417.30	648.10	702.19	2043.14
		19	294.61	430.56	563.24	667.89	1981.89
T4	4	4	305.35	444.88	633.35	747.45	2128.90
		10	283.57	398.11	553.64	723.68	1942.55
		13	301.14	445.81	606.81	717.85	2076.50
		18	308.37	438.22	631.14	744.48	2117.05
T5	5	5	399.47	527.47	656.15	770.00	2335.62
		9	404.85	502.27	615.50	627.00	2147.90
		14	360.78	484.67	593.71	784.33	2228.10
		20	391.00	483.25	688.77	777.00	2324.27

Feed conversion ratio (Feed consumption per 1 kg of live weight) per box

Tab. No. 10c

Treatment	Tr. No.	Box No.	Feed conversion ratio			
			Day 14	Day 21	Day 28	Day 35
			g/kg LW	g/kg LW	g/kg LW	g/kg LW
T1	1	1	1551.95	1591.95	1742.21	1803.39
		6	1549.11	1539.07	1640.21	1872.61
		12	1350.48	1665.68	1595.80	1746.01
		16	1469.72	1542.66	1585.55	1700.41
T2	2	2	1392.31	1512.53	1559.81	1705.94
		7	1347.36	1451.35	1649.45	1828.68
		11	1327.48	1808.83	2046.67	2063.22
		17	1699.20	1648.44	1626.17	1757.22
T3	3	3	2051.32	1813.39	1830.76	1908.60
		8	1307.71	1415.88	1571.55	1645.62
		15	1321.47	1427.50	1466.25	1552.63
		19	1527.92	1548.53	1663.61	1898.82
T4	4	4	1992.90	1862.80	1884.40	1889.91
		10	1390.08	1498.00	1606.84	1657.03
		13	1382.48	1578.45	1669.15	1785.86
		18	1414.08	1560.14	1552.25	1671.33
T5	5	5	1394.90	1425.03	1756.20	1929.39
		9	1258.69	1340.31	1483.36	1615.59
		14	1231.83	1290.67	1454.73	1563.41
		20	1304.24	1449.17	1451.48	1560.53

Feed consumption per 1 kg of weight gain (WG) per box

Tab. No. 10d

Treatment	Tr. No.	Box No.	Feed consumption per 1 kg of weight gain				
			1-14 days	15-21 days	22-28 days	29-35 days	1-35 days
			g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	1	1817.49	1637.44	2021.52	1955.90	1870.88
		6	1815.23	1527.38	1824.87	2457.62	1943.46
		12	1573.31	2000.49	1468.26	2156.07	1808.39
		16	1718.58	1626.28	1658.36	1990.28	1761.82
T2	2	2	1612.96	1647.72	1645.13	2100.12	1765.97
		7	1572.34	1576.16	2000.45	2291.57	1896.91
		11	1555.17	2344.53	2536.63	2111.56	2146.23
		17	1998.67	1630.72	1586.71	2143.08	1824.96
T3	3	3	2389.95	1543.95	1862.91	2106.86	1977.99
		8	1512.02	1539.38	1884.24	1827.74	1703.87
		15	1539.73	1545.90	1531.96	1776.75	1607.20
		19	1778.53	1571.83	1894.12	2594.01	1972.30
T4	4	4	2324.58	1716.95	1924.50	1903.81	1958.66
		10	1624.83	1621.96	1812.45	1772.50	1717.49
		13	1595.48	1796.84	1843.29	2102.11	1848.32
		18	1648.45	1720.76	1538.13	1966.23	1730.22
T5	5	5	1635.85	1462.78	2567.83	2479.52	2018.72
		9	1430.58	1436.56	1800.34	2051.04	1673.08
		14	1407.11	1355.65	1801.30	1831.10	1614.35
		20	1475.39	1619.98	1455.82	1848.60	1608.33

Feed consumption per box

Tab. No. 10e

Treatment	Tr. No.	Box No.	Feed consumption				
			Starter (1-14 days)	Grower (15-21 days)	Grower (21-28 days)	Finisher (29-35 days)	Total
			kg	kg	kg	kg	kg
T1	1	1	19.12	17.74	25.18	27.94	89.98
		6	19.02	16.12	22.82	34.50	92.46
		12	17.64	24.60	20.40	31.00	93.64
		16	18.98	18.32	23.62	30.30	91.22
T2	2	2	18.32	19.28	22.66	30.08	90.34
		7	17.42	16.98	26.76	32.90	94.06
		11	16.32	25.90	28.74	25.06	96.02
		17	20.98	18.22	21.30	27.08	87.58
T3	3	3	26.06	17.32	24.08	30.48	97.94
		8	17.42	17.96	23.44	27.82	86.64
		15	16.78	17.58	21.74	26.20	82.30
		19	20.06	18.26	23.40	32.56	94.28
T4	4	4	25.84	19.86	25.44	28.46	99.60
		10	17.80	18.08	22.98	28.22	87.08
		13	18.64	21.74	24.56	30.18	95.12
		18	18.40	20.36	21.34	30.74	90.84
T5	5	5	17.52	14.66	23.66	24.82	80.66
		9	19.38	18.76	23.12	25.72	86.98
		14	17.80	17.74	23.48	30.16	89.18
		20	20.80	21.92	22.82	31.60	97.14

Foot pad lesions

Tab. No. 10f

Treatment	Tr. No.	Box	Evaluation	
			right foot	left foot
T1	1	1	0.40	0.50
		6	0.26	0.26
		12	0.95	1.05
		16	1.73	1.77
T2	2	2	0.33	0.19
		7	0.19	0.05
		11	0.47	0.59
		17	0.11	0.16
T3	3	3	0.00	0.05
		8	0.35	0.40
		15	1.52	1.43
		19	0.00	0.05
T4	4	4	0.00	0.10
		10	0.14	0.18
		13	0.25	0.20
		18	0.14	0.14
T5	5	5	0.00	0.00
		9	2.25	2.20
		14	1.29	1.38
		20	0.59	0.50