



MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE ÚSTRAŠICE

státní podnik

390 02 Tábor 2

Česká republika

XXXXX

XXXXX (No. 1240)

XXXXX

XXXXX (VT č. 1240)

International Poultry Testing Station Ústrašice
Mezinárodní testování drůbeže Ústrašice

Czech Republic
Česká republika

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Zpracovatel studie:

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Associate Investigator:
Spoluzpracovatel studie:

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Study monitor:
Dohlížitel:

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Study sponsor :
Dohlížitel:

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March 2024
Březen 2024

Aim of the Project

Two xxxxx were tested in a simultaneous dose-response assay in order to estimate optimal dosage as well as relative effectiveness of products at commercial feeding conditions. An additional aspect was effectiveness a xxxxx.

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 sended for the contents of nutrients by xxxxx.

Trial period

Beginning of the trial:	16 January 2024
End of the trial:	20 February 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 – 43 weeks

Experimental treatments:

Tr. No.	Tr.	Treatment	xxxxx	xxxxx	Reps	Birds / Rep	Birds
1	T1	xxxxx	xxxxx	xxxxx	6	140	840
2	T2	xxxxx	xxxxx	xxxxx	6	140	840
3	T3	xxxxx	xxxxx	xxxxx	6	140	840
4	T4	xxxxx	xxxxx	xxxxx	6	140	840
5	T5	xxxxx	xxxxx	xxxxx	6	140	840
6	T6	xxxxx	xxxxx	xxxxx	6	140	840
7	T7	xxxxx	xxxxx	xxxxx	6	140	840
8	T8	xxxxx	xxxxx	xxxxx	6	140	840
9	T9	xxxxx	xxxxx	xxxxx	6	140	840
10	T10	xxxxx	xxxxx	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 0-8 days of age for the starter BR1, 9-16 days of age for the grower BR2-1, 17-24 days of age for the grower BR2-2 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 (%)	BR1	BR2 A		BR2 B		BR3	
	T1-T10	T1-T7	T8-T10	T1-T7	T8-T10	T1-T7	T8-T10
Corn	55.24	58.48	63.98	59.38	64.03	61.77	65.77
Soyabean meal	34.46	32.07	26.29	31.81	27.07	29.91	25.99
Soybean oil	4.24	4.07	3.19	4.58	3.80	4.63	3.96
MCP	1.42	1.07	0.10	0.57	0.91	0.20	0.76
Limestone	1.20	0.85	0.46	0.69	0.82	0.55	0.76
Neophos	0.54	0.55	2.22	1.05	0.57	1.43	0.57
Salt	0.32	0.32	0.20	0.25	0.31	0.20	0.31
xxxxx	2.08	2.09	3.06	1.17	1.99	0.81	1.38
AMV BR1 plus	0.50	-	-	-	-	-	-
AMV BR2 plus	-	0.50	0.50	0.50	0.50	-	-
AMV BR3 plus	-	-	-	-	-	0.50	0.50
Nutritional composition (%)							
Crude protein	218.10	209.50	197.00	199.80	190.00	190.00	180.00
ME (MJ/kg)	12.80	12.95	12.95	13.10	13.10	13.20	13.20
Lysine	14.19	13.62	13.45	12.22	12.08	11.06	10.95
Methionine	7.01	6.85	7.04	5.94	6.09	5.38	5.51
Met.+Cys.	10.21	9.93	9.82	9.02	8.93	8.37	8.30
Ca	9.50	7.50	7.50	7.00	7.00	6.50	6.50
P dig.	5.00	4.30	4.30	3.90	3.90	3.60	3.60
Na	1.60	1.60	2.00	1.60	1.60	1.60	1.60

Parameters recorded and methods applied

Live weight

Live weight was measured on day 1 and on day 8 (the birds in each pen were weighed altogether). On day 16 and 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 – 8 days, 9 – 16 days, 17 – 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 – 8 days, 9 – 16 days, 17 – 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 – 8 days, 9 – 16 days, 17 – 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, 8, 16, 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
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	10 Performance results per pen:
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	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	91.10	88.90	97.60	840	62.00	41.13
T2	2				840		41.13
T3	3				840		41.13
T4	4				840		41.13
T5	5				840		41.13
T6	6				840		41.13
T7	7				840		41.13
T8	8				840		41.25
T9	9				840		41.13
T10	10				840		41.19

Body weight per phases

Tab. No. 2a

Treatment	Tr. No.	Day 1		Day 8		Day 16		Day 24		Day 35	
		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	840	41.13	840	223.10	835	701.44	830	1278.49	827	2310.58
T2	2	840	41.13	840	215.12	836	718.29	834	1292.18	829	2313.79
T3	3	840	41.13	840	225.54	834	699.22	831	1288.46	820	2246.22
T4	4	840	41.13	840	228.75	835	697.40	834	1281.20	828	2272.16
T5	5	840	41.13	840	228.21	828	704.48	824	1275.35	818	2299.16
T6	6	840	41.13	840	222.44	833	702.23	831	1268.83	831	2257.81
T7	7	840	41.13	840	229.52	836	695.97	832	1299.71	826	2299.02
T8	8	840	41.25	840	229.58	836	672.60	834	1258.94	831	2231.37
T9	9	840	41.13	840	212.62	835	679.86	834	1270.66	832	2264.13
T10	10	840	41.19	840	222.92	832	679.84	830	1296.51	825	2260.38

Weight gain per phases

Tab. No. 2b

Treatment	Tr. No.	Day 1 - 8		Day 9 - 16		Day 17 - 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	Weight gain per phase	Daily weight gain
		g	g	g	g	g	g	g	g	g	g
T1	1	181.97	22.75	478.34	59.79	577.06	72.13	1032.09	86.01	2269.45	63.04
T2	2	173.99	21.75	503.17	62.90	573.89	71.74	1021.61	85.13	2272.66	63.13
T3	3	184.41	23.05	473.68	59.21	589.24	73.65	957.76	79.81	2205.09	61.25
T4	4	187.62	23.45	468.65	58.58	583.80	72.97	990.96	82.58	2231.03	61.97
T5	5	187.08	23.39	476.27	59.53	570.87	71.36	1023.80	85.32	2258.03	62.72
T6	6	181.31	22.66	479.79	59.97	566.60	70.82	988.98	82.41	2216.68	61.57
T7	7	188.39	23.55	466.45	58.31	603.74	75.47	999.31	83.28	2257.89	62.72
T8	8	188.33	23.54	443.01	55.38	586.35	73.29	972.43	81.04	2190.12	60.84
T9	9	171.49	21.44	467.24	58.40	590.80	73.85	993.48	82.79	2223.00	61.75
T10	10	181.73	22.72	456.93	57.12	616.66	77.08	963.87	80.32	2219.19	61.64

Feed conversion per 1 kg of live weight

Tab. No. 2c

Treatment	Tr. No.	Feed conversion ratio			
		Day 8	Day 16	Day 24	Day 35
		g/kg live weight	g/kg live weight	g/kg live weight	g/kg live weight
T1	1	846.85	1019.71	1208.35	1425.27
T2	2	907.03	1006.67	1202.61	1432.24
T3	3	851.41	1021.31	1187.89	1433.18
T4	4	847.25	1033.72	1191.20	1432.97
T5	5	812.73	991.57	1188.65	1416.29
T6	6	827.40	1006.97	1200.01	1429.56
T7	7	811.20	1028.17	1198.27	1424.93
T8	8	838.99	1041.35	1205.83	1445.09
T9	9	881.30	1015.38	1188.65	1431.25
T10	10	837.38	1035.02	1182.93	1440.45

Feed conversion per 1 kg of weight gain

Tab. No. 2d

Treatment	Tr. No.	Feed conversion ratio				
		Day 1-8	Day 9-16	Day 17-24	Day 25-35	Day 1-35
		g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1038.27	1100.42	1440.26	1696.34	1451.36
T2	2	1121.44	1049.40	1449.09	1724.54	1458.35
T3	3	1041.31	1102.59	1387.01	1768.25	1460.27
T4	4	1033.00	1125.22	1379.93	1746.94	1459.57
T5	5	991.40	1078.09	1434.74	1703.23	1442.54
T6	6	1015.10	1090.63	1441.03	1725.27	1456.31
T7	7	988.30	1135.12	1395.73	1722.87	1451.13
T8	8	1022.76	1146.48	1395.62	1756.36	1472.48
T9	9	1092.67	1076.58	1389.04	1743.12	1457.91
T10	10	1027.18	1131.95	1347.19	1790.50	1467.50

Feed consumption per phases

Tab. No. 2e

Treatment	Tr. No.	Feed consumption				
		Starter (d 1-8)	Grower (d 9-16)	Grower (d 17-24)	Finisher (d 25-35)	Total (d 1-35)
		kg	kg	kg	kg	kg
T1	1	158.70	441.70	689.80	1449.40	2739.60
T2	2	163.90	442.20	693.60	1464.20	2763.90
T3	3	161.30	436.60	679.30	1391.80	2669.00
T4	4	162.80	440.60	672.10	1440.40	2715.90
T5	5	155.80	427.20	675.60	1430.70	2689.30
T6	6	154.60	437.40	678.50	1417.90	2688.40
T7	7	156.40	444.00	702.10	1424.70	2727.20
T8	8	161.80	425.60	682.20	1421.40	2691.00
T9	9	157.40	421.30	684.50	1441.00	2704.20
T10	10	156.80	432.20	690.32	1424.60	2703.92

Mortality

Tab. No. 3

Treatment	Tr. No.	Mortality in the period											Mortality according causes														
		Day 1 - 8		Day 9 - 16		Day 17 - 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	birds	g	%															
T1	1	0	0	5	3093	5	3490	3	4728	13	11311	1.55										12			1		
T2	2	0	0	4	1594	2	1456	5	8589	11	11639	1.31										11					
T3	3	0	0	6	2276	3	2197	11	15918	20	20391	2.38										19			1		
T4	4	0	0	5	1388	1	862	6	11699	12	13949	1.43									2	9			1		
T5	5	0	0	12	4648	4	3306	6	10170	22	18124	2.62	1									20			1		
T6	6	0	0	7	2941	2	1404	0	0	9	4345	1.07									2	6			1		
T7	7	0	0	4	2119	4	3505	6	9304	14	14928	1.67										13			1		
T8	8	0	0	4	1783	2	1144	3	4976	9	7903	1.07									1	6			2		
T9	9	0	0	5	2252	1	735	2	2647	8	5634	0.95										7			1		
T10	10	0	0	8	3440	2	1946	5	6934	15	12320	1.79										13			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)

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	♂	2472	1757	136	28	1.13	599	24.23	34.09	537	21.73	30.58	1136	45.96	64.67	71.07	76.57
		♀	2121	1485	134	27	1.28	484	22.82	32.59	459	21.63	30.89	943	44.46	63.48	70.04	76.34
		♂	2296	1621	135	28	1.20	542	23.58	33.40	498	21.69	30.72	1040	45.27	64.13	70.60	76.46
T2	2	♂	2528	1793	139	29	1.14	604	23.87	33.66	543	21.49	30.30	1147	45.36	63.97	70.92	76.40
		♀	2197	1565	132	30	1.37	530	24.14	33.89	472	21.47	30.15	1002	45.61	64.04	71.23	77.25
		♂	2363	1679	136	30	1.25	567	24.00	33.77	508	21.48	30.23	1075	45.48	64.00	71.06	76.80
T3	3	♂	2448	1723	138	31	1.28	567	23.17	32.93	525	21.43	30.46	1092	44.61	63.39	70.37	76.01
		♀	2081	1478	128	28	1.35	485	23.31	32.82	450	21.62	30.45	935	44.93	63.27	71.02	77.20
		♂	2264	1600	133	30	1.31	526	23.24	32.88	487	21.52	30.45	1014	44.76	63.33	70.67	76.56
T4	4	♂	2449	1744	134	25	1.03	572	23.37	32.81	546	22.29	31.29	1118	45.65	64.11	71.21	76.69
		♀	2104	1490	124	26	1.21	486	23.10	32.63	462	21.97	31.02	948	45.07	63.65	70.81	76.72
		♂	2277	1617	129	25	1.11	529	23.24	32.73	504	22.14	31.17	1033	45.38	63.90	71.03	76.71
T5	5	♂	2526	1787	140	29	1.16	605	23.95	33.84	537	21.25	30.04	1142	45.20	63.88	70.76	76.29
		♀	2143	1505	126	24	1.10	493	22.99	32.73	464	21.67	30.85	957	44.66	63.58	70.25	76.14
		♂	2334	1646	133	26	1.13	549	23.51	33.33	501	21.44	30.41	1049	44.95	63.74	70.52	76.22

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	♂	2449	1744	137	23	0.95	589	24.05	33.77	523	21.34	29.97	1111	45.39	63.74	71.20	76.78
		♀	2067	1473	128	24	1.17	472	22.85	32.05	446	21.56	30.25	918	44.41	62.30	71.28	77.48
		♂	2258	1608	132	24	1.05	531	23.50	32.99	484	21.44	30.10	1015	44.94	63.08	71.24	77.10
T7	7	♂	2431	1747	140	30	1.22	563	23.15	32.22	544	22.36	31.11	1106	45.51	63.33	71.86	77.64
		♀	2137	1525	128	26	1.21	504	23.56	33.01	474	22.17	31.07	977	45.73	64.07	71.38	77.35
		♂	2284	1636	134	28	1.21	533	23.34	32.59	509	22.27	31.09	1042	45.61	63.68	71.63	77.50
T8	8	♂	2417	1701	137	29	1.21	551	22.79	32.37	542	22.43	31.87	1093	45.22	64.24	70.39	76.05
		♀	2094	1474	129	31	1.46	468	22.35	31.76	455	21.74	30.89	923	44.09	62.65	70.37	76.51
		♂	2256	1588	133	30	1.32	509	22.58	32.09	499	22.11	31.42	1008	44.69	63.50	70.38	76.26
T9	9	♂	2476	1733	138	28	1.13	560	22.63	32.34	536	21.64	30.93	1096	44.28	63.27	69.98	75.56
		♀	2200	1541	135	31	1.42	508	23.10	32.96	480	21.82	31.14	988	44.91	64.10	70.07	76.22
		♂	2338	1637	137	30	1.27	534	22.85	32.64	508	21.72	31.03	1042	44.58	63.66	70.02	75.87
T10	10	♂	2488	1760	144	31	1.25	570	22.92	32.41	548	22.01	31.12	1118	44.94	63.53	70.74	76.52
		♀	2144	1525	133	30	1.38	500	23.32	32.80	478	22.31	31.38	979	45.63	64.18	71.10	77.28
		♂	2316	1642	138	30	1.31	535	23.11	32.59	513	22.15	31.24	1048	45.26	63.83	70.91	76.87

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

Treatment	Tr. No.	Evaluation	
		right foot	left foot
T1	1	0.98	1.03
T2	2	0.83	0.88
T3	3	0.85	0.93
T4	4	0.80	0.82
T5	5	1.06	1.09
T6	6	0.70	0.69
T7	7	0.95	0.94
T8	8	0.69	0.71
T9	9	0.98	1.03
T10	10	0.93	0.92

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

Treatment	Tr. No.	Litter scoring
T1	1	2.33
T2	2	2.17
T3	3	2.33
T4	4	2.33
T5	5	2.17
T6	6	2.17
T7	7	2.50
T8	8	2.33
T9	9	2.67
T10	10	2.33

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

Treatment	Tr. No.	Litter scoring
T1	1	4.67
T2	2	3.83
T3	3	3.83
T4	4	4.00
T5	5	3.83
T6	6	3.83
T7	7	4.17
T8	8	4.33
T9	9	4.33
T10	10	4.17

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	417	2487.46	244.72	9.84	410	2130.68	229.97	10.79
T2	2	427	2483.47	247.86	9.98	402	2133.56	207.35	9.72
T3	3	413	2410.27	245.33	10.18	407	2079.75	248.43	11.95
T4	4	429	2432.21	240.32	9.88	399	2100.08	239.13	11.39
T5	5	409	2458.83	262.06	10.66	409	2139.49	213.60	9.98
T6	6	418	2440.07	260.81	10.69	413	2073.34	239.62	11.56
T7	7	424	2474.36	254.04	10.27	402	2114.08	236.83	11.20
T8	8	424	2366.34	256.78	10.85	407	2090.76	252.75	12.09
T9	9	428	2414.00	256.91	10.64	404	2105.37	229.88	10.92
T10	10	415	2435.16	227.24	9.33	410	2083.46	229.07	10.99

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	41.13	0.42		o	o	o	o	o	o	o	o	o	o
T2	2	6	41.13	0.42	1.000000		o	o	o	o	o	o	o	o	o
T3	3	6	41.13	0.42	1.000000	1.000000		o	o	o	o	o	o	o	o
T4	4	6	41.13	0.48	0.994743	0.995166	0.995132		o	o	o	o	o	o	o
T5	5	6	41.13	0.42	1.000000	1.000000	1.000000	0.995046		o	o	o	o	o	o
T6	6	6	41.13	0.42	1.000000	1.000000	1.000000	0.995021	1.000000		o	o	o	o	o
T7	7	6	41.13	0.42	1.000000	1.000000	1.000000	0.994345	1.000000	1.000000		o	o	o	o
T8	8	6	41.25	0.38	0.667061	0.666030	0.664708	0.632626	0.655705	0.649389	0.640922		o	o	o
T9	9	6	41.13	0.27	1.000000	1.000000	1.000000	0.995091	1.000000	1.000000	1.000000	0.660628		o	o
T10	10	6	41.19	0.29	0.828992	0.828269	0.827348	0.801186	0.822331	0.816242	0.808643	0.795633	0.826191		o

Body weight - day 8

Tab. No. 8b

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	223.10	0.98		o	o	o	o	o	o	o	o	o	o
T2	2	6	215.12	1.29	1.000000		o	*	*	o	**	**	o	o	
T3	3	6	225.54	2.03	1.000000	0.552251		o	o	o	o	o	o	o	
T4	4	6	228.75	3.19	1.000000	0.021922	1.000000		o	o	o	o	**	o	
T5	5	6	228.21	2.69	1.000000	0.042603	1.000000	1.000000		o	o	o	**	o	
T6	6	6	222.44	3.09	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o	o	
T7	7	6	229.52	8.97	1.000000	0.007143	1.000000	1.000000	1.000000	0.909529		o	**	o	
T8	8	6	229.58	2.25	0.992697	0.005110	1.000000	1.000000	1.000000	0.727680	1.000000		***	o	
T9	9	6	212.62	2.81	1.000000	1.000000	0.167428	0.004616	0.009603	1.000000	0.001349	0.000935		o	
T10	10	6	222.92	1.57	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	0.851208	0.679756	1.000000		

Body weight - day 16

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	835	701.44	101.66		o	o	o	o	o	o	***	***	***
T2	2	836	718.29	101.51	0.089457		*	**	o	o	*	***	***	***
T3	3	834	699.22	97.45	1.000000	0.023072		o	o	o	o	***	***	***
T4	4	835	697.40	93.97	1.000000	0.004497	1.000000		o	o	o	***	***	***
T5	5	828	704.48	88.31	1.000000	0.252012	1.000000	1.000000		o	o	***	***	***
T6	6	833	702.23	89.01	1.000000	0.063637	1.000000	1.000000	1.000000		o	***	***	***
T7	7	836	695.97	85.32	1.000000	0.010643	1.000000	1.000000	1.000000	1.000000		***	***	***
T8	8	836	672.60	81.10	0.000000	0.000000	0.000000	0.000001	0.000000	0.000000	0.000000		o	o
T9	9	835	679.86	100.31	0.000011	0.000000	0.000078	0.000579	0.000002	0.000018	0.000215	1.000000		o
T10	10	832	679.84	105.49	0.000004	0.000000	0.000032	0.000254	0.000001	0.000007	0.000091	1.000000	1.000000	

Body weight - day 24

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	830	1278.49	153.08		o	o	o	o	o	o	o	o	o	o
T2	2	834	1292.18	159.11	1.000000		o	o	o	*	o	***	o	o	
T3	3	831	1288.46	163.59	1.000000	1.000000		o	o	o	o	**	o	o	
T4	4	834	1281.20	184.52	1.000000	1.000000	1.000000		o	o	o	o	o	o	
T5	5	824	1275.35	164.11	1.000000	0.085949	1.000000	1.000000		o	**	o	o	o	
T6	6	831	1268.83	162.10	1.000000	0.012469	0.308254	1.000000	1.000000		***	o	o	*	
T7	7	832	1299.71	166.34	0.177384	1.000000	1.000000	0.186180	0.008965	0.000901		***	**	o	
T8	8	834	1258.94	161.79	0.666654	0.000125	0.007775	0.639037	1.000000	1.000000	0.000005		o	***	
T9	9	834	1270.66	153.09	1.000000	0.085364	1.000000	1.000000	1.000000	1.000000	0.008407	1.000000		o	
T10	10	830	1296.51	172.07	1.000000	1.000000	1.000000	1.000000	0.233613	0.037663	1.000000	0.000488	0.219059		

Body weight - day 35

Tab. No. 8e

Treatment	Treat. No.	No. of birds	Average (g)	Standard deviation	Scheffe test										
					T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	
T1	1	827	2310.58	297.00		o	*	o	o	o	o	o	***	o	o
T2	2	829	2313.79	288.18	1.000000		**	o	o	o	o	o	***	o	o
T3	3	820	2246.22	297.01	0.020061	0.009870		o	o	o	o	o	o	o	o
T4	4	828	2272.16	291.52	0.632085	0.505829	0.955794		o	o	o	o	o	o	o
T5	5	818	2299.16	287.42	0.999924	0.999396	0.152059	0.943161		o	o	**	o	o	
T6	6	831	2257.81	310.39	0.148777	0.090892	0.999913	0.999468	0.520797		o	o	o	o	
T7	7	826	2299.02	304.66	0.999914	0.999335	0.152244	0.944107	1.000000	0.522218		**	o	o	
T8	8	831	2231.37	289.57	0.000443	0.000164	0.999312	0.537770	0.009396	0.948658	0.009335		o	o	
T9	9	832	2264.13	288.73	0.324882	0.224086	0.996916	0.999996	0.755875	1.000000	0.757569	0.820931		o	
T10	10	825	2260.38	288.01	0.212697	0.136907	0.999541	0.999899	0.623625	1.000000	0.625261	0.910073	1.000000		

FCR - day 8

Tab. No. 9a

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	846.91	19.07		**	o	o	o	o	o	o	o	o	o
T2	2	6	907.12	28.87	0.008648		*	**	***	***	***	**	o	**	
T3	3	6	851.62	42.96	0.828031	0.011197		o	o	o	o	o	o	o	o
T4	4	6	847.45	40.82	0.978849	0.007993	0.836996		o	o	o	o	o	o	o
T5	5	6	812.58	39.29	0.135958	0.000099	0.099808	0.136708		o	o	o	**	o	
T6	6	6	827.27	26.05	0.383192	0.000795	0.299659	0.382095	0.470118		o	o	*	o	
T7	7	6	811.68	39.56	0.132646	0.000094	0.095685	0.131938	0.964623	0.472177		o	**	o	
T8	8	6	839.03	17.06	0.698029	0.003454	0.576259	0.697950	0.239771	0.587733	0.235508		o	o	
T9	9	6	881.29	46.04	0.126101	0.206573	0.147890	0.119110	0.003852	0.022138	0.003681	0.065919		o	
T10	10	6	837.53	36.18	0.665434	0.003127	0.541771	0.659957	0.250183	0.613599	0.250631	0.941045	0.061143		

FCR - day 16

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	1022.12	34.80		o	o	o	o	o	o	o	o	o	o
T2	2	6	1008.82	55.35	0.624594		o	o	o	o	o	o	o	o	o
T3	3	6	1021.81	20.63	0.990117	0.619286		o	o	o	o	o	o	o	o
T4	4	6	1035.41	51.09	0.611193	0.347682	0.616771		o	o	o	o	o	o	o
T5	5	6	992.42	31.27	0.294005	0.530411	0.290481	0.137236		o	o	o	o	o	o
T6	6	6	1008.30	47.64	0.619943	0.983054	0.618960	0.344578	0.516952		o	o	o	o	o
T7	7	6	1028.74	29.34	0.786604	0.474276	0.791107	0.785261	0.204913	0.470578		o	o	o	o
T8	8	6	1041.87	29.68	0.477963	0.253745	0.478921	0.804900	0.092097	0.250064	0.628930		o	o	o
T9	9	6	1017.47	58.60	0.859220	0.723711	0.859237	0.519511	0.355934	0.725744	0.678406	0.395034		o	o
T10	10	6	1037.25	44.88	0.577400	0.321499	0.579364	0.939940	0.124261	0.317478	0.744862	0.850255	0.485085		

FCR - day 24

Tab. No. 9c

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	1210.69	30.19		o	o	o	o	o	o	o	o	o	o
T2	2	6	1203.51	40.02	1.000000		o	o	o	o	o	o	o	o	o
T3	3	6	1188.66	33.52	1.000000	1.000000		o	o	o	o	o	o	o	o
T4	4	6	1192.64	60.46	1.000000	1.000000	1.000000		o	o	o	o	o	o	o
T5	5	6	1188.80	14.05	1.000000	1.000000	1.000000	1.000000		o	o	o	o	o	o
T6	6	6	1200.58	29.01	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o	o	o
T7	7	6	1198.65	17.99	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o	o
T8	8	6	1207.31	40.19	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o	o	o
T9	9	6	1188.87	24.52	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o	o
T10	10	6	1183.39	33.36	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o

FCR - day 35

Tab. No. 9d

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	1426.43	19.98		o	o	o	o	o	o	o	o	o	o
T2	2	6	1432.47	22.57	0.735522		o	o	o	o	o	o	o	o	o
T3	3	6	1434.12	34.39	0.681139	0.924477		o	o	o	o	o	o	o	o
T4	4	6	1433.29	20.23	0.708915	0.959893	0.958941		o	o	o	o	o	o	o
T5	5	6	1416.65	22.20	0.569761	0.395816	0.359518	0.378167		o	o	o	o	o	o
T6	6	6	1430.19	34.61	0.815253	0.894812	0.834015	0.863787	0.448505		o	o	o	o	o
T7	7	6	1424.88	9.53	0.923654	0.679263	0.625924	0.653274	0.609263	0.757911		o	o	o	o
T8	8	6	1446.74	45.41	0.286682	0.436220	0.463251	0.451587	0.119582	0.380803	0.255328		o	o	o
T9	9	6	1431.18	16.84	0.782643	0.935879	0.870646	0.902926	0.427630	0.951141	0.725098	0.403877		o	o
T10	10	6	1441.36	32.58	0.429101	0.619266	0.652971	0.638906	0.198275	0.549404	0.387516	0.738480	0.578657		o

Performance results per replicate

Body weight per phases

Tab. No. 10a (page 1)

Treatment	Tr. No.	Pen	Day 1		Day 8		Day 16		Day 24		Day 35	
			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	140	41.79	140	224.64	138	691.81	138	1288.99	136	2263.24
		11	140	41.07	140	223.21	139	738.27	137	1337.66	136	2344.26
		21	140	41.43	140	222.50	139	689.28	139	1206.69	139	2254.75
		40	140	40.71	140	222.86	140	656.43	139	1271.37	139	2382.88
		50	140	40.71	140	223.57	140	728.50	138	1341.96	138	2338.77
		60	140	41.07	140	221.79	139	704.39	139	1225.68	139	2279.50
T2	2	2	140	41.79	140	215.36	139	751.65	139	1335.11	139	2254.03
		12	140	41.07	140	214.29	140	743.64	139	1314.60	139	2357.55
		22	140	41.43	140	213.57	140	693.57	140	1275.29	138	2334.49
		39	140	40.71	140	216.79	137	662.85	137	1304.16	135	2323.33
		49	140	40.71	140	216.43	140	731.57	140	1329.07	139	2330.07
		59	140	41.07	140	214.29	140	725.50	139	1194.89	139	2283.67
T3	3	3	140	41.79	140	226.07	139	705.90	139	1354.03	139	2222.09
		13	140	40.71	140	228.57	138	741.96	137	1312.77	130	2277.31
		23	140	41.43	140	224.64	139	692.30	138	1273.91	137	2382.48
		38	140	41.07	140	226.79	140	662.36	139	1239.71	138	2155.51
		48	140	40.71	140	222.86	139	690.79	139	1299.50	138	2161.74
		58	140	41.07	140	224.29	139	702.59	139	1251.08	138	2281.16
T4	4	4	140	41.79	140	229.29	137	684.31	137	1300.58	137	2158.32
		14	140	41.07	140	230.71	140	752.14	140	1241.50	137	2263.94
		24	140	41.43	140	222.50	140	676.43	140	1228.57	137	2327.01
		37	140	41.07	140	229.29	139	704.96	139	1340.22	139	2280.65
		47	140	40.36	140	229.29	139	678.27	139	1316.83	139	2273.45
		57	140	41.07	140	231.43	140	687.93	139	1260.43	139	2328.63
T5	5	5	140	41.79	140	225.36	138	698.04	136	1319.19	135	2267.63
		15	140	40.71	140	225.71	137	741.68	136	1283.75	135	2260.52
		25	140	41.43	140	232.86	138	697.32	138	1284.06	135	2391.19
		36	140	41.07	140	228.57	138	675.29	137	1298.69	136	2283.16
		46	140	40.71	140	228.57	139	682.66	139	1231.51	139	2276.26
		56	140	41.07	140	228.21	138	732.32	138	1236.16	138	2316.59

Body weight per phases

Tab. No. 10a (page 2)

Treatment	Tr. No.	Pen	Day 1		Day 8		Day 16		Day 24		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g		
T6	6	6	140	41.79	140	222.50	139	684.32	138	1325.87	138	2252.46
		16	140	41.07	140	217.86	139	748.71	139	1290.14	139	2295.68
		26	140	41.43	140	220.36	137	698.69	137	1241.97	137	2381.09
		35	140	40.71	140	225.00	140	683.29	140	1297.36	140	2216.71
		45	140	40.71	140	226.43	139	678.71	138	1271.74	138	2215.87
		55	140	41.07	140	222.50	139	719.78	139	1185.76	139	2186.76
T7	7	7	140	41.79	140	232.14	140	714.07	140	1342.50	140	2330.07
		17	140	41.07	140	232.50	140	682.14	138	1336.09	138	2330.22
		27	140	41.43	140	235.71	138	730.87	138	1318.70	136	2343.90
		34	140	40.71	140	211.79	139	665.18	139	1264.89	137	2221.09
		44	140	40.71	140	229.64	140	675.36	139	1292.09	139	2247.70
		54	140	41.07	140	235.36	139	708.56	138	1243.70	136	2321.47
T8	8	8	140	41.43	140	229.64	139	663.96	139	1334.39	138	2142.03
		18	140	41.07	140	230.71	139	681.22	138	1284.06	138	2327.39
		28	140	41.43	140	231.79	140	683.50	140	1260.71	140	2380.07
		33	140	41.07	140	229.29	139	634.96	138	1194.06	137	2179.56
		43	140	40.71	140	225.36	139	658.71	139	1296.55	138	2180.87
		53	140	41.79	140	230.71	140	712.86	140	1184.14	140	2176.57
T9	9	9	140	41.43	140	213.21	140	738.07	140	1318.86	140	2262.36
		19	140	41.07	140	212.86	139	663.60	138	1296.96	137	2286.86
		29	140	41.43	140	208.21	138	665.58	138	1254.49	137	2280.88
		32	140	40.71	140	214.64	140	646.21	140	1210.07	140	2140.07
		42	140	41.07	140	216.07	138	666.09	138	1301.30	138	2307.83
		52	140	41.07	140	210.71	140	699.07	140	1242.86	140	2308.29
T10	10	10	140	41.43	140	221.43	140	732.07	139	1363.60	137	2249.71
		20	140	41.07	140	222.86	135	671.33	135	1293.78	133	2297.82
		30	140	41.43	140	221.79	140	654.36	140	1249.21	140	2250.00
		31	140	40.71	140	225.71	138	642.54	138	1308.55	138	2142.46
		41	140	41.43	140	223.57	139	647.12	139	1288.13	138	2241.38
		51	140	41.07	140	222.14	140	730.57	139	1276.12	139	2381.44

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

Tab. No. 10b (page 1)

Treatment	Tr. No.	Box	Day 1 - 8		Day 9 - 16		Day 17 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g	g	g
T1	1	1	182.85	22.86	467.17	58.40	597.17	74.65	974.25	81.19	2221.45	61.71
		11	182.14	22.77	515.06	64.38	599.39	74.92	1006.60	83.88	2303.19	63.98
		21	181.07	22.63	466.78	58.35	517.41	64.68	1048.06	87.34	2213.32	61.48
		40	182.15	22.77	433.57	54.20	614.94	76.87	1111.51	92.63	2342.17	65.06
		50	182.86	22.86	504.93	63.12	613.46	76.68	996.81	83.07	2298.06	63.83
		60	180.72	22.59	482.60	60.33	521.29	65.16	1053.81	87.82	2238.43	62.18
T2	2	2	173.57	21.70	536.30	67.04	583.45	72.93	918.92	76.58	2212.24	61.45
		12	173.22	21.65	529.36	66.17	570.96	71.37	1042.95	86.91	2316.48	64.35
		22	172.14	21.52	480.00	60.00	581.71	72.71	1059.21	88.27	2293.06	63.70
		39	176.08	22.01	446.06	55.76	641.31	80.16	1019.17	84.93	2282.62	63.41
		49	175.72	21.96	515.14	64.39	597.50	74.69	1001.00	83.42	2289.36	63.59
		59	173.22	21.65	511.21	63.90	469.39	58.67	1088.78	90.73	2242.60	62.29
T3	3	3	184.28	23.04	479.83	59.98	648.13	81.02	868.06	72.34	2180.30	60.56
		13	187.86	23.48	513.39	64.17	570.82	71.35	964.53	80.38	2236.60	62.13
		23	183.21	22.90	467.66	58.46	581.61	72.70	1108.57	92.38	2341.05	65.03
		38	185.72	23.21	435.57	54.45	577.36	72.17	915.80	76.32	2114.44	58.73
		48	182.15	22.77	467.93	58.49	608.71	76.09	862.24	71.85	2121.03	58.92
		58	183.22	22.90	478.30	59.79	548.49	68.56	1030.08	85.84	2240.09	62.22
T4	4	4	187.50	23.44	455.02	56.88	616.28	77.03	857.74	71.48	2116.53	58.79
		14	189.64	23.71	521.43	65.18	489.36	61.17	1022.44	85.20	2222.87	61.75
		24	181.07	22.63	453.93	56.74	552.14	69.02	1098.44	91.54	2285.58	63.49
		37	188.22	23.53	475.68	59.46	635.25	79.41	940.43	78.37	2239.58	62.21
		47	188.93	23.62	448.99	56.12	638.56	79.82	956.62	79.72	2233.09	62.03
		57	190.36	23.79	456.50	57.06	572.50	71.56	1068.20	89.02	2287.56	63.54
T5	5	5	183.57	22.95	472.69	59.09	621.15	77.64	948.44	79.04	2225.84	61.83
		15	185.00	23.13	515.96	64.50	542.07	67.76	976.77	81.40	2219.81	61.66
		25	191.43	23.93	464.46	58.06	586.74	73.34	1107.13	92.26	2349.76	65.27
		36	187.50	23.44	446.72	55.84	623.40	77.92	984.48	82.04	2242.09	62.28
		46	187.86	23.48	454.09	56.76	548.85	68.61	1044.75	87.06	2235.55	62.10
		56	187.14	23.39	504.10	63.01	503.84	62.98	1080.43	90.04	2275.52	63.21

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

Tab. No. 10b (page 2)

Treatment	Tr. No.	Box	Day 1 - 8		Day 9 - 16		Day 17 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g	g	g
T6	6	6	180.71	22.59	461.82	57.73	641.55	80.19	926.59	77.22	2210.67	61.41
		16	176.79	22.10	530.85	66.36	541.44	67.68	1005.54	83.79	2254.61	62.63
		26	178.93	22.37	478.33	59.79	543.28	67.91	1139.12	94.93	2339.66	64.99
		35	184.29	23.04	458.29	57.29	614.07	76.76	919.36	76.61	2176.00	60.44
		45	185.72	23.21	452.28	56.53	593.03	74.13	944.13	78.68	2175.16	60.42
		55	181.43	22.68	497.28	62.16	465.97	58.25	1001.01	83.42	2145.69	59.60
T7	7	7	190.35	23.79	481.93	60.24	628.43	78.55	987.57	82.30	2288.28	63.56
		17	191.43	23.93	449.64	56.21	653.94	81.74	994.13	82.84	2289.15	63.59
		27	194.28	24.29	495.16	61.89	587.83	73.48	1025.20	85.43	2302.47	63.96
		34	171.08	21.38	453.39	56.67	599.71	74.96	956.20	79.68	2180.38	60.57
		44	188.93	23.62	445.71	55.71	616.73	77.09	955.61	79.63	2206.99	61.31
		54	194.29	24.29	473.20	59.15	535.13	66.89	1077.77	89.81	2280.40	63.34
T8	8	8	188.21	23.53	434.31	54.29	670.43	83.80	807.64	67.30	2100.60	58.35
		18	189.64	23.71	450.51	56.31	602.83	75.35	1043.33	86.94	2286.32	63.51
		28	190.36	23.79	451.71	56.46	577.21	72.15	1119.36	93.28	2338.64	64.96
		33	188.22	23.53	405.68	50.71	559.09	69.89	985.50	82.13	2138.49	59.40
		43	184.65	23.08	433.35	54.17	637.84	79.73	884.32	73.69	2140.16	59.45
		53	188.92	23.62	482.14	60.27	471.29	58.91	992.43	82.70	2134.78	59.30
T9	9	9	171.78	21.47	524.86	65.61	580.79	72.60	943.50	78.63	2220.93	61.69
		19	171.79	21.47	450.74	56.34	633.36	79.17	989.90	82.49	2245.79	62.38
		29	166.78	20.85	457.37	57.17	588.91	73.61	1026.38	85.53	2239.45	62.21
		32	173.93	21.74	431.57	53.95	563.86	70.48	930.00	77.50	2099.36	58.32
		42	175.00	21.88	450.02	56.25	635.22	79.40	1006.52	83.88	2266.76	62.97
		52	169.64	21.21	488.36	61.04	543.79	67.97	1065.43	88.79	2267.22	62.98
T10	10	10	180.00	22.50	510.64	63.83	631.53	78.94	886.11	73.84	2208.28	61.34
		20	181.79	22.72	448.48	56.06	622.44	77.81	1004.04	83.67	2256.75	62.69
		30	180.36	22.54	432.57	54.07	594.86	74.36	1000.79	83.40	2208.57	61.35
		31	185.00	23.13	416.82	52.10	666.01	83.25	833.91	69.49	2101.75	58.38
		41	182.14	22.77	423.55	52.94	641.01	80.13	953.25	79.44	2199.95	61.11
		51	181.07	22.63	508.43	63.55	545.54	68.19	1105.32	92.11	2340.37	65.01

Feed conversion per 1 kg of live weight

Tab. No. 10c (page 1)

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 8	Day 16	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight	g/kg live weight
T1	1	1	813.99	1012.06	1189.52	1420.21
		11	838.40	986.89	1197.37	1418.56
		21	869.98	1066.69	1242.47	1453.69
		40	855.77	1060.94	1217.18	1395.45
		50	849.84	987.35	1170.90	1431.25
		60	853.46	1018.76	1246.70	1439.41
T2	2	2	872.31	945.85	1165.31	1447.69
		12	943.33	974.93	1211.89	1394.58
		22	926.42	1046.34	1255.74	1431.93
		39	873.15	1097.60	1207.98	1461.38
		49	917.49	1009.57	1149.03	1433.30
		59	910.00	978.64	1231.10	1425.96
T3	3	3	818.33	1011.90	1141.14	1430.19
		13	828.13	987.22	1194.05	1469.67
		23	899.84	1034.57	1210.52	1378.70
		38	800.00	1039.58	1231.00	1465.98
		48	862.18	1017.44	1157.43	1446.10
		58	901.27	1040.16	1197.83	1414.06
T4	4	4	866.04	1074.17	1186.17	1447.57
		14	770.90	953.47	1262.87	1458.70
		24	879.61	1059.13	1231.40	1398.93
		37	834.89	991.41	1139.43	1430.56
		47	856.70	1054.42	1105.73	1430.25
		57	876.54	1079.85	1230.25	1433.71
T5	5	5	808.24	996.11	1182.06	1416.93
		15	800.63	956.04	1167.99	1445.34
		25	852.76	1020.72	1200.93	1390.12
		36	759.38	1030.91	1180.97	1436.49
		46	790.63	993.90	1196.59	1417.65
		56	863.85	956.83	1204.28	1393.35

Feed conversion per 1 kg of live weight

Tab. No. 10c (page 2)

Treatm ent	Tr. No.	Box	Feed conversion ratio			
			Day 8	Day 16	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight	g/kg live weight
T6	6	6	796.15	1002.57	1153.40	1419.31
		16	806.56	937.79	1193.96	1427.57
		26	836.30	1005.41	1213.28	1372.08
		35	812.70	1051.64	1191.43	1452.60
		45	861.20	1069.87	1240.38	1474.48
		55	850.72	982.50	1211.05	1435.10
T7	7	7	760.00	1013.30	1195.00	1428.53
		17	783.41	1078.53	1178.12	1426.13
		27	863.64	1010.17	1195.83	1438.49
		34	849.92	1039.22	1206.18	1426.54
		44	814.93	1035.43	1186.81	1419.72
		54	798.18	995.79	1229.93	1409.90
T8	8	8	849.14	1035.88	1157.90	1491.82
		18	814.24	1014.70	1213.78	1422.10
		28	822.80	1033.55	1201.70	1368.81
		33	850.47	1047.13	1240.06	1466.45
		43	839.94	1097.92	1168.51	1449.88
		53	857.59	1022.04	1261.91	1481.36
T9	9	9	860.97	908.74	1149.81	1403.40
		19	892.62	1012.72	1185.57	1443.76
		29	867.92	1046.44	1194.66	1437.04
		32	808.65	1041.23	1175.85	1423.85
		42	935.54	1080.07	1209.54	1450.93
		52	922.03	1015.63	1217.82	1428.09
T10	10	10	819.35	970.83	1169.05	1451.35
		20	871.79	1066.27	1208.67	1443.09
		30	859.90	1046.83	1214.59	1415.62
		31	781.65	1062.50	1123.94	1496.48
		41	821.09	1083.74	1186.55	1438.94
		51	871.38	993.35	1197.52	1402.67

Feed conversion per 1 kg of weight gain

Tab. No. 10d (page 1)

Treatment	Tr. No.	Box	Feed conversion ratio				
			Day 1-8	Day 9-16	Day 17-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1	1000.02	1107.85	1397.28	1730.12	1447.35
		11	1027.44	1051.29	1460.86	1718.50	1444.28
		21	1069.04	1161.46	1476.64	1696.87	1481.10
		40	1047.03	1166.39	1386.47	1599.35	1419.88
		50	1039.04	1048.24	1392.79	1783.95	1456.88
		60	1047.42	1094.80	1556.72	1664.39	1465.96
T2	2	2	1082.33	975.56	1448.83	1858.61	1475.21
		12	1167.00	987.72	1522.57	1625.85	1419.43
		22	1149.39	1099.70	1505.40	1646.48	1457.94
		39	1075.02	1207.90	1323.70	1790.35	1488.00
		49	1130.05	1048.25	1319.78	1811.79	1458.82
		59	1125.76	1007.41	1624.46	1640.68	1452.21
T3	3	3	1003.90	1103.92	1282.05	1881.32	1457.79
		13	1007.58	1058.40	1468.10	1866.48	1497.40
		23	1103.32	1099.64	1421.44	1574.34	1403.42
		38	976.92	1164.32	1452.51	1787.20	1494.69
		48	1054.88	1091.94	1316.63	1883.98	1474.10
		58	1103.31	1105.49	1400.84	1678.96	1440.20
T4	4	4	1059.07	1181.74	1311.15	1844.95	1476.74
		14	937.85	1034.25	1738.43	1698.70	1485.76
		24	1080.88	1147.13	1442.43	1587.22	1424.34
		37	1017.07	1067.02	1304.64	1846.70	1456.94
		47	1039.71	1155.89	1160.43	1877.87	1456.25
		57	1065.66	1182.91	1411.88	1674.97	1459.57
T5	5	5	992.24	1086.84	1394.19	1750.26	1444.19
		15	976.81	1025.19	1462.15	1815.41	1472.51
		25	1037.32	1105.89	1416.57	1613.78	1415.12
		36	925.71	1170.63	1346.79	1776.59	1463.27
		46	961.96	1096.70	1449.73	1678.83	1443.63
		56	1053.43	999.17	1567.67	1611.00	1418.78

Feed conversion per 1 kg of weight gain

Tab. No. 10d (page 2)

Treatment	Tr. No.	Box	Feed conversion ratio				
			Day 1-8	Day 9-16	Day 17-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T6	6	6	980.26	1102.26	1316.10	1802.61	1446.41
		16	993.93	991.96	1549.30	1727.84	1453.74
		26	1029.95	1084.66	1483.27	1546.20	1396.85
		35	992.22	1168.95	1346.98	1821.15	1479.78
		45	1049.98	1174.28	1438.66	1792.16	1502.36
		55	1043.30	1041.73	1565.54	1701.16	1462.74
T7	7	7	926.85	1135.32	1401.45	1745.99	1454.62
		17	951.49	1231.14	1282.66	1763.25	1451.92
		27	1047.80	1080.49	1428.75	1754.80	1464.78
		34	1052.17	1127.61	1392.75	1722.12	1453.42
		44	990.53	1149.04	1354.36	1735.30	1446.07
		54	966.90	1094.34	1542.53	1622.26	1435.70
T8	8	8	1036.06	1135.24	1279.11	2048.75	1521.52
		18	990.58	1117.48	1441.03	1680.79	1447.90
		28	1001.88	1141.68	1400.82	1557.02	1393.06
		33	1036.05	1158.82	1462.99	1741.31	1494.96
		43	1025.12	1232.39	1241.82	1866.37	1477.69
		53	1047.28	1100.74	1624.73	1743.20	1510.36
T9	9	9	1068.62	928.14	1456.16	1757.89	1429.58
		19	1106.02	1069.78	1368.39	1785.87	1470.53
		29	1083.52	1128.58	1363.36	1736.86	1464.06
		32	997.92	1156.90	1330.12	1746.54	1451.46
		42	1155.09	1149.48	1347.25	1765.30	1477.49
		52	1145.25	1056.02	1477.74	1673.37	1453.95
T10	10	10	1007.94	1036.51	1399.89	1892.02	1478.80
		20	1068.75	1164.54	1366.18	1754.40	1470.35
		30	1057.43	1142.67	1399.14	1666.55	1442.17
		31	953.65	1215.76	1183.77	2083.77	1525.81
		41	1007.85	1223.22	1290.68	1783.13	1466.30
		51	1069.03	1046.64	1471.96	1640.85	1427.39

Feed consumption per phases

Tab. No. 10e (page 1)

Treatment	Tr. No.	Box	Feed consumption				
			Starter (D 1-8)	Grower (D 9-16)	Grower (D 17-24)	Finisher (D 24-35)	Total (D 1-35)
			kg	kg	kg	kg	kg
T1	1	1	25.60	72.05	115.15	230.40	443.20
		11	26.20	75.75	120.55	235.50	458.00
		21	27.10	75.10	106.20	247.20	455.60
		40	26.70	70.80	117.60	247.10	462.20
		50	26.60	74.10	117.50	245.40	463.60
		60	26.50	73.90	112.80	243.80	457.00
T2	2	2	26.30	72.80	117.50	237.40	454.00
		12	28.30	73.20	120.90	235.70	458.10
		22	27.70	73.90	122.60	241.40	465.60
		39	26.50	74.60	116.30	248.20	465.60
		49	27.80	75.60	110.40	253.20	467.00
		59	27.30	72.10	105.90	248.30	453.60
T3	3	3	25.90	73.50	115.50	227.00	441.90
		13	26.50	75.70	114.70	235.50	452.40
		23	28.30	71.60	114.50	239.70	454.10
		38	25.40	71.00	116.40	226.00	438.80
		48	26.90	71.00	111.40	224.60	433.90
		58	28.30	73.80	106.80	239.00	447.90
T4	4	4	27.80	73.40	110.70	216.80	428.70
		14	24.90	75.50	119.10	240.90	460.40
		24	27.40	72.90	111.50	242.90	454.70
		37	26.80	70.90	115.20	241.40	454.30
		47	27.50	72.30	103.00	249.70	452.50
		57	28.40	75.60	112.60	248.70	465.30
T5	5	5	25.50	71.00	118.40	224.20	439.10
		15	25.30	72.80	108.10	240.20	446.40
		25	27.80	71.10	114.70	242.80	456.40
		36	24.30	72.80	114.80	239.50	451.40
		46	25.30	69.40	110.60	243.80	449.10
		56	27.60	70.10	109.00	240.20	446.90

Feed consumption per phases

Tab. No. 10e (page 2)

Treatm ent	Tr. No.	Box	Feed consumption				
			Starter (D 1-8)	Grower (D 9-16)	Grower (D 17-24)	Finisher (D 24-35)	Total (D 1-35)
			kg	kg	kg	kg	kg
T6	6	6	24.80	71.10	116.70	230.50	443.10
		16	24.60	73.30	116.60	241.50	456.00
		26	25.80	71.40	110.40	241.30	448.90
		35	25.60	75.00	115.80	234.40	450.80
		45	27.30	74.40	117.60	233.50	452.80
		55	26.50	72.20	101.40	236.70	436.80
T7	7	7	24.70	76.60	123.30	241.40	466.00
		17	25.50	77.50	116.70	241.90	461.60
		27	28.50	74.30	115.90	246.20	464.90
		34	25.20	71.60	116.10	226.60	439.50
		44	26.20	71.70	115.70	230.50	444.10
		54	26.30	72.30	114.40	238.10	451.10
T8	8	8	27.30	68.60	119.20	228.20	443.30
		18	26.30	70.40	120.30	242.00	459.00
		28	26.70	72.20	113.20	244.00	456.10
		33	27.30	65.50	112.20	237.10	442.10
		43	26.50	74.60	110.10	227.90	439.10
		53	27.70	74.30	107.20	242.20	451.40
T9	9	9	25.70	68.20	118.40	232.20	444.50
		19	26.60	67.10	119.70	242.60	456.00
		29	25.30	71.50	110.80	244.00	451.60
		32	24.30	69.90	105.00	227.40	426.60
		42	28.30	72.40	118.10	245.20	464.00
		52	27.20	72.20	112.50	249.60	461.50
T10	10	10	25.40	74.10	123.20	230.90	453.60
		20	27.20	71.90	114.80	233.80	447.70
		30	26.70	69.20	116.52	233.50	445.92
		31	24.70	70.40	108.80	239.80	443.70
		41	25.70	72.10	115.00	234.50	447.30
		51	27.10	74.50	112.00	252.10	465.70

Foot pad lesions

Tab. No. 10f (page 1)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T1	1	1	0.78	0.95
		11	0.60	0.63
		21	0.80	0.78
		40	1.33	1.35
		50	1.03	1.10
		60	1.38	1.40
T2	2	2	0.55	0.63
		12	0.85	1.00
		22	0.55	0.55
		39	1.18	1.28
		49	1.05	1.08
		59	0.78	0.73
T3	3	3	0.33	0.45
		13	1.68	1.78
		23	0.88	0.88
		38	0.40	0.50
		48	0.75	0.80
		58	1.08	1.18
T4	4	4	0.50	0.50
		14	1.08	1.23
		24	0.80	0.90
		37	0.55	0.50
		47	1.05	1.08
		57	0.83	0.70
T5	5	5	1.48	1.63
		15	1.40	1.48
		25	0.73	0.75
		36	0.95	0.93
		46	0.73	0.63
		56	1.08	1.15

Foot pad lesions

Tab. No. 10f (page 2)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T6	6	6	0.50	0.50
		16	1.33	1.28
		26	0.63	0.65
		35	0.80	0.68
		45	0.35	0.33
		55	0.58	0.70
T7	7	7	0.73	0.68
		17	1.38	1.40
		27	0.65	0.65
		34	0.80	0.78
		44	0.88	0.75
		54	1.28	1.38
T8	8	8	0.78	0.80
		18	0.55	0.53
		28	0.65	0.70
		33	0.60	0.48
		43	0.83	0.90
		53	0.73	0.88
T9	9	9	0.80	0.83
		19	1.35	1.35
		29	0.83	0.75
		32	1.20	1.30
		42	0.53	0.68
		52	1.15	1.30
T10	10	10	0.53	0.53
		20	0.58	0.58
		30	2.08	2.10
		31	0.93	1.00
		41	0.70	0.75
		51	0.75	0.55

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	2
		50	3
		60	3
T2	2	2	2
		12	2
		22	2
		39	2
		49	2
		59	3
T3	3	3	2
		13	3
		23	2
		38	2
		48	2
		58	3
T4	4	4	2
		14	2
		24	2
		37	3
		47	2
		57	3
T5	5	5	3
		15	2
		25	2
		36	2
		46	2
		56	2

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

Treatment	Tr. No.	Box No.	Litter scoring
T6	6	6	2
		16	2
		26	2
		35	2
		45	2
		55	3
T7	7	7	2
		17	3
		27	3
		34	3
		44	2
		54	2
T8	8	8	3
		18	2
		28	2
		33	3
		43	2
		53	2
T9	9	9	3
		19	3
		29	3
		32	2
		42	3
		52	2
T10	10	10	3
		20	2
		30	3
		31	2
		41	2
		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	5
		11	5
		21	5
		40	4
		50	4
		60	5
T2	2	2	4
		12	4
		22	3
		39	4
		49	4
		59	4
T3	3	3	4
		13	5
		23	4
		38	3
		48	3
		58	4
T4	4	4	3
		14	4
		24	4
		37	4
		47	4
		57	5
T5	5	5	5
		15	4
		25	3
		36	4
		46	3
		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	3
		16	4
		26	3
		35	5
		45	3
		55	5
T7	7	7	5
		17	4
		27	3
		34	5
		44	3
		54	5
T8	8	8	5
		18	4
		28	4
		33	5
		43	4
		53	4
T9	9	9	4
		19	5
		29	5
		32	4
		42	4
		52	4
T10	10	10	4
		20	5
		30	5
		31	3
		41	4
		51	4