



MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE ÚSTRAŠICE

státní podnik

390 02 Tábor 2

Česká republika

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International Poultry Testing Station Ústrašice
Mezinárodní testování drůbeže Ústrašice

Czech Republic
Česká republika

Study Investigator:
Zpracovatel studie:

Ing. Jan Tyl

Associate Investigator:
Spoluzpracovatel studie:

Ing. Hana Horná
Ing. Markéta Krekulová

Study monitor:
Dohlížitel:

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Study sponsor :
Dohlížitel:

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December 2024
Prosinec 2024

Aim of the Project

Variations of balance protein levels in grower and finisher diets for broilers including an extended performance test for methionine sources

- To evaluate whether xxxxx recommendations are still suitable or whether adjustments particularly in grower and finisher phase would be needed
- To validate concept of xxxxx compared to xxxxxx at changing balance protein levels

Study location

The study was carried out on the test facility Mezinárodní testování drůbeže, s.p., (next MTD, s.p. only), Ústřašice, Czech Republic. Feed samples were sent for the contents of nutrients by xxxxx.

Trial period

Beginning of the trial: 24 September 2024

End of the trial: 29 October 2024

Study responsibility

Ing. Jan Tyl was the independent Study Director, responsible that the trial is conducted according to the protocol. Ing. Hana Horná was responsible for daily animal care at the test facility. Full details of study's responsibility are provided below.

Persons involved in the trial

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Material and methods

Birds

In total there were 8400 day old chicks of xxxxx. Day-old chicks were randomly distributed into 10 dietary treatments with 6 replicates per treatment and 140 chicken per replicate.

Origin 1-day old chicks:

breeder company – xxxxx

parent flock – xxxxx

age of the breeding flock – 46 weeks

Experimental treatments:

Tr. No.	Tr.	xxxxx			xxxx	xxxx	Reps	Birds / Rep	Birds
		Starter	Grower	Finisher					
1	T1	100	100	100	deficient	no	6	140	840
2	T2	100	100	100	adequate	no	6	140	840
3	T3	100	100	110	adequate	no	6	140	840
4	T4	100	100	120	adequate	no	6	140	840
5	T5	100	110	110	adequate	no	6	140	840
6	T6	100	110	120	adequate	no	6	140	840
7	T7	100	120	120	adequate	no	6	140	840
8	T8	100	100	100	adequate	xxxxx	6	140	840
9	T9	100	110	110	adequate	xxxxx	6	140	840
10	T10	100	120	120	adequate	xxxxx	6	140	840

Housing system

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

Light was provided as follows during the experimental period:

Lighting programme:

Day 1 - 7	23 hours of light + 1 hour of darkness
Day 8 - 32	18 hours of light + 6 hours of darkness
Day 33 - 35	23 hours of light + 1 hour of darkness

Stocking density: 17,2 broilers per square meter

The conduct of the trial was conformed to the national welfare legislation.

Veterinary precautions

The chicken house was disinfected with xxxxx before the chick placement.

On days 1 and 12 the chicken were vaccinated with xxxxx. On the first days old chickens was applied the water solution of permanganate.

Feeds and Diets

Chickens were fed ad libitum according to three phase feeding programme. The test phases were 0-10 days of age for the starter BR1, 11-24 days of age for the grower BR2 and 25-35 days of age for the finisher BR3.

Feed was produced by International Poultry Testing Station Ústrašice. The composition of diets is shown in following tables.

Composition of the feed

Ingredients (%)	Starter									
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Corn	33.34	32.99	32.99	32.99	32.99	32.99	32.99	32.51	32.51	32.51
Wheat	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
SBM	32.68	32.68	32.68	32.68	32.68	32.68	32.68	32.68	32.68	32.68
RSM	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Soybean oil	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
Neophos	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
xxxxx	0.98	1.33	1.33	1.33	1.33	1.33	1.33	1.81	1.81	1.81
Limestone	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
MCP	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Salt	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
AMV BR1 plus	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Nutritional composition (%)										
Crude protein	22.39	22.59	22.59	22.59	22.59	22.59	22.59	22.39	22.39	22.39
Lysine dig.	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Methionine dig.	0.28	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Met.+Cys. dig.	0.58	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93

Ingredients (%)	Grower									
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Corn	34.25	33.95	33.95	33.95	30.09	30.09	26.24	33.53	29.59	25.65
Wheat	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
SBM	26.92	26.92	26.92	26.92	29.96	29.96	33.00	26.92	29.96	33.00
RSM	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
Soybean oil	4.17	4.17	4.17	4.17	4.66	4.66	5.14	4.17	4.66	5.14
Neophos	2.38	2.38	2.38	2.38	2.31	2.31	2.25	2.38	2.31	2.25
xxxxx	0.85	1.16	1.16	1.16	1.51	1.51	1.86	1.58	2.02	2.46
Limestone	0.30	0.30	0.30	0.30	0.30	0.30	0.29	0.30	0.30	0.29
MCP	-	-	-	-	0.03	0.03	0.07	-	0.03	0.07
Salt	0.13	0.13	0.13	0.13	0.14	0.14	0.15	0.13	0.14	0.15
AMV BR2 plus	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Nutritional composition (%)										
Crude protein	20.33	20.51	20.51	20.51	21.96	21.96	23.41	20.33	21.74	23.16
Lysine dig.	1.15	1.15	1.15	1.15	1.27	1.27	1.38	1.15	1.27	1.38
Methionine dig.	0.26	0.57	0.57	0.57	0.64	0.64	0.72	0.57	0.64	0.72
Met.+Cys. dig.	0.54	0.85	0.85	0.85	0.94	0.94	1.02	0.85	0.94	1.02

Ingredients (%)	Finisher									
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Corn	34.71	34.49	32.71	30.93	32.71	30.93	30.93	34.19	32.32	30.44
Wheat	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
SBM	25.92	25.92	27.16	28.40	27.16	28.40	28.40	25.92	27.16	28.40
RSM	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Soybean oil	5.23	5.23	5.38	5.52	5.38	5.52	5.52	5.23	5.38	5.52
Neophos	1.88	1.88	1.87	1.87	1.87	1.87	1.87	1.88	1.87	1.87
xxxxx	0.28	0.50	0.90	1.31	0.90	1.31	1.31	0.80	1.30	1.79
Limestone	0.30	0.30	0.29	0.28	0.29	0.28	0.28	0.30	0.29	0.28
MCP	-	-	-	-	-	-	-	-	-	-
Salt	0.19	0.19	0.19	0.20	0.19	0.20	0.20	0.19	0.19	0.20
AMV BR3 plus	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Nutritional composition (%)										
Crude protein	19.40	19.64	20.45	21.25	20.45	21.25	21.25	19.64	20.45	21.25
Lysine dig.	1.00	1.00	1.10	1.20	1.10	1.20	1.20	1.00	1.10	1.20
Methionine dig.	0.26	0.48	0.55	0.62	0.55	0.62	0.62	0.48	0.55	0.62
Met.+Cys. dig.	0.54	0.76	0.84	0.91	0.84	0.91	0.91	0.76	0.84	0.91

Parameters recorded and methods applied

Live weight

Live weight was measured on day 1 and on day 10 (the birds in each pen were weighed altogether). On day 24 of age birds were weighed individually, without fasting. On day 35 birds were weighed individually, after 12 hours of fasting.

Weight gain

Weight gain per phase and average daily weight gains were calculated for the periods 1 – 10 days, 11 – 24 days, 25 – 35 days and for the overall experiment (1 – 35 days).

Feed consumption

Feed consumption was determined per pen for the feed – starter, grower and finisher.

Feed conversion ratio

Feed conversion ratio was calculated as feed consumption per 1 kg of live weight and per 1 kg of weight gain for the periods 1 – 10 days, 11 – 24 days, 25 – 35 days and for the overall experiment (1 – 35 days). The calculation was included weight of deaths.

Mortality

All pens were checked three times a day to see if there were any dead or ill birds. Dead chickens were registered by date, weight and reason of mortality on the day of death. Mortality was recorded for the periods 1 – 10 days, 11 – 24 days, 25 – 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, 10, 24 and 35) 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 per 1 kg of live weight
	2d Feed conversion per 1 kg of weight gain
	2e Feed consumption
	3 Mortality
	4 Carcass analysis
	5 Foot pad lesions
	6a Litter scoring at the age of 24 days
	6b Litter scoring at the age of 35 days
	7 Statistical analysis of body weight at the age of 35 days (average body weight, standard deviation, coefficient of variation)
	8 - 9 Statistical analyses of performance results
	10 Performance results per pen:
	10a Body weight
	10b Weight gain
	10c Feed conversion per 1 kg of live weight
	10d Feed conversion per 1 kg of weight gain
	10e Feed consumption
	10f Foot pad lesions
	10ga Litter scoring at the age of 24 days
	10gb Litter scoring at the age of 35 days

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	78.10	70.00	89.63	840	64.50	43.21
T2	2				840		43.10
T3	3				840		43.10
T4	4				840		43.15
T5	5				840		43.04
T6	6				840		43.10
T7	7				840		42.98
T8	8				840		43.10
T9	9				840		43.04
T10	10				840		43.04

Body weight per phases

Tab. No. 2a

Treatment	Tr. No.	Day 1		Day 10		Day 24		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g
T1	1	840	43.21	840	229.64	837	766.13	835	1387.54
T2	2	840	43.10	840	311.85	835	1261.44	832	2209.69
T3	3	840	43.10	840	314.35	833	1300.11	830	2250.52
T4	4	840	43.15	840	316.96	833	1276.95	831	2272.39
T5	5	840	43.04	840	315.71	831	1311.94	822	2284.23
T6	6	840	43.10	840	313.33	831	1316.87	824	2310.83
T7	7	840	42.98	840	313.63	836	1320.37	831	2320.76
T8	8	840	43.10	840	318.21	832	1261.57	830	2206.30
T9	9	840	43.04	840	316.19	830	1312.67	821	2209.37
T10	10	840	43.04	840	316.55	833	1312.62	827	2245.42

Weight gain per phases

Tab. No. 2b

Treatment	Tr. No.	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35	
		Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain
		g	g	g	g	g	g	g	g
T1	1	186.43	18.64	536.49	29.80	621.42	88.77	1344.33	38.41
T2	2	268.75	26.88	949.59	52.76	948.25	135.46	2166.59	61.90
T3	3	271.25	27.13	985.76	54.76	950.41	135.77	2207.42	63.07
T4	4	273.81	27.38	959.99	53.33	995.44	142.21	2229.24	63.69
T5	5	272.68	27.27	996.22	55.35	972.30	138.90	2241.20	64.03
T6	6	270.24	27.02	1003.54	55.75	993.95	141.99	2267.73	64.79
T7	7	270.65	27.07	1006.74	55.93	1000.39	142.91	2277.78	65.08
T8	8	275.12	27.51	943.36	52.41	944.73	134.96	2163.21	61.81
T9	9	273.15	27.32	996.48	55.36	896.69	128.10	2166.33	61.90
T10	10	273.51	27.35	996.07	55.34	932.80	133.26	2202.38	62.93

Feed conversion per 1 kg of live weight

Tab. No. 2c

Treatment	Tr. No.	Feed conversion ratio		
		Day 10	Day 24	Day 35
		g/kg live weight	g/kg live weight	g/kg live weight
T1	1	974.60	1530.04	1841.13
T2	2	853.22	1218.77	1484.39
T3	3	858.93	1186.81	1459.38
T4	4	827.42	1204.51	1440.45
T5	5	821.27	1159.12	1419.90
T6	6	815.73	1156.62	1407.78
T7	7	825.20	1128.89	1399.34
T8	8	800.22	1175.32	1469.80
T9	9	837.35	1162.44	1455.78
T10	10	826.25	1131.53	1414.83

Feed conversion per 1 kg of weight gain

Tab. No. 2d

Treatment	Tr. No.	Feed conversion ratio			
		Day 1-10	Day 11-24	Day 25-35	Day 1-35
		g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1200.51	1238.27	2226.95	1900.48
T2	2	990.03	1007.32	1839.58	1514.09
T3	3	995.39	978.47	1834.75	1488.08
T4	4	957.83	998.27	1744.28	1468.54
T5	5	950.88	960.51	1776.57	1447.49
T6	6	945.81	961.54	1744.01	1434.83
T7	7	956.23	932.52	1758.39	1425.89
T8	8	925.57	972.61	1865.04	1499.31
T9	9	969.27	959.31	1889.55	1485.07
T10	10	956.26	931.62	1816.86	1442.70

Feed consumption per phases

Tab. No. 2e

Treatment	Tr. No.	Feed consumption			
		Starter (d 1-10)	Grower (d 11-24)	Finisher (d 25-35)	Total (d 1-35)
		kg	kg	kg	kg
T1	1	188.00	796.60	1155.50	2140.10
T2	2	223.50	1063.20	1452.40	2739.10
T3	3	226.80	1063.70	1448.70	2739.20
T4	4	220.30	1064.80	1445.20	2730.30
T5	5	217.80	1051.80	1422.70	2692.30
T6	6	214.70	1056.70	1432.00	2703.40
T7	7	217.40	1031.00	1464.70	2713.10
T8	8	213.90	1024.80	1464.50	2703.20
T9	9	222.40	1048.90	1397.50	2668.80
T10	10	219.70	1022.40	1405.40	2647.50

Mortality

Tab. No. 3

Treatment	Tr. No.	Mortality in the period									Mortality according causes														
		Day 1 - 10		Day 11 - 24		Day 25 - 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	%															
T1	1	0	0	3	2261	2	1520	5	3781	0.60									2	3					
T2	2	0	0	5	2439	3	4370	8	6809	0.95									2	6					
T3	3	0	0	7	4379	3	4648	10	9027	1.19										9			1		
T4	4	0	0	7	3211	2	3878	9	7089	1.07										8			1		
T5	5	0	0	9	5092	9	13391	18	18483	2.14									1	15			2		
T6	6	0	0	9	4913	7	11295	16	16208	1.90										16					
T7	7	0	0	4	2036	5	8256	9	10292	1.07									1	7			1		
T8	8	0	0	8	4299	2	3636	10	7935	1.19									2	8					
T9	9	0	0	10	4130	9	15223	19	19353	2.26									1	18					
T10	10	0	0	7	4303	6	9983	13	14286	1.55									2	9			2		

Causes:

- 1 - Viral diseases
- 2 - Bacterial diseases
- 3 - Fungal diseases
- 4 - Parasitary diseases
- 5 - Tumors

- 6 - Injuries
- 7 - Digestive tract diseases
- 8 - Respiratory tract diseases
- 9 - Reproduction tract diseases
- 10 - Locomotion apparatus diseases

- 11 - Sudden death syndrome
- 12 - Cannibalism
- 13 - Diverticulus inflammation
- 14 - Culling and other causes
- 15 - Sampling (excluded of calculation)

Results of carcass analysis

Tab. No. 4 (page 1)

Treatment	Tr. No.	Sex	Weight				Ratio of abd. fat to live weight	Breast muscles without skin			Thigh muscles with skin			Total muscles			Carcass	
			Total	Body	Gibl.	Abd. fat		Weight	Percentage		Weight	Percentage		Weight	Percentage		Value	Yield
									Total weight	Body carcass		Total weight	Body carcass		Total weight	Body carcass		
			g	g	g	g		g	%	%	%	g	%	%	g	%	%	%
T1	1	♂	1580	1019	109	20	1.26	255	16.13	25.02	345	21.87	33.91	600	38.00	58.93	64.49	71.37
		♀	1288	814	100	17	1.29	199	15.45	24.47	280	21.72	34.39	479	37.17	58.86	63.15	70.89
		♂	1434	916	104	18	1.27	227	15.83	24.77	313	21.80	34.13	540	37.63	58.90	63.89	71.15
T2	2	♂	2406	1684	136	27	1.11	546	22.70	32.44	522	21.69	30.99	1068	44.39	63.42	69.99	75.66
		♀	2118	1485	127	26	1.24	491	23.16	33.03	465	21.94	31.30	955	45.10	64.34	70.10	76.10
		♂	2262	1584	132	27	1.17	518	22.92	32.72	493	21.81	31.13	1012	44.72	63.85	70.04	75.87
T3	3	♂	2419	1700	142	25	1.04	557	23.04	32.80	519	21.45	30.54	1076	44.49	63.34	70.25	76.13
		♀	2149	1503	135	23	1.05	495	23.02	32.91	465	21.63	30.93	959	44.65	63.84	69.94	76.21
		♂	2284	1601	138	24	1.05	526	23.03	32.85	492	21.54	30.72	1018	44.57	63.57	70.11	76.17
T4	4	♂	2458	1737	141	24	0.98	577	23.47	33.21	539	21.93	31.03	1116	45.40	64.24	70.67	76.43
		♀	2183	1551	132	22	1.02	526	24.09	33.91	477	21.84	30.75	1003	45.93	64.66	71.04	77.09
		♂	2320	1644	137	23	1.00	551	23.76	33.54	508	21.89	30.90	1059	45.65	64.44	70.85	76.74
T5	5	♂	2508	1769	142	24	0.94	585	23.32	33.06	543	21.63	30.67	1128	44.96	63.73	70.54	76.20
		♀	2129	1500	133	23	1.08	513	24.08	34.17	459	21.55	30.59	971	45.63	64.76	70.45	76.68
		♂	2318	1634	137	23	1.00	549	23.67	33.57	501	21.60	30.63	1049	45.27	64.20	70.50	76.42

Treatment	Tr. No.	Sex	Weight				Ratio of abd. fat to live weight	Breast muscles without skin			Thigh muscles with skin			Total muscles			Carcass	
			Total	Body	Gibl.	Abd. fat		Weight	Percentage		Weight	Percentage		Weight	Percentage		Value	Yield
									Total weight	Body carcass		Total weight	Body carcass		Total weight	Body carcass		
			g	g	g	g		g	%	%	%	g	%	%	g	%	%	%
T6	6	♂	2497	1760	141	24	0.95	591	23.67	33.57	546	21.86	31.01	1137	45.53	64.58	70.50	76.16
		♀	2154	1525	135	23	1.06	524	24.31	34.33	466	21.62	30.53	989	45.92	64.86	70.80	77.08
		♂	2326	1643	138	23	1.00	557	23.96	33.92	506	21.75	30.79	1063	45.71	64.71	70.64	76.58
T7	7	♂	2540	1796	146	19	0.75	610	24.03	33.99	558	21.97	31.07	1168	46.00	65.05	70.71	76.46
		♀	2163	1519	137	21	0.96	513	23.70	33.75	472	21.84	31.11	985	45.54	64.86	70.21	76.52
		♂	2352	1657	141	20	0.85	561	23.88	33.88	515	21.91	31.09	1077	45.79	64.96	70.48	76.49
T8	8	♂	2390	1671	137	28	1.16	549	22.98	32.88	519	21.73	31.09	1069	44.71	63.97	69.89	75.62
		♀	2124	1491	130	30	1.40	491	23.10	32.91	465	21.89	31.18	955	44.99	64.09	70.21	76.32
		♂	2257	1581	133	29	1.27	520	23.04	32.89	492	21.80	31.13	1012	44.84	64.02	70.04	75.95
T9	9	♂	2372	1684	144	24	1.00	558	23.52	33.11	527	22.20	31.27	1084	45.72	64.38	71.01	77.07
		♀	2120	1494	136	22	1.05	491	23.15	32.84	458	21.62	30.67	949	44.77	63.51	70.49	76.89
		♂	2246	1589	140	23	1.02	524	23.34	32.99	493	21.93	30.99	1017	45.27	63.97	70.77	76.98
T10	10	♂	2467	1736	146	18	0.74	586	23.76	33.77	550	22.28	31.67	1136	46.04	65.44	70.36	76.26
		♀	2138	1522	134	19	0.90	510	23.84	33.47	475	22.21	31.19	984	46.05	64.67	71.21	77.47
		♂	2302	1629	140	19	0.82	548	23.80	33.63	512	22.25	31.44	1060	46.04	65.08	70.75	76.83

Foot pad lesions**Tab. No. 5**

Treatment	Tr. No.	Evaluation	
		right foot	left foot
T1	1	1.19	1.09
T2	2	1.49	1.41
T3	3	1.37	1.35
T4	4	1.43	1.33
T5	5	1.32	1.25
T6	6	1.43	1.38
T7	7	1.37	1.22
T8	8	1.55	1.49
T9	9	1.69	1.62
T10	10	1.68	1.60

Litter scoring at the age of 24 days Tab. No. 6a

Treatment	Tr. No.	Litter scoring
T1	1	1.67
T2	2	2.83
T3	3	2.67
T4	4	2.83
T5	5	2.83
T6	6	2.67
T7	7	3.17
T8	8	3.33
T9	9	3.17
T10	10	3.17

Litter scoring at the age of 35 days Tab. No. 6b

Treatment	Tr. No.	Litter scoring
T1	1	3.50
T2	2	4.50
T3	3	4.67
T4	4	4.50
T5	5	4.33
T6	6	4.67
T7	7	4.67
T8	8	4.83
T9	9	4.83
T10	10	4.67

Statistical analysis - Body weight at 35 days of age

Tab. No. 7

Treatment	Tr. No.	Cocks				Hens			
		Number of birds	Average body weight	Standard deviation	Coefficient of variation	Number of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%		g/birds	g/birds	%
T1	1	428	1520.28	206.17	13.56	407	1247.96	184.50	14.78
T2	2	423	2367.80	228.77	9.66	409	2046.16	260.30	12.72
T3	3	434	2415.16	241.58	10.00	396	2070.08	248.18	11.99
T4	4	418	2424.45	244.90	10.10	413	2118.50	239.20	11.29
T5	5	414	2449.25	252.51	10.31	408	2116.79	231.01	10.91
T6	6	423	2491.82	226.73	9.10	401	2119.90	227.54	10.73
T7	7	417	2501.18	219.60	8.78	414	2139.03	229.99	10.75
T8	8	423	2370.99	231.39	9.76	407	2035.14	258.35	12.69
T9	9	419	2366.95	265.44	11.21	402	2045.12	228.96	11.20
T10	10	420	2420.48	246.45	10.18	407	2064.77	261.71	12.67

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. 8a

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test										
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
T1	1	6	43.21	0.55		o	o	o	o	o	o	o	o	o	o
T2	2	6	43.10	0.43	0.720264		o	o	o	o	o	o	o	o	o
T3	3	6	43.10	0.58	0.727283	1.000000		o	o	o	o	o	o	o	o
T4	4	6	43.15	0.53	0.842277	0.852505	0.858860		o	o	o	o	o	o	o
T5	5	6	43.04	0.49	0.619090	0.866013	0.864914	0.739012		o	o	o	o	o	o
T6	6	6	43.10	0.58	0.733377	1.000000	1.000000	0.864914	0.858860		o	o	o	o	o
T7	7	6	42.98	0.43	0.508184	0.737661	0.733377	0.619090	0.842277	0.727283		o	o	o	o
T8	8	6	43.10	0.58	0.709630	1.000000	1.000000	0.842277	0.866917	1.000000	0.739012		o	o	o
T9	9	6	43.04	0.49	0.616040	0.864914	0.858860	0.737661	1.000000	0.852505	0.852505	0.866013		o	o
T10	10	6	43.04	0.44	0.611502	0.858860	0.852505	0.733377	1.000000	0.842277	0.858860	0.864914	1.000000		o

Body weight - day 10

Tab. No. 8b

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test									
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
T1	1	6	229.64	11.44		***	***	***	***	***	***	***	***	***
T2	2	6	311.85	6.01	0.000115		o	o	o	o	o	o	o	o
T3	3	6	314.35	5.17	0.000032	0.582186		o	o	o	o	o	o	o
T4	4	6	316.96	3.94	0.000017	0.290654	0.573980		o	o	o	o	o	o
T5	5	6	315.71	7.14	0.000028	0.405853	0.738011	0.783751		o	o	o	o	o
T6	6	6	313.33	5.31	0.000062	0.716197	0.817181	0.449347	0.600330		o	o	o	o
T7	7	6	313.63	8.56	0.000055	0.683032	0.861442	0.481818	0.633791	0.942056		o	o	o
T8	8	6	318.21	4.63	0.000017	0.192002	0.414097	0.760061	0.591589	0.313690	0.339363		o	o
T9	9	6	316.19	9.07	0.000023	0.358867	0.673070	0.859784	0.907396	0.539619	0.573204	0.656173		o
T10	10	6	316.55	5.58	0.000019	0.326946	0.627970	0.918927	0.849100	0.497659	0.531196	0.703127	0.930492	

Body weight - day 24

Tab. No. 8c

Treatment	Treat. No.	No. of birds	Average (g)	Standard deviation	Kruskal-Wallis test									
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
T1	1	837	766.13	140.05		***	***	***	***	***	***	***	***	***
T2	2	835	1261.44	172.95	0.000000		**	o	***	***	***	o	***	***
T3	3	833	1300.11	179.08	0.000000	0.005531		o	o	o	o	**	o	o
T4	4	833	1276.95	161.98	0.000000	1.000000	0.787419		*	**	***	o	*	**
T5	5	831	1311.94	160.75	0.000000	0.000082	1.000000	0.042717		o	o	***	o	o
T6	6	831	1316.87	168.56	0.000000	0.000001	1.000000	0.001864	1.000000		o	***	o	o
T7	7	836	1320.37	172.05	0.000000	0.000000	1.000000	0.000259	1.000000	1.000000		***	o	o
T8	8	832	1261.57	167.04	0.000000	1.000000	0.001341	1.000000	0.000015	0.000000	0.000000		***	***
T9	9	830	1312.67	162.61	0.000000	0.000027	1.000000	0.018988	1.000000	1.000000	1.000000	0.000005		o
T10	10	833	1312.62	157.45	0.000000	0.000007	1.000000	0.007293	1.000000	1.000000	1.000000	0.000001	1.000000	

Body weight - day 35

Tab. No. 8d

Treatment	Treat. No.	No. of birds	Average (g)	Standard deviation	Kruskal-Wallis test									
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
T1	1	835	1387.54	238.50		***	***	***	***	***	***	***	***	***
T2	2	832	2209.69	292.80	0.000000		o	*	*	***	***	o	o	o
T3	3	830	2250.52	299.29	0.000000	1.000000		o	o	o	**	o	*	o
T4	4	831	2272.39	286.29	0.000000	0.024933	1.000000		o	o	o	**	***	o
T5	5	822	2284.23	293.59	0.000000	0.024280	1.000000	1.000000		o	o	**	***	o
T6	6	824	2310.83	293.46	0.000000	0.000002	0.061995	1.000000	1.000000		o	***	***	**
T7	7	831	2320.76	288.64	0.000000	0.000000	0.001341	0.118744	0.114275	1.000000		***	***	***
T8	8	830	2206.30	296.93	0.000000	1.000000	0.397815	0.006862	0.007191	0.000000	0.000000		o	o
T9	9	821	2209.37	295.75	0.000000	1.000000	0.018362	0.000111	0.000118	0.000000	0.000000	1.000000		o
T10	10	827	2245.42	310.06	0.000000	1.000000	1.000000	1.000000	1.000000	0.008407	0.000102	1.000000	0.130021	

FCR - day 10

Tab. No. 9a

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Kruskal-Wallis test										
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
T1	1	6	978.27	105.08		o	o	o	o	o	o	o	*	o	o
T2	2	6	853.39	26.55	1.000000		o	o	o	o	o	o	o	o	o
T3	3	6	858.33	46.57	1.000000	1.000000		o	o	o	o	o	o	o	o
T4	4	6	827.46	20.82	0.124787	1.000000	1.000000		o	o	o	o	o	o	o
T5	5	6	821.67	25.10	0.057035	1.000000	1.000000	1.000000		o	o	o	o	o	o
T6	6	6	816.19	47.87	0.100284	1.000000	1.000000	1.000000	1.000000		o	o	o	o	o
T7	7	6	825.18	21.37	0.094890	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o	o
T8	8	6	800.14	53.64	0.015059	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o
T9	9	6	837.31	32.62	0.592177	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o	o
T10	10	6	826.62	47.29	0.131712	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o

FCR - day 24

Tab. No. 9b

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test										
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
T1	1	6	1536.17	106.61		***	***	***	***	***	***	***	***	***	***
T2	2	6	1219.45	35.74	0.000115		o	o	o	o	o	*	o	o	*
T3	3	6	1189.23	61.51	0.000055	0.401993		o	o	o	o	o	o	o	o
T4	4	6	1205.86	42.93	0.000062	0.687448	0.622210		o	o	o	o	o	o	o
T5	5	6	1160.81	48.82	0.000023	0.132190	0.447921	0.239847		o	o	o	o	o	o
T6	6	6	1158.34	49.08	0.000019	0.121498	0.420962	0.223036	0.941598		o	o	o	o	o
T7	7	6	1130.65	40.10	0.000017	0.026587	0.137886	0.058762	0.420559	0.442633		o	o	o	o
T8	8	6	1176.97	69.37	0.000032	0.256247	0.716625	0.423024	0.653942	0.618916	0.235062		o	o	o
T9	9	6	1164.14	52.99	0.000028	0.148581	0.486639	0.264756	0.921349	0.872354	0.382843	0.703824		o	o
T10	10	6	1132.76	38.37	0.000017	0.028999	0.147250	0.063403	0.436644	0.449556	0.950221	0.248772	0.401898		o

FCR - day 35

Tab. No. 9c

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test									
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
T1	1	6	1842.42	38.72		***	***	***	***	***	***	***	***	***
T2	2	6	1484.60	29.79	0.000115		o	o	*	**	**	o	o	*
T3	3	6	1459.54	25.44	0.000032	0.344001		o	o	o	*	o	o	o
T4	4	6	1440.82	33.87	0.000028	0.105689	0.434047		o	o	o	o	o	o
T5	5	6	1421.03	48.16	0.000023	0.020396	0.131552	0.408598		o	o	o	o	o
T6	6	6	1408.36	34.45	0.000017	0.006428	0.058189	0.219857	0.619239		o	*	o	o
T7	7	6	1399.78	33.19	0.000017	0.002614	0.029360	0.129551	0.422277	0.719368		*	*	o
T8	8	6	1470.16	44.66	0.000062	0.545851	0.677200	0.267588	0.069147	0.026101	0.011984		o	o
T9	9	6	1460.11	51.07	0.000055	0.337127	0.981054	0.449495	0.139415	0.059714	0.029942	0.673874		o
T10	10	6	1416.81	59.23	0.000019	0.014537	0.105914	0.346671	0.859569	0.723341	0.504328	0.052163	0.109597	

Performance results per replicate

Body weight per phases

Tab. No. 10a (page 1)

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 24		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T1	1	1	140	43.93	140	232.14	140	760.07	139	1416.83
		11	140	43.57	140	229.29	140	756.64	139	1431.73
		21	140	42.50	140	223.93	139	698.92	139	1402.73
		40	140	42.86	140	237.14	139	845.47	139	1419.78
		50	140	42.86	140	244.29	139	813.81	139	1393.74
		60	140	43.57	140	211.07	140	722.29	140	1261.36
T2	2	2	140	43.57	140	312.86	140	1184.57	138	2170.07
		12	140	43.21	140	315.71	138	1270.22	137	2236.50
		22	140	42.50	140	313.57	139	1313.96	139	2233.09
		39	140	42.86	140	306.79	140	1219.57	140	2160.71
		49	140	42.86	140	319.29	139	1281.01	139	2212.81
		59	140	43.57	140	302.86	139	1300.22	139	2245.40
T3	3	3	140	43.57	140	306.79	140	1210.93	140	2149.36
		13	140	43.21	140	321.07	139	1226.69	137	2238.61
		23	140	42.50	140	315.00	139	1402.52	139	2338.85
		38	140	42.86	140	315.71	139	1315.54	138	2241.88
		48	140	42.50	140	317.50	140	1279.43	140	2234.64
		58	140	43.93	140	310.00	136	1367.79	136	2301.47
T4	4	4	140	43.57	140	315.71	140	1232.00	140	2269.79
		14	140	43.21	140	321.79	138	1265.87	136	2295.22
		24	140	42.50	140	312.14	139	1347.05	139	2333.09
		37	140	42.86	140	315.36	138	1247.17	138	2235.87
		47	140	42.86	140	321.79	139	1242.52	139	2229.64
		57	140	43.93	140	315.00	139	1327.12	139	2271.01
T5	5	5	140	43.57	140	323.57	139	1245.11	138	2205.43
		15	140	43.21	140	308.21	138	1313.77	137	2320.44
		25	140	42.50	140	310.71	139	1309.71	138	2323.62
		36	140	42.86	140	321.79	138	1294.06	135	2281.11
		46	140	42.50	140	321.07	139	1291.08	139	2189.50
		56	140	43.57	140	308.93	138	1418.55	135	2388.44

Body weight per phases

Tab. No. 10a (page 2)

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 24		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T6	6	6	140	43.57	140	316.07	139	1301.15	138	2288.19
		16	140	43.21	140	314.64	138	1244.06	136	2284.41
		26	140	42.50	140	305.71	137	1398.98	136	2358.75
		35	140	42.86	140	320.36	139	1238.99	137	2236.57
		45	140	42.50	140	308.57	140	1350.36	140	2313.07
		55	140	43.93	140	314.64	138	1368.48	137	2384.23
T7	7	7	140	43.57	140	308.57	139	1287.48	138	2264.13
		17	140	43.21	140	313.21	138	1255.00	138	2274.86
		27	140	42.50	140	311.07	140	1430.64	140	2392.86
		34	140	42.86	140	312.14	140	1261.71	137	2294.09
		44	140	42.50	140	330.36	140	1294.21	139	2309.57
		54	140	43.21	140	306.43	139	1392.52	139	2387.41
T8	8	8	140	43.93	140	321.79	140	1251.57	140	2212.00
		18	140	43.21	140	320.71	139	1190.14	138	2156.96
		28	140	42.50	140	316.79	139	1335.68	139	2210.50
		33	140	42.86	140	317.50	139	1230.58	138	2175.29
		43	140	42.50	140	322.50	139	1211.44	139	2190.00
		53	140	43.57	140	310.00	136	1352.06	136	2294.34
T9	9	9	140	43.57	140	318.21	137	1230.15	136	2222.21
		19	140	43.21	140	317.50	138	1330.29	135	2303.04
		29	140	42.50	140	300.36	139	1390.14	138	2078.62
		32	140	42.86	140	327.14	139	1270.00	137	2202.04
		42	140	42.50	140	321.07	139	1275.11	139	2083.31
		52	140	43.57	140	312.86	138	1379.78	136	2372.43
T10	10	10	140	43.57	140	309.64	138	1373.19	138	2334.71
		20	140	43.21	140	316.79	137	1342.77	137	2307.96
		30	140	42.50	140	323.57	140	1346.00	139	2158.49
		31	140	43.21	140	312.14	139	1256.76	137	2243.07
		41	140	42.50	140	322.50	140	1221.71	139	2084.75
		51	140	43.21	140	314.64	139	1336.55	137	2346.50

Weight gain per phases (WG) and daily weight gain (DWG)

Tab. No. 10b (page 1)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T1	1	1	188.21	18.82	527.93	29.33	656.76	93.82	1372.91	39.23
		11	185.71	18.57	527.36	29.30	675.08	96.44	1388.16	39.66
		21	181.43	18.14	474.99	26.39	703.81	100.54	1360.23	38.86
		40	194.29	19.43	608.32	33.80	574.32	82.05	1376.93	39.34
		50	201.43	20.14	569.53	31.64	579.93	82.85	1350.88	38.60
		60	167.50	16.75	511.21	28.40	539.07	77.01	1217.79	34.79
T2	2	2	269.29	26.93	871.71	48.43	985.50	140.79	2126.50	60.76
		12	272.50	27.25	954.50	53.03	966.28	138.04	2193.28	62.67
		22	271.07	27.11	1000.39	55.58	919.14	131.31	2190.59	62.59
		39	263.93	26.39	912.79	50.71	941.14	134.45	2117.86	60.51
		49	276.43	27.64	961.72	53.43	931.80	133.11	2169.95	62.00
		59	259.29	25.93	997.36	55.41	945.18	135.03	2201.82	62.91
T3	3	3	263.21	26.32	904.14	50.23	938.43	134.06	2105.79	60.17
		13	277.86	27.79	905.62	50.31	1011.92	144.56	2195.40	62.73
		23	272.50	27.25	1087.52	60.42	936.33	133.76	2296.35	65.61
		38	272.86	27.29	999.83	55.55	926.34	132.33	2199.03	62.83
		48	275.00	27.50	961.93	53.44	955.21	136.46	2192.14	62.63
		58	266.07	26.61	1057.79	58.77	933.68	133.38	2257.54	64.50
T4	4	4	272.14	27.21	916.29	50.90	1037.79	148.26	2226.21	63.61
		14	278.57	27.86	944.08	52.45	1029.35	147.05	2252.01	64.34
		24	269.64	26.96	1034.91	57.49	986.04	140.86	2290.59	65.45
		37	272.50	27.25	931.82	51.77	988.70	141.24	2193.01	62.66
		47	278.93	27.89	920.73	51.15	987.12	141.02	2186.78	62.48
		57	271.07	27.11	1012.12	56.23	943.88	134.84	2227.08	63.63
T5	5	5	280.00	28.00	921.54	51.20	960.33	137.19	2161.86	61.77
		15	265.00	26.50	1005.55	55.86	1006.67	143.81	2277.22	65.06
		25	268.21	26.82	999.00	55.50	1013.91	144.84	2281.12	65.17
		36	278.93	27.89	972.27	54.02	987.05	141.01	2238.25	63.95
		46	278.57	27.86	970.01	53.89	898.42	128.35	2147.00	61.34
		56	265.36	26.54	1109.62	61.65	969.89	138.56	2344.87	67.00

Weight gain per phases (WG) and daily weight gain (DWG)

Tab. No. 10b (page 2)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T6	6	6	272.50	27.25	985.08	54.73	987.04	141.01	2244.62	64.13
		16	271.43	27.14	929.42	51.63	1040.35	148.62	2241.20	64.03
		26	263.21	26.32	1093.26	60.74	959.77	137.11	2316.25	66.18
		35	277.50	27.75	918.64	51.04	997.58	142.51	2193.71	62.68
		45	266.07	26.61	1041.79	57.88	962.71	137.53	2270.57	64.87
		55	270.71	27.07	1053.84	58.55	1015.76	145.11	2340.31	66.87
T7	7	7	265.00	26.50	978.91	54.38	976.65	139.52	2220.56	63.44
		17	270.00	27.00	941.79	52.32	1019.86	145.69	2231.64	63.76
		27	268.57	26.86	1119.57	62.20	962.21	137.46	2350.36	67.15
		34	269.29	26.93	949.57	52.75	1032.37	147.48	2251.23	64.32
		44	287.86	28.79	963.86	53.55	1015.35	145.05	2267.07	64.77
		54	263.21	26.32	1086.09	60.34	994.89	142.13	2344.20	66.98
T8	8	8	277.86	27.79	929.79	51.65	960.43	137.20	2168.07	61.94
		18	277.50	27.75	869.43	48.30	966.81	138.12	2113.74	60.39
		28	274.29	27.43	1018.90	56.61	874.82	124.97	2168.00	61.94
		33	274.64	27.46	913.08	50.73	944.71	134.96	2132.43	60.93
		43	280.00	28.00	888.94	49.39	978.56	139.79	2147.50	61.36
		53	266.43	26.64	1042.06	57.89	942.28	134.61	2250.77	64.31
T9	9	9	274.64	27.46	911.93	50.66	992.06	141.72	2178.63	62.25
		19	274.29	27.43	1012.79	56.27	972.75	138.96	2259.82	64.57
		29	257.86	25.79	1089.79	60.54	688.48	98.35	2036.12	58.17
		32	284.29	28.43	942.86	52.38	932.04	133.15	2159.19	61.69
		42	278.57	27.86	954.04	53.00	808.20	115.46	2040.81	58.31
		52	269.29	26.93	1066.93	59.27	992.64	141.81	2328.86	66.54
T10	10	10	266.07	26.61	1063.55	59.09	961.52	137.36	2291.14	65.46
		20	273.57	27.36	1025.99	57.00	965.18	137.88	2264.74	64.71
		30	281.07	28.11	1022.43	56.80	812.49	116.07	2115.99	60.46
		31	268.93	26.89	944.62	52.48	986.30	140.90	2199.85	62.85
		41	280.00	28.00	899.21	49.96	863.03	123.29	2042.25	58.35
		51	271.43	27.14	1021.90	56.77	1009.95	144.28	2303.28	65.81

Feed conversion per 1 kg of live weight

Tab. No. 10c (page 1)

Treatment	Tr. No.	Box	Feed conversion ratio		
			Day 10	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T1	1	1	1006.15	1538.39	1815.88
		11	906.54	1608.61	1806.58
		21	1030.30	1661.05	1820.14
		40	855.42	1373.57	1836.97
		50	923.98	1451.15	1865.99
		60	1147.21	1584.26	1908.94
T2	2	2	858.45	1235.53	1472.94
		12	814.48	1252.78	1476.78
		22	865.60	1214.46	1488.33
		39	894.06	1255.71	1538.18
		49	843.40	1193.62	1483.59
		59	844.34	1164.58	1447.79
T3	3	3	798.60	1221.61	1450.27
		13	901.00	1280.69	1499.97
		23	866.21	1125.77	1438.92
		38	895.93	1191.52	1476.46
		48	886.39	1199.75	1460.44
		58	801.84	1116.01	1431.19
T4	4	4	837.10	1234.93	1444.13
		14	847.95	1228.50	1416.55
		24	826.09	1144.16	1419.81
		37	844.85	1238.09	1478.89
		47	792.45	1231.93	1483.02
		57	816.33	1157.58	1402.53
T5	5	5	799.12	1227.75	1472.05
		15	852.84	1150.47	1376.92
		25	813.79	1138.00	1374.54
		36	812.43	1190.82	1460.65
		46	798.67	1172.91	1461.74
		56	853.18	1084.90	1380.30

Feed conversion per 1 kg of live weight

Tab. No. 10c (page 2)

Treatm ent	Tr. No.	Box	Feed conversion ratio		
			Day 10	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T6	6	6	815.82	1192.16	1430.55
		16	864.93	1210.19	1433.80
		26	855.14	1098.08	1380.62
		35	755.85	1183.53	1440.30
		45	844.91	1169.53	1411.23
		55	760.50	1096.52	1353.63
T7	7	7	849.54	1159.75	1424.61
		17	820.98	1146.29	1377.98
		27	845.01	1060.96	1363.88
		34	791.76	1155.46	1420.77
		44	830.27	1157.90	1441.87
		54	813.52	1103.55	1369.55
T8	8	8	854.61	1271.54	1512.53
		18	728.29	1143.70	1463.89
		28	854.57	1095.28	1436.60
		33	830.15	1212.28	1509.32
		43	775.19	1224.18	1497.34
		53	758.06	1114.86	1401.31
T9	9	9	792.37	1205.91	1448.09
		19	881.89	1218.11	1452.17
		29	848.99	1078.11	1475.06
		32	858.08	1173.96	1499.46
		42	832.04	1183.46	1515.31
		52	810.50	1125.30	1370.59
T10	10	10	888.12	1083.56	1373.56
		20	879.37	1133.26	1394.42
		30	801.32	1120.78	1494.77
		31	787.19	1189.01	1407.29
		41	777.41	1163.47	1482.48
		51	826.33	1106.48	1348.33

Feed conversion per 1 kg of weight gain

Tab. No. 10d (page 1)

Treatm ent	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1	1240.99	1231.46	2139.72	1874.22
		11	1119.23	1334.30	2029.80	1863.45
		21	1271.65	1330.70	1978.94	1877.29
		40	1044.12	1133.09	2521.61	1894.45
		50	1120.57	1175.42	2455.03	1925.20
		60	1445.63	1249.38	2343.98	1977.24
T2	2	2	997.35	1009.07	1762.00	1503.30
		12	943.64	1049.06	1774.25	1506.24
		22	1001.32	1007.20	1880.87	1517.37
		39	1039.24	1031.07	1904.22	1569.31
		49	974.16	982.60	1883.11	1513.07
		59	986.23	967.12	1838.18	1476.62
T3	3	3	930.80	1019.55	1745.32	1480.28
		13	1041.13	1045.42	1771.21	1529.74
		23	1001.31	930.59	1909.34	1465.70
		38	1036.65	976.01	1883.96	1505.42
		48	1023.38	980.03	1809.62	1488.76
		58	934.23	930.84	1897.15	1459.72
T4	4	4	971.13	1020.67	1692.48	1472.39
		14	979.49	1010.99	1649.95	1444.14
		24	956.29	951.91	1797.02	1446.32
		37	977.72	1022.55	1783.93	1508.14
		47	914.21	1026.20	1800.16	1512.24
		57	948.62	963.53	1748.48	1430.32
T5	5	5	923.47	1019.26	1790.81	1501.96
		15	991.91	949.18	1676.22	1403.39
		25	942.74	944.27	1681.96	1400.34
		36	937.26	987.31	1825.70	1489.25
		46	920.51	973.59	1877.80	1490.84
		56	993.27	898.03	1822.88	1406.39

Feed conversion per 1 kg of weight gain

Tab. No. 10d (page 2)

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T6	6	6	946.26	993.06	1745.93	1458.53
		16	1002.63	989.83	1704.98	1461.87
		26	993.22	909.60	1800.99	1406.42
		35	872.59	987.30	1762.91	1468.74
		45	979.87	976.68	1750.26	1437.65
		55	883.91	920.30	1704.04	1379.40
T7	7	7	989.22	955.54	1775.31	1452.73
		17	952.38	939.89	1664.77	1404.97
		27	978.72	877.42	1814.27	1388.54
		34	917.77	959.82	1749.35	1447.98
		44	952.85	946.21	1806.71	1469.00
		54	947.08	923.87	1742.71	1394.94
T8	8	8	989.72	1052.09	1826.57	1543.18
		18	841.70	946.81	1859.34	1494.00
		28	986.98	891.81	1958.88	1464.93
		33	959.69	997.27	1898.85	1539.90
		43	892.86	1016.76	1835.76	1527.17
		53	882.04	938.99	1818.96	1428.99
T9	9	9	918.08	998.52	1749.75	1477.50
		19	1020.83	1005.47	1778.64	1480.50
		29	988.92	893.71	2280.26	1506.10
		32	987.44	952.19	1950.62	1529.58
		42	958.97	973.23	2040.24	1547.04
		52	941.64	940.05	1725.65	1396.92
T10	10	10	1033.56	881.64	1789.89	1399.99
		20	1018.28	924.41	1762.84	1421.39
		30	922.49	928.37	2117.29	1524.85
		31	913.68	992.52	1687.86	1435.22
		41	895.41	958.51	1935.81	1513.38
		51	957.89	911.37	1672.55	1373.88

Feed consumption per phases

Tab. No. 10e (page 1)

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-24)	Finisher (D 24-35)	Total (D 1-35)
			kg	kg	kg	kg
T1	1	1	32.70	131.00	195.10	358.80
		11	29.10	141.30	190.70	361.10
		21	32.30	129.90	193.60	355.80
		40	28.40	133.60	201.30	363.30
		50	31.60	134.50	197.90	364.00
		60	33.90	126.30	176.90	337.10
T2	2	2	37.60	167.30	240.00	444.90
		12	36.00	185.10	235.80	456.90
		22	38.00	184.40	240.30	462.70
		39	38.40	176.00	250.90	465.30
		49	37.70	175.30	243.90	456.90
		59	35.80	175.10	241.50	452.40
T3	3	3	34.30	172.80	229.30	436.40
		13	40.50	179.70	246.20	466.40
		23	38.20	181.90	248.50	468.60
		38	39.60	179.10	241.80	460.50
		48	39.40	175.50	242.00	456.90
		58	34.80	174.70	240.90	450.40
T4	4	4	37.00	176.00	245.90	458.90
		14	38.20	177.30	233.20	448.70
		24	36.10	178.50	246.30	460.90
		37	37.30	176.70	243.40	457.40
		47	35.70	177.80	247.00	460.50
		57	36.00	178.50	229.40	443.90
T5	5	5	36.20	176.70	238.00	450.90
		15	36.80	173.30	231.60	441.70
		25	35.40	172.30	236.20	443.90
		36	36.60	177.30	242.40	456.30
		46	35.90	175.10	234.50	445.50
		56	36.90	177.10	240.00	454.00

Feed consumption per phases

Tab. No. 10e (page 2)

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-24)	Finisher (D 24-35)	Total (D 1-35)
			kg	kg	kg	kg
T6	6	6	36.10	179.80	239.00	454.90
		16	38.10	170.90	242.80	451.80
		26	36.60	176.40	234.80	447.80
		35	33.90	170.30	242.10	446.30
		45	36.50	184.60	235.90	457.00
		55	33.50	174.70	237.40	445.60
T7	7	7	36.70	171.50	240.70	448.90
		17	36.00	163.70	234.30	434.00
		27	36.80	175.70	244.40	456.90
		34	34.60	169.50	249.50	453.60
		44	38.40	171.40	254.80	464.60
		54	34.90	179.20	241.00	455.10
T8	8	8	38.50	184.30	245.60	468.40
		18	32.70	157.00	249.70	439.40
		28	37.90	165.90	238.20	442.00
		33	36.90	170.90	248.20	456.00
		43	35.00	171.30	249.70	456.00
		53	32.90	175.40	233.10	441.40
T9	9	9	35.30	169.70	238.80	443.80
		19	39.20	185.10	234.80	459.10
		29	35.70	172.80	217.40	425.90
		32	39.30	168.50	249.10	456.90
		42	37.40	172.90	229.20	439.50
		52	35.50	179.90	228.20	443.60
T10	10	10	38.50	167.90	237.50	443.90
		20	39.00	172.40	233.10	444.50
		30	36.30	174.90	239.70	450.90
		31	34.40	173.50	229.60	437.50
		41	35.10	163.90	233.00	432.00
		51	36.40	169.80	232.50	438.70

Foot pad lesions

Tab. No. 10f (page 1)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T1	1	1	0.88	0.93
		11	1.08	1.20
		21	0.58	0.43
		40	1.18	1.08
		50	2.13	1.83
		60	1.33	1.10
T2	2	2	1.25	1.08
		12	1.28	1.20
		22	0.73	0.60
		39	1.65	1.68
		49	2.63	2.70
		59	1.40	1.23
T3	3	3	0.55	0.58
		13	1.23	1.30
		23	1.08	0.95
		38	1.53	1.50
		48	2.53	2.48
		58	1.33	1.30
T4	4	4	0.90	0.63
		14	1.48	1.33
		24	1.08	0.90
		37	1.43	1.30
		47	2.45	2.55
		57	1.23	1.25
T5	5	5	1.43	1.28
		15	1.18	1.25
		25	0.88	0.65
		36	0.93	0.83
		46	2.25	2.23
		56	1.25	1.30

Foot pad lesions

Tab. No. 10f (page 2)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T6	6	6	0.78	0.73
		16	1.18	0.80
		26	0.98	0.85
		35	1.43	1.43
		45	2.38	2.50
		55	1.83	1.98
T7	7	7	0.95	0.68
		17	0.88	0.78
		27	1.10	0.85
		34	1.28	1.18
		44	2.15	2.13
		54	1.85	1.73
T8	8	8	1.20	1.10
		18	0.75	0.78
		28	1.78	1.33
		33	1.60	1.75
		43	2.00	2.05
		53	2.00	1.95
T9	9	9	1.15	1.00
		19	1.20	1.08
		29	1.65	1.68
		32	2.03	1.93
		42	2.03	2.03
		52	2.08	2.03
T10	10	10	1.35	0.98
		20	1.25	1.25
		30	1.75	1.55
		31	2.13	2.23
		41	1.68	1.68
		51	1.95	1.90

Litter scoring at the age of 24 days Tab. No. 10ga (page 1)

Treatment	Tr. No.	Box No.	Litter scoring
T1	1	1	2
		11	2
		21	2
		40	1
		50	1
		60	2
T2	2	2	4
		12	3
		22	3
		39	2
		49	2
		59	3
T3	3	3	3
		13	3
		23	3
		38	2
		48	2
		58	3
T4	4	4	3
		14	2
		24	2
		37	3
		47	3
		57	4
T5	5	5	4
		15	3
		25	3
		36	2
		46	2
		56	3

Litter scoring at the age of 24 days Tab. No. 10ga (page 2)

Treatment	Tr. No.	Box No.	Litter scoring
T6	6	6	3
		16	3
		26	3
		35	3
		45	2
		55	2
T7	7	7	3
		17	4
		27	3
		34	3
		44	3
		54	3
T8	8	8	4
		18	3
		28	3
		33	4
		43	3
		53	3
T9	9	9	3
		19	3
		29	4
		32	4
		42	3
		52	2
T10	10	10	4
		20	4
		30	4
		31	2
		41	3
		51	2

Litter scoring at the age of 35 days Tab. No. 10gb (page 1)

Treatment	Tr. No.	Box No.	Litter scoring
T1	1	1	4
		11	4
		21	3
		40	3
		50	3
		60	4
T2	2	2	5
		12	5
		22	4
		39	4
		49	4
		59	5
T3	3	3	5
		13	5
		23	5
		38	4
		48	4
		58	5
T4	4	4	4
		14	4
		24	4
		37	5
		47	5
		57	5
T5	5	5	5
		15	4
		25	5
		36	4
		46	4
		56	4

Litter scoring at the age of 35 days Tab. No. 10gb (page 2)

Treatment	Tr. No.	Box No.	Litter scoring
T6	6	6	5
		16	5
		26	5
		35	5
		45	4
		55	4
T7	7	7	5
		17	5
		27	5
		34	4
		44	5
		54	4
T8	8	8	5
		18	5
		28	5
		33	5
		43	5
		53	4
T9	9	9	5
		19	5
		29	5
		32	5
		42	5
		52	4
T10	10	10	5
		20	5
		30	5
		31	4
		41	5
		51	4