



# 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:

XXXXX

**Study sponsor :**

Dohlížitel:

XXXXX

**January 2025**

Leden 2025

## **Aim of the Project**

To evaluate interaction of methionine sources on effectiveness of xxxxx in broilers.

## **Study location**

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

## **Trial period**

Beginning of the trial:	6 November 2024
End of the trial:	10 December 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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**Veterinary Surgeon:** xxxxxx  
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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 – 66 weeks

### **Experimental treatments:**

<b>Tr. No.</b>	<b>Tr.</b>	<b>xxxxx</b>	<b>xxxxx</b>	<b>xxxxx</b>	<b>Reps</b>	<b>Birds / Rep</b>	<b>Birds</b>
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 Manual of 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 A, 17-24 days of age for the grower BR2 B 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**

<b>Ingredients (%)</b>	<b>BR1</b>	<b>BR2 A</b>	<b>BR2 B</b>	<b>BR3</b>
Soyabean meal	34.30	31.95	23.93	24.01
Corn	30.83	26.40	32.25	30.54
Wheat	20.00	25.00	25.00	25.00
Peas	5.00	7.00	9.00	11.00
Soybean oil	4.01	4.63	4.52	5.29
MCP	1.23	0.79	0.21	-
Neophos	1.11	1.15	2.11	1.95
Limestone	0.96	0.63	0.45	0.37
Salt	0.30	0.29	0.21	0.20
xxxxx	1.76	1.66	1.82	1.14
AMV BR1 plus	0.50	-	-	-
AMV BR2 plus	-	0.50	0.50	-
AMV BR3 plus	-	-	-	0.50
<b>Nutritional composition (%)</b>				
Crude protein	221.50	215.40	188.70	186.40
ME (MJ/kg)	12.40	12.65	12.90	13.10
Lysine	12.90	12.40	11.00	10.10
Methionine	2.69	2.60	2.29	2.29
Met.+Cys.	5.52	5.39	4.79	4.81
Ca	9.50	7.50	7.50	6.50
P dig.	5.00	4.20	4.20	3.60
Na	1.80	1.80	1.90	1.90

## **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.	<b>1 Hatchability</b>
	<b>2 Performance results:</b>
	<b>2a Body weight</b>
	<b>2b Weight gain</b>
	<b>2c Feed conversion per 1 kg of live weight</b>
	<b>2d Feed conversion per 1 kg of weight gain</b>
	<b>2e Feed consumption</b>
	<b>3 Mortality</b>
	<b>4 Carcass analysis</b>
	<b>5 Foot pad lesions</b>
	<b>6a Litter scoring at the age of 24 days</b>
	<b>6b Litter scoring at the age of 35 days</b>
	<b>7 Statistical analysis of body weight at the age of 35 days</b> (average body weight, standard deviation, coefficient of variation)
	<b>8 - 9 Statistical analyses of performance results</b>
	<b>10 Performance results per pen:</b>
	<b>10a Body weight</b>
	<b>10b Weight gain</b>
	<b>10c Feed conversion per 1 kg of live weight</b>
	<b>10d Feed conversion per 1 kg of weight gain</b>
	<b>10e Feed consumption</b>
	<b>10f Foot pad lesions</b>
	<b>10ga Litter scoring at the age of 24 days</b>
	<b>10gb Litter scoring at the age of 35 days</b>

**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	74.80	68.10	91.10	840	72.00	48.33
T2	2				840		48.22
T3	3				840		48.16
T4	4				840		48.39
T5	5				840		48.22
T6	6				840		48.04
T7	7				840		48.10
T8	8				840		48.04
T9	9				840		48.04
T10	10				840		48.10



**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	48.33	819	190.80	826	448.84	825	799.36	824	1370.91
T2	2	840	48.22	830	164.28	828	404.48	824	704.44	822	1236.01
T3	3	840	48.16	824	226.26	821	677.60	819	1334.73	815	2244.72
T4	4	840	48.39	825	233.74	818	676.19	816	1317.55	813	2250.73
T5	5	840	48.22	831	235.81	828	706.07	823	1421.53	818	2369.74
T6	6	840	48.04	821	237.66	810	694.27	806	1345.22	799	2329.37
T7	7	840	48.10	825	235.72	817	719.50	814	1433.18	805	2406.46
T8	8	840	48.04	825	238.08	822	727.59	817	1410.31	809	2413.09
T9	9	840	48.04	821	235.64	810	743.77	804	1455.75	799	2438.96
T10	10	840	48.10	830	235.25	821	738.43	818	1440.62	813	2415.72

**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	142.46	17.81	258.04	32.26	350.52	43.81	571.55	51.96	1322.58	37.79
T2	2	116.06	14.51	240.20	30.03	299.96	37.50	531.57	48.32	1187.79	33.94
T3	3	178.10	22.26	451.34	56.42	657.12	82.14	910.00	82.73	2196.57	62.76
T4	4	185.35	23.17	442.44	55.31	641.36	80.17	933.18	84.83	2202.33	62.92
T5	5	187.59	23.45	470.27	58.78	715.46	89.43	948.21	86.20	2321.53	66.33
T6	6	189.63	23.70	456.61	57.08	650.95	81.37	984.15	89.47	2281.34	65.18
T7	7	187.62	23.45	483.78	60.47	713.68	89.21	973.28	88.48	2358.36	67.38
T8	8	190.04	23.76	489.51	61.19	682.71	85.34	1002.78	91.16	2365.05	67.57
T9	9	187.60	23.45	508.13	63.52	711.98	89.00	983.21	89.38	2390.92	68.31
T10	10	187.15	23.39	503.18	62.90	702.19	87.77	975.10	88.65	2367.62	67.65

**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	995.69	1288.06	1607.63	1955.69
T2	2	1163.35	1297.29	1634.06	1996.42
T3	3	866.61	1100.11	1251.89	1561.35
T4	4	826.79	1095.43	1248.89	1544.91
T5	5	837.70	1077.72	1205.02	1513.08
T6	6	797.92	1085.03	1239.96	1478.17
T7	7	844.87	1060.13	1208.51	1489.35
T8	8	838.42	1047.74	1228.37	1478.22
T9	9	856.85	1041.63	1223.87	1497.25
T10	10	829.96	1038.01	1214.08	1489.35

**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	1340.97	1502.34	2019.32	2444.49	2028.33
T2	2	1650.21	1389.66	2089.10	2481.84	2078.79
T3	3	1104.79	1218.33	1409.09	2019.02	1596.46
T4	4	1045.95	1239.03	1412.19	1965.19	1579.78
T5	5	1054.87	1198.97	1331.30	1979.42	1545.09
T6	6	1004.42	1237.22	1407.06	1807.43	1510.56
T7	7	1065.06	1166.44	1359.36	1907.88	1520.71
T8	8	1053.35	1150.56	1422.34	1833.67	1509.06
T9	9	1080.56	1129.10	1415.66	1907.51	1528.54
T10	10	1045.41	1136.61	1400.82	1899.31	1520.37

**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	157.00	323.20	584.40	1152.70	2217.30
T2	2	159.70	276.60	520.00	1084.20	2040.50
T3	3	162.60	451.50	759.40	1497.80	2871.30
T4	4	160.40	449.70	739.10	1495.30	2844.50
T5	5	164.80	466.90	786.70	1539.10	2957.50
T6	6	156.60	458.10	739.10	1427.70	2781.50
T7	7	165.10	461.50	790.30	1501.00	2917.90
T8	8	165.80	463.20	795.20	1494.40	2918.60
T9	9	167.00	464.90	816.00	1503.80	2951.70
T10	10	162.70	470.10	805.20	1510.50	2948.50

**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	11	1579	3	491	1	675	1	1391	16	4136	1.90									1	9		3	3		
T2	2	10	926	2	481	4	3361	2	1314	18	6082	2.14									1	12		4	1		
T3	3	16	1178	3	729	2	2098	4	5535	25	9540	2.98										13		11	1		
T4	4	15	1153	7	2675	2	1372	3	6173	27	11373	3.21										13		11	3		
T5	5	9	779	3	737	5	5638	5	9022	22	16176	2.62										11		5	6		
T6	6	19	1161	11	3006	4	3391	7	12987	41	20545	4.88									2	21		14	4		
T7	7	15	964	8	2267	3	2598	9	16148	35	21977	4.17									1	20		12	2		
T8	8	15	1303	3	957	5	4940	8	15008	31	22208	3.69									1	22		6	2		
T9	9	19	1401	11	2794	6	8438	5	10046	41	22679	4.88										26		13	2		
T10	10	10	833	9	2547	3	2626	5	9738	27	15744	3.21									3	15		5	4		

**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	♂	1520	993	113	25	1.67	234	15.41	23.60	347	22.81	34.94	581	38.22	58.53	65.30	72.74
		♀	1276	843	111	19	1.47	199	15.60	23.59	294	23.07	34.90	493	38.66	58.49	66.10	74.80
		♂	<b>1398</b>	<b>918</b>	<b>112</b>	<b>22</b>	<b>1.58</b>	<b>217</b>	<b>15.49</b>	<b>23.60</b>	<b>321</b>	<b>22.93</b>	<b>34.92</b>	<b>537</b>	<b>38.42</b>	<b>58.51</b>	<b>65.66</b>	<b>73.68</b>
T2	2	♂	1441	926	106	20	1.41	210	14.58	22.70	328	22.78	35.47	539	37.37	58.17	64.24	71.62
		♀	1159	739	104	17	1.47	165	14.20	22.27	261	22.50	35.29	425	36.70	57.55	63.77	72.76
		♂	<b>1300</b>	<b>833</b>	<b>105</b>	<b>19</b>	<b>1.44</b>	<b>187</b>	<b>14.41</b>	<b>22.51</b>	<b>295</b>	<b>22.66</b>	<b>35.39</b>	<b>482</b>	<b>37.07</b>	<b>57.89</b>	<b>64.03</b>	<b>72.13</b>
T3	3	♂	2482	1742	145	38	1.54	543	21.90	31.20	558	22.50	32.06	1102	44.39	63.27	70.17	75.99
		♀	2127	1519	138	37	1.76	477	22.42	31.39	473	22.25	31.17	950	44.67	62.56	71.40	77.89
		♂	<b>2305</b>	<b>1630</b>	<b>141</b>	<b>38</b>	<b>1.64</b>	<b>510</b>	<b>22.14</b>	<b>31.29</b>	<b>516</b>	<b>22.39</b>	<b>31.64</b>	<b>1026</b>	<b>44.52</b>	<b>62.94</b>	<b>70.74</b>	<b>76.87</b>
T4	4	♂	2500	1764	146	36	1.46	554	22.17	31.43	559	22.36	31.70	1114	44.54	63.13	70.54	76.37
		♀	2136	1511	137	35	1.65	482	22.58	31.91	473	22.15	31.30	955	44.73	63.21	70.76	77.17
		♂	<b>2318</b>	<b>1638</b>	<b>141</b>	<b>36</b>	<b>1.55</b>	<b>518</b>	<b>22.36</b>	<b>31.65</b>	<b>516</b>	<b>22.26</b>	<b>31.52</b>	<b>1034</b>	<b>44.62</b>	<b>63.17</b>	<b>70.64</b>	<b>76.74</b>
T5	5	♂	2563	1799	144	31	1.21	587	22.91	32.64	558	21.79	31.04	1146	44.70	63.67	70.21	75.82
		♀	2212	1584	141	39	1.77	511	23.11	32.26	482	21.81	30.45	994	44.92	62.70	71.63	78.00
		♂	<b>2384</b>	<b>1690</b>	<b>142</b>	<b>35</b>	<b>1.47</b>	<b>549</b>	<b>23.01</b>	<b>32.46</b>	<b>520</b>	<b>21.80</b>	<b>30.75</b>	<b>1068</b>	<b>44.80</b>	<b>63.21</b>	<b>70.88</b>	<b>76.85</b>

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	♂	2553	1815	146	38	1.49	600	23.50	33.05	570	22.32	31.39	1170	45.82	64.44	71.10	76.83
		♀	2190	1567	139	35	1.58	514	23.48	32.82	479	21.87	30.57	993	45.34	63.38	71.54	77.89
		♂	<b>2372</b>	<b>1691</b>	<b>143</b>	<b>36</b>	<b>1.53</b>	<b>557</b>	<b>23.49</b>	<b>32.94</b>	<b>524</b>	<b>22.11</b>	<b>31.01</b>	<b>1081</b>	<b>45.60</b>	<b>63.95</b>	<b>71.30</b>	<b>77.32</b>
T7	7	♂	2686	1924	148	39	1.46	642	23.92	33.39	587	21.85	30.51	1229	45.77	63.90	71.63	77.15
		♀	2255	1617	143	35	1.57	532	23.60	32.92	498	22.09	30.81	1030	45.69	63.72	71.70	78.06
		♂	<b>2471</b>	<b>1770</b>	<b>146</b>	<b>37</b>	<b>1.51</b>	<b>587</b>	<b>23.77</b>	<b>33.17</b>	<b>543</b>	<b>21.96</b>	<b>30.64</b>	<b>1130</b>	<b>45.73</b>	<b>63.82</b>	<b>71.66</b>	<b>77.57</b>
T8	8	♂	2620	1837	152	36	1.36	598	22.83	32.56	568	21.67	30.90	1166	44.50	63.46	70.13	75.92
		♀	2288	1643	145	34	1.51	546	23.84	33.20	506	22.10	30.77	1051	45.94	63.97	71.82	78.17
		♂	<b>2454</b>	<b>1740</b>	<b>149</b>	<b>35</b>	<b>1.43</b>	<b>572</b>	<b>23.30</b>	<b>32.86</b>	<b>537</b>	<b>21.87</b>	<b>30.84</b>	<b>1109</b>	<b>45.17</b>	<b>63.70</b>	<b>70.92</b>	<b>76.97</b>
T9	9	♂	2642	1874	157	35	1.34	611	23.13	32.61	587	22.21	31.31	1198	45.34	63.91	70.94	76.87
		♀	2312	1645	145	40	1.72	544	23.52	33.05	510	22.05	30.99	1053	45.57	64.05	71.15	77.41
		♂	<b>2474</b>	<b>1758</b>	<b>151</b>	<b>38</b>	<b>1.52</b>	<b>577</b>	<b>23.31</b>	<b>32.82</b>	<b>548</b>	<b>22.13</b>	<b>31.16</b>	<b>1124</b>	<b>45.45</b>	<b>63.98</b>	<b>71.04</b>	<b>77.12</b>
T10	10	♂	2614	1861	155	35	1.34	611	23.39	32.85	566	21.67	30.44	1178	45.05	63.29	71.18	77.13
		♀	2252	1601	143	33	1.46	529	23.49	33.03	498	22.12	31.11	1027	45.61	64.15	71.11	77.47
		♂	<b>2433</b>	<b>1731</b>	<b>149</b>	<b>34</b>	<b>1.40</b>	<b>570</b>	<b>23.43</b>	<b>32.94</b>	<b>532</b>	<b>21.88</b>	<b>30.75</b>	<b>1102</b>	<b>45.31</b>	<b>63.69</b>	<b>71.15</b>	<b>77.28</b>



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

<b>Treatment</b>	<b>Tr. No.</b>	<b>Evaluation</b>	
		<b>right foot</b>	<b>left foot</b>
T1	1	1.13	1.05
T2	2	1.21	1.20
T3	3	2.08	2.12
T4	4	1.90	1.82
T5	5	2.07	1.95
T6	6	1.57	1.51
T7	7	1.81	1.73
T8	8	1.78	1.75
T9	9	1.60	1.58
T10	10	1.67	1.62

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

<b>Treatment</b>	<b>Tr. No.</b>	<b>Litter scoring</b>
T1	1	1.33
T2	2	1.00
T3	3	2.50
T4	4	2.50
T5	5	2.50
T6	6	2.17
T7	7	2.33
T8	8	2.17
T9	9	2.50
T10	10	2.33

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

<b>Treatment</b>	<b>Tr. No.</b>	<b>Litter scoring</b>
T1	1	3.83
T2	2	3.67
T3	3	4.50
T4	4	4.33
T5	5	4.33
T6	6	4.33
T7	7	4.00
T8	8	4.17
T9	9	4.50
T10	10	4.00

**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	429	1509.04	248.21	16.45	395	1220.89	245.70	20.12
T2	2	406	1361.90	223.86	16.44	416	1113.15	202.15	18.16
T3	3	416	2413.05	241.31	10.00	399	2069.22	246.20	11.90
T4	4	403	2433.80	218.32	8.97	410	2070.78	249.90	12.07
T5	5	425	2538.45	244.21	9.62	393	2187.30	212.70	9.72
T6	6	400	2506.25	268.03	10.69	399	2152.06	248.21	11.53
T7	7	409	2580.34	246.82	9.57	396	2226.87	228.64	10.27
T8	8	412	2577.91	230.36	8.94	397	2242.04	241.70	10.78
T9	9	417	2603.48	275.51	10.58	382	2259.37	254.87	11.28
T10	10	420	2583.21	252.95	9.79	393	2236.72	258.21	11.54

### 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	48.33	0.77		o	o	o	o	o	o	o	o	o	o
T2	2	6	48.22	0.78	0.719928		o	o	o	o	o	o	o	o	o
T3	3	6	48.16	0.53	0.603001	0.845929		o	o	o	o	o	o	o	o
T4	4	6	48.39	0.37	0.850158	0.606395	0.500620		o	o	o	o	o	o	o
T5	5	6	48.22	0.45	0.701633	1.000000	0.855949	0.592344		o	o	o	o	o	o
T6	6	6	48.04	0.37	0.417990	0.619883	0.739399	0.335859	0.624320		o	o	o	o	o
T7	7	6	48.10	0.49	0.505125	0.726617	0.855949	0.412590	0.733686	0.862310		o	o	o	o
T8	8	6	48.04	0.49	0.417176	0.618389	0.737246	0.335182	0.623126	0.995785	0.859908		o	o	o
T9	9	6	48.04	0.44	0.412590	0.612057	0.730266	0.331485	0.618389	0.996264	0.850158	1.000000		o	o
T10	10	6	48.10	0.43	0.497604	0.716153	0.845929	0.406530	0.726617	0.868052	1.000000	0.866096	0.859908		o

**Body weight - day 8**

**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	190.80	8.45		***	***	***	***	***	***	***	***	***
T2	2	6	164.28	2.31	0.000115		***	***	***	***	***	***	***	***
T3	3	6	226.26	2.50	0.000115	0.000062		**	**	***	**	***	**	**
T4	4	6	233.74	3.56	0.000062	0.000055	0.008677		o	o	o	o	o	o
T5	5	6	235.81	1.96	0.000023	0.000019	0.002492	0.509928		o	o	o	o	o
T6	6	6	237.66	4.95	0.000019	0.000017	0.000382	0.217791	0.500720		o	o	o	o
T7	7	6	235.72	2.39	0.000028	0.000023	0.002396	0.518073	0.974126	0.508180		o	o	o
T8	8	6	238.08	3.10	0.000017	0.000017	0.000265	0.178024	0.439072	0.878954	0.438670		o	o
T9	9	6	235.64	5.54	0.000032	0.000028	0.002195	0.518703	0.955953	0.507932	0.977862	0.435459		o
T10	10	6	235.25	7.36	0.000055	0.000032	0.002649	0.584894	0.855891	0.440388	0.873380	0.373472	0.886417	

**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	826	448.84	82.41		o	***	***	***	***	***	***	***	***
T2	2	828	404.48	77.30	0.342512		***	***	***	***	***	***	***	***
T3	3	821	677.60	84.91	0.000000	0.000000		o	***	o	***	***	***	***
T4	4	818	676.19	87.56	0.000000	0.000000	1.000000		***	o	***	***	***	***
T5	5	828	706.07	81.36	0.000000	0.000000	0.000000	0.000000		o	o	**	***	***
T6	6	810	694.27	83.15	0.000000	0.000000	0.136891	0.096051	0.100469		***	***	***	***
T7	7	817	719.50	73.25	0.000000	0.000000	0.000000	0.000000	0.796654	0.000003		o	o	*
T8	8	822	727.59	82.53	0.000000	0.000000	0.000000	0.000000	0.001642	0.000000	1.000000		o	o
T9	9	810	743.77	99.14	0.000000	0.000000	0.000000	0.000000	0.000006	0.000000	0.175169	1.000000		o
T10	10	821	738.43	83.33	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.033704	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	825	799.36	177.39		o	***	***	***	***	***	***	***	***
T2	2	824	704.44	137.04	0.150797		***	***	***	***	***	***	***	***
T3	3	819	1334.73	183.53	0.000000	0.000000		o	***	o	***	***	***	***
T4	4	816	1317.55	176.83	0.000000	0.000000	1.000000		***	o	***	***	***	***
T5	5	823	1421.53	181.62	0.000000	0.000000	0.000000	0.000000		***	o	o	o	o
T6	6	806	1345.22	179.95	0.000000	0.000000	1.000000	1.000000	0.000000		***	***	***	***
T7	7	814	1433.18	174.08	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000		o	o	o
T8	8	817	1410.31	179.51	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	1.000000		o	o
T9	9	804	1455.75	186.52	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	1.000000	0.054957		o
T10	10	818	1440.62	168.55	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	1.000000	0.129300	1.000000	

**Body weight - day 35**

**Tab. No. 8e**

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	824	1370.91	285.81		o	***	***	***	***	***	***	***	***
T2	2	822	1236.01	246.70	0.668629		***	***	***	***	***	***	***	***
T3	3	815	2244.72	298.16	0.000000	0.000000		o	***	**	***	***	***	***
T4	4	813	2250.73	296.71	0.000000	0.000000	1.000000		***	*	***	***	***	***
T5	5	818	2369.74	288.92	0.000000	0.000000	0.000000	0.000000		o	o	o	o	o
T6	6	799	2329.37	313.13	0.000000	0.000000	0.006518	0.018829	0.150747		**	***	***	***
T7	7	805	2406.46	296.42	0.000000	0.000000	0.000000	0.000000	1.000000	0.002008		o	o	o
T8	8	809	2413.09	289.57	0.000000	0.000000	0.000000	0.000000	1.000000	0.000057	1.000000		o	o
T9	9	799	2438.96	316.49	0.000000	0.000000	0.000000	0.000000	0.438923	0.000002	1.000000	1.000000		o
T10	10	813	2415.72	308.58	0.000000	0.000000	0.000000	0.000000	1.000000	0.000018	1.000000	1.000000	1.000000	

**FCR - day 8**

**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	995.86	45.13		o	o	o	o	***	o	o	o	o
T2	2	6	1163.91	56.39	1.000000		o	*	*	***	o	*	o	*
T3	3	6	866.62	8.62	1.000000	1.000000		o	o	*	o	o	o	o
T4	4	6	826.39	40.10	0.118195	0.014132	1.000000		o	o	o	o	o	o
T5	5	6	837.73	24.01	0.273217	0.037842	1.000000	1.000000		o	o	o	o	o
T6	6	6	798.02	20.43	0.000424	0.000023	0.033579	1.000000	1.000000		o	o	o	o
T7	7	6	844.97	25.08	1.000000	0.211741	1.000000	1.000000	1.000000	1.000000		o	o	o
T8	8	6	838.35	16.57	0.317408	0.045186	1.000000	1.000000	1.000000	1.000000	1.000000		o	o
T9	9	6	857.70	36.46	1.000000	0.222928	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o
T10	10	6	830.44	25.26	0.105957	0.012437	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	

**FCR - day 16**

**Tab. No. 9b**

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	1294.39	97.90		o	o	o	o	o	*	*	*	**
T2	2	6	1303.95	97.44	1.000000		o	o	o	o	*	**	*	**
T3	3	6	1101.19	39.62	1.000000	1.000000		o	o	o	o	o	o	o
T4	4	6	1096.44	27.38	1.000000	1.000000	1.000000		o	o	o	o	o	o
T5	5	6	1078.52	31.16	0.333506	0.302012	1.000000	1.000000		o	o	o	o	o
T6	6	6	1086.19	41.18	0.539483	0.490988	1.000000	1.000000	1.000000		o	o	o	o
T7	7	6	1060.28	15.15	0.045186	0.040157	1.000000	1.000000	1.000000	1.000000		o	o	o
T8	8	6	1048.24	27.25	0.010934	0.009603	1.000000	1.000000	1.000000	1.000000	1.000000		o	o
T9	9	6	1043.57	50.40	0.012437	0.010934	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o
T10	10	6	1038.85	31.48	0.003054	0.002656	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	



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	1620.11	134.03		o	o	o	*	o	*	o	o	*
T2	2	6	1635.03	78.40	1.000000		o	o	*	o	*	o	o	*
T3	3	6	1254.18	67.94	0.851208	1.000000		o	o	o	o	o	o	o
T4	4	6	1251.39	61.52	0.711385	0.851208	1.000000		o	o	o	o	o	o
T5	5	6	1206.67	61.89	0.018190	0.023317	1.000000	1.000000		o	o	o	o	o
T6	6	6	1241.34	37.61	0.273217	0.333506	1.000000	1.000000	1.000000		o	o	o	o
T7	7	6	1210.10	55.14	0.029766	0.037842	1.000000	1.000000	1.000000	1.000000		o	o	o
T8	8	6	1230.22	60.74	0.111923	0.138987	1.000000	1.000000	1.000000	1.000000	1.000000		o	o
T9	9	6	1224.56	36.23	0.050792	0.063980	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o
T10	10	6	1214.80	45.54	0.037842	0.047913	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	

FCR - day 35

Tab. No. 9d

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	1960.49	83.87		o	o	o	o	o	*	**	*	**
T2	2	6	1996.87	33.03	1.000000		o	o	o	o	**	**	*	**
T3	3	6	1561.60	29.11	1.000000	1.000000		o	o	o	o	o	o	o
T4	4	6	1545.12	23.79	1.000000	1.000000	1.000000		o	o	o	o	o	o
T5	5	6	1513.17	22.56	0.333506	0.222928	1.000000	1.000000		o	o	o	o	o
T6	6	6	1479.11	104.25	0.105957	0.067738	1.000000	1.000000	1.000000		o	o	o	o
T7	7	6	1489.86	31.44	0.014132	0.008425	0.679756	1.000000	1.000000	1.000000		o	o	o
T8	8	6	1478.47	36.08	0.003054	0.001736	0.222928	0.889713	1.000000	1.000000	1.000000		o	o
T9	9	6	1497.41	23.65	0.029766	0.018190	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000		o
T10	10	6	1489.56	27.30	0.008425	0.004940	0.468225	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	

**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	47.14	137	188.69	137	374.45	137	693.94	137	1277.08
		11	140	47.86	139	193.88	139	430.94	139	772.16	138	1421.23
		21	140	48.93	140	180.36	138	453.77	138	810.14	138	1334.57
		40	140	48.21	138	186.59	138	459.42	138	777.61	138	1374.42
		50	140	49.29	128	205.47	137	458.10	137	752.19	137	1266.28
		60	140	48.57	137	189.78	137	516.50	136	991.99	136	1553.09
T2	2	2	140	47.14	139	165.11	139	372.45	138	683.12	138	1211.38
		12	140	47.86	138	166.67	138	389.06	137	677.96	136	1220.15
		22	140	48.93	137	160.95	136	375.59	134	713.81	133	1180.90
		39	140	48.21	139	163.31	139	402.45	139	713.17	139	1268.20
		49	140	49.29	140	162.86	140	462.43	140	739.43	140	1252.50
		59	140	47.86	137	166.79	136	424.19	136	698.60	136	1280.88
T3	3	3	140	47.50	138	225.72	138	651.74	137	1313.80	137	2250.36
		13	140	47.86	138	224.07	137	658.03	136	1316.47	134	2260.22
		23	140	48.57	138	228.26	137	683.80	137	1418.03	137	2294.67
		38	140	48.21	138	228.26	138	684.42	138	1261.96	136	2184.34
		48	140	48.93	139	222.66	138	708.12	138	1281.23	138	2193.77
		58	140	47.86	133	228.57	133	679.47	133	1420.15	133	2286.47
T4	4	4	140	47.86	135	229.63	133	606.47	133	1215.56	133	2163.83
		14	140	48.21	140	233.93	140	682.93	140	1290.86	139	2243.38
		24	140	48.57	138	231.16	137	697.74	136	1373.38	135	2311.19
		37	140	48.21	138	239.86	136	705.96	136	1292.57	136	2236.76
		47	140	48.93	137	235.04	136	679.12	136	1314.56	135	2265.33
		57	140	48.57	137	232.85	136	683.01	135	1417.63	135	2282.89
T5	5	5	140	47.86	140	236.79	140	676.50	139	1431.37	136	2353.31
		15	140	48.21	139	233.81	139	723.09	137	1408.69	137	2416.42
		25	140	48.93	138	234.06	138	687.54	138	1469.93	138	2383.04
		36	140	47.86	139	234.53	137	737.30	135	1362.44	135	2367.85
		46	140	48.57	138	236.96	137	692.19	137	1369.05	136	2324.12
		56	140	47.86	137	238.69	137	720.36	137	1486.35	136	2373.16

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	47.50	137	238.69	137	654.09	137	1228.98	136	2201.10
		16	140	48.21	136	242.65	134	675.00	133	1333.16	132	2337.73
		26	140	48.57	136	233.46	135	697.04	134	1431.64	133	2339.55
		35	140	47.86	136	240.44	132	733.86	131	1368.63	129	2430.85
		45	140	48.21	139	229.86	136	690.81	135	1330.81	134	2303.43
		55	140	47.86	137	240.88	136	716.03	136	1380.74	135	2369.19
T7	7	7	140	47.50	135	237.41	134	718.81	133	1458.50	130	2381.77
		17	140	47.86	137	234.67	135	747.78	135	1456.96	132	2459.62
		27	140	48.93	139	235.25	137	703.65	137	1435.40	137	2372.55
		34	140	48.21	139	235.25	139	702.23	139	1354.10	138	2392.32
		44	140	48.21	136	239.34	134	708.43	132	1387.50	131	2349.62
		54	140	47.86	139	232.37	138	736.38	138	1506.67	137	2481.17
T8	8	8	140	47.50	139	237.77	138	713.70	137	1326.06	135	2392.07
		18	140	47.86	136	239.34	136	768.53	135	1475.33	134	2468.21
		28	140	48.93	135	242.90	134	734.85	133	1506.77	133	2481.73
		33	140	47.86	139	235.97	138	696.59	138	1334.71	136	2369.56
		43	140	48.21	137	238.69	137	734.89	135	1440.22	132	2391.21
		53	140	47.86	139	233.81	139	717.91	139	1383.88	139	2378.06
T9	9	9	140	47.50	136	236.03	135	714.30	135	1494.44	134	2428.06
		19	140	47.86	138	237.32	137	740.80	137	1448.61	137	2458.54
		29	140	48.57	136	238.24	134	712.99	133	1486.09	133	2373.08
		32	140	47.86	139	237.77	136	717.13	133	1378.95	130	2443.54
		42	140	48.57	138	239.86	137	772.41	135	1405.70	134	2412.61
		52	140	47.86	134	224.63	131	806.41	131	1522.06	131	2518.93
T10	10	10	140	47.50	140	236.07	140	719.36	140	1355.36	139	2368.56
		20	140	48.21	139	223.02	139	738.78	138	1455.94	137	2420.00
		30	140	48.57	135	242.96	132	732.50	130	1513.31	129	2380.62
		31	140	47.86	140	235.36	137	707.81	137	1398.10	136	2421.47
		41	140	48.57	140	231.79	138	765.72	138	1462.10	137	2453.87
		51	140	47.86	136	242.28	135	766.81	135	1464.59	135	2448.96

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	141.55	17.69	185.77	23.22	319.49	39.94	583.14	53.01	1229.94	35.14
		11	146.02	18.25	237.05	29.63	341.22	42.65	649.07	59.01	1373.37	39.24
		21	131.43	16.43	273.41	34.18	356.38	44.55	524.42	47.67	1285.64	36.73
		40	138.38	17.30	272.83	34.10	318.19	39.77	596.81	54.26	1326.21	37.89
		50	156.18	19.52	252.63	31.58	294.09	36.76	514.09	46.74	1216.99	34.77
		60	141.21	17.65	326.72	40.84	475.49	59.44	561.10	51.01	1504.52	42.99
T2	2	2	117.97	14.75	207.34	25.92	310.67	38.83	528.26	48.02	1164.24	33.26
		12	118.81	14.85	222.39	27.80	288.90	36.11	542.19	49.29	1172.29	33.49
		22	112.02	14.00	214.64	26.83	338.22	42.28	467.10	42.46	1131.97	32.34
		39	115.10	14.39	239.14	29.89	310.72	38.84	555.04	50.46	1219.99	34.86
		49	113.57	14.20	299.57	37.45	277.00	34.63	513.07	46.64	1203.21	34.38
		59	118.93	14.87	257.40	32.18	274.41	34.30	582.28	52.93	1233.02	35.23
T3	3	3	178.22	22.28	426.01	53.25	662.06	82.76	936.57	85.14	2202.86	62.94
		13	176.21	22.03	433.96	54.24	658.44	82.31	943.75	85.80	2212.36	63.21
		23	179.69	22.46	455.53	56.94	734.23	91.78	876.64	79.69	2246.10	64.17
		38	180.05	22.51	456.16	57.02	577.54	72.19	922.38	83.85	2136.13	61.03
		48	173.73	21.72	485.45	60.68	573.12	71.64	912.54	82.96	2144.84	61.28
		58	180.71	22.59	450.90	56.36	740.68	92.58	866.32	78.76	2238.61	63.96
T4	4	4	181.77	22.72	376.84	47.10	609.10	76.14	948.27	86.21	2115.97	60.46
		14	185.72	23.21	449.00	56.13	607.93	75.99	952.52	86.59	2195.17	62.72
		24	182.59	22.82	466.58	58.32	675.65	84.46	937.80	85.25	2262.62	64.65
		37	191.65	23.96	466.10	58.26	586.62	73.33	944.19	85.84	2188.55	62.53
		47	186.11	23.26	444.08	55.51	635.44	79.43	950.77	86.43	2216.40	63.33
		57	184.28	23.03	450.17	56.27	734.61	91.83	865.26	78.66	2234.32	63.84
T5	5	5	188.93	23.62	439.71	54.96	754.87	94.36	921.94	83.81	2305.45	65.87
		15	185.60	23.20	489.28	61.16	685.59	85.70	1007.74	91.61	2368.21	67.66
		25	185.13	23.14	453.48	56.68	782.39	97.80	913.12	83.01	2334.11	66.69
		36	186.67	23.33	502.77	62.85	625.15	78.14	1005.41	91.40	2319.99	66.29
		46	188.39	23.55	455.23	56.90	676.86	84.61	955.07	86.82	2275.55	65.02
		56	190.83	23.85	481.68	60.21	765.99	95.75	886.81	80.62	2325.30	66.44

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	191.19	23.90	415.40	51.93	574.89	71.86	972.12	88.37	2153.60	61.53
		16	194.44	24.30	432.35	54.04	658.16	82.27	1004.57	91.32	2289.52	65.41
		26	184.89	23.11	463.58	57.95	734.60	91.83	907.91	82.54	2290.98	65.46
		35	192.58	24.07	493.42	61.68	634.76	79.35	1062.23	96.57	2382.99	68.09
		45	181.65	22.71	460.95	57.62	640.01	80.00	972.62	88.42	2255.22	64.43
		55	193.02	24.13	475.15	59.39	664.71	83.09	988.45	89.86	2321.33	66.32
T7	7	7	189.91	23.74	481.40	60.17	739.69	92.46	923.27	83.93	2334.27	66.69
		17	186.81	23.35	513.11	64.14	709.19	88.65	1002.66	91.15	2411.76	68.91
		27	186.32	23.29	468.40	58.55	731.75	91.47	937.15	85.20	2323.62	66.39
		34	187.04	23.38	466.98	58.37	651.87	81.48	1038.22	94.38	2344.11	66.97
		44	191.13	23.89	469.09	58.64	679.07	84.88	962.12	87.47	2301.41	65.75
		54	184.51	23.06	504.00	63.00	770.29	96.29	974.50	88.59	2433.31	69.52
T8	8	8	190.27	23.78	475.93	59.49	612.36	76.55	1066.02	96.91	2344.57	66.99
		18	191.48	23.93	529.19	66.15	706.80	88.35	992.88	90.26	2420.35	69.15
		28	193.97	24.25	491.95	61.49	771.92	96.49	974.96	88.63	2432.80	69.51
		33	188.11	23.51	460.62	57.58	638.12	79.76	1034.85	94.08	2321.70	66.33
		43	190.48	23.81	496.20	62.03	705.33	88.17	950.99	86.45	2343.00	66.94
		53	185.95	23.24	484.10	60.51	665.97	83.25	994.17	90.38	2330.20	66.58
T9	9	9	188.53	23.57	478.27	59.78	780.15	97.52	933.62	84.87	2380.56	68.02
		19	189.46	23.68	503.48	62.94	707.81	88.48	1009.93	91.81	2410.68	68.88
		29	189.67	23.71	474.75	59.34	773.11	96.64	886.99	80.64	2324.51	66.41
		32	189.91	23.74	479.36	59.92	661.82	82.73	1064.59	96.78	2395.68	68.45
		42	191.29	23.91	532.55	66.57	633.29	79.16	1006.91	91.54	2364.04	67.54
		52	176.77	22.10	581.79	72.72	715.65	89.46	996.87	90.62	2471.07	70.60
T10	10	10	188.57	23.57	483.29	60.41	636.00	79.50	1013.20	92.11	2321.06	66.32
		20	174.81	21.85	515.76	64.47	717.17	89.65	964.06	87.64	2371.79	67.77
		30	194.39	24.30	489.54	61.19	780.81	97.60	867.31	78.85	2332.05	66.63
		31	187.50	23.44	472.45	59.06	690.29	86.29	1023.37	93.03	2373.61	67.82
		41	183.22	22.90	533.94	66.74	696.38	87.05	991.77	90.16	2405.30	68.72
		51	194.42	24.30	524.54	65.57	697.78	87.22	984.37	89.49	2401.10	68.60

**Feed conversion per 1 kg of live weight**

**Tab. No. 10c (page 1)**

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
T1	1	1	977.07	1454.13	1745.20	2048.03
		11	998.71	1286.15	1644.56	1872.16
		21	974.26	1243.25	1520.15	1947.11
		40	1058.41	1365.32	1738.05	2008.08
		50	932.71	1211.29	1669.84	2035.18
		60	1034.00	1206.16	1402.86	1852.39
T2	2	2	1147.58	1416.30	1737.34	2039.75
		12	1107.77	1324.56	1610.26	1977.86
		22	1233.46	1360.54	1514.16	2018.11
		39	1220.74	1347.90	1651.16	1973.88
		49	1175.44	1155.39	1601.62	2017.68
		59	1098.47	1219.01	1695.61	1953.95
T3	3	3	863.17	1130.23	1280.15	1567.85
		13	862.68	1142.83	1293.57	1580.71
		23	856.51	1102.99	1166.45	1521.10
		38	873.00	1069.11	1323.85	1583.55
		48	880.52	1039.62	1290.48	1587.25
		58	863.83	1122.37	1170.61	1529.17
T4	4	4	748.53	1128.69	1311.04	1561.44
		14	833.59	1100.30	1296.48	1572.18
		24	859.60	1066.52	1200.97	1525.84
		37	842.71	1060.69	1282.41	1560.10
		47	824.02	1104.76	1264.35	1540.94
		57	849.88	1117.65	1153.10	1510.24
T5	5	5	826.55	1112.87	1197.91	1518.53
		15	822.72	1056.82	1269.99	1523.38
		25	867.51	1107.41	1134.16	1479.33
		36	838.28	1033.61	1269.13	1537.55
		46	807.07	1093.40	1233.99	1528.19
		56	864.26	1067.03	1134.84	1492.03

**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	763.45	1137.14	1288.07	1531.19
		16	789.84	1138.40	1262.92	1510.13
		26	813.11	1068.28	1183.96	1512.92
		35	793.17	1056.38	1262.00	1273.89
		45	809.48	1072.77	1235.68	1565.15
		55	819.08	1044.15	1215.40	1481.38
T7	7	7	843.40	1073.28	1203.00	1515.01
		17	865.53	1049.58	1237.59	1481.39
		27	851.62	1072.74	1172.98	1478.36
		34	842.18	1075.94	1284.18	1528.07
		44	798.85	1044.01	1235.68	1497.33
		54	868.22	1046.16	1127.19	1438.97
T8	8	8	844.87	1074.19	1318.12	1513.23
		18	847.07	1010.42	1206.08	1463.84
		28	855.60	1079.25	1161.31	1446.19
		33	845.94	1059.71	1285.51	1518.85
		43	825.20	1028.07	1228.35	1496.12
		53	811.41	1037.81	1181.94	1432.61
T9	9	9	840.02	1092.87	1192.26	1491.15
		19	857.97	1046.58	1229.22	1497.39
		29	836.35	1096.32	1193.61	1518.76
		32	836.88	1058.81	1258.85	1471.88
		42	844.66	985.67	1275.88	1530.89
		52	930.32	981.16	1197.52	1474.40
T10	10	10	807.87	1058.48	1290.12	1519.84
		20	868.92	1036.37	1203.67	1473.19
		30	802.86	1061.77	1164.07	1516.13
		31	825.49	1073.82	1235.83	1469.94
		41	850.54	1001.66	1219.51	1503.96
		51	826.97	1001.01	1175.61	1454.31

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	1296.04	1956.78	2092.76	2412.07	2127.86
		11	1327.79	1522.00	2097.83	2143.23	1937.87
		21	1336.97	1423.27	1874.75	2608.82	2022.18
		40	1431.66	1576.36	2277.39	2360.37	2082.12
		50	1261.40	1412.92	2387.69	2571.35	2119.33
		60	1396.25	1306.97	1618.20	2652.34	1913.75
T2	2	2	1609.23	1630.81	2123.46	2433.47	2123.25
		12	1555.19	1489.08	1997.19	2449.33	2060.53
		22	1777.69	1457.86	1683.99	2808.96	2107.86
		39	1734.94	1435.02	2044.45	2388.85	2052.43
		49	1685.60	1144.49	2346.57	2617.29	2100.33
		59	1549.14	1298.04	2438.37	2265.44	2031.89
T3	3	3	1096.22	1272.33	1427.77	1974.90	1602.24
		13	1099.91	1289.32	1445.85	1988.68	1616.01
		23	1090.97	1228.02	1225.77	2095.75	1554.69
		38	1109.97	1167.59	1626.10	1943.97	1620.02
		48	1129.07	1113.41	1601.97	2005.08	1623.94
		58	1102.91	1255.63	1215.11	2118.56	1563.57
T4	4	4	951.63	1363.53	1496.11	1885.51	1598.45
		14	1049.98	1239.26	1516.86	1947.93	1606.80
		24	1090.56	1170.64	1341.51	2002.38	1559.44
		37	1057.54	1174.40	1551.77	1942.22	1595.40
		47	1044.94	1254.97	1436.01	1925.54	1575.94
		57	1078.11	1258.19	1186.42	2099.14	1544.17
T5	5	5	1035.93	1267.06	1274.46	2027.10	1550.40
		15	1037.73	1168.95	1496.43	1881.79	1554.87
		25	1099.12	1232.02	1157.73	2035.55	1510.78
		36	1054.43	1126.15	1549.63	1907.46	1570.14
		46	1017.85	1244.36	1378.19	1949.56	1561.48
		56	1084.66	1168.36	1198.78	2096.19	1523.49



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	957.03	1353.01	1460.13	1838.12	1565.66
		16	990.64	1338.32	1392.77	1843.74	1543.57
		26	1032.72	1198.88	1294.74	2038.37	1546.41
		35	995.97	1189.11	1504.55	1289.58	1301.23
		45	1025.88	1206.31	1414.37	2021.46	1599.64
		55	1026.12	1160.07	1400.44	1854.23	1512.83
T7	7	7	1061.47	1188.43	1330.69	2023.94	1547.65
		17	1091.63	1135.48	1437.23	1839.86	1511.93
		27	1076.77	1185.76	1269.83	1947.19	1510.15
		34	1060.62	1193.96	1508.66	1847.51	1559.77
		44	1005.85	1171.85	1439.56	1879.88	1530.37
		54	1094.89	1128.65	1205.08	1925.89	1467.73
T8	8	8	1056.96	1189.99	1604.47	1759.26	1544.55
		18	1063.40	1085.17	1420.66	1850.54	1493.78
		28	1078.09	1191.65	1240.48	1890.18	1476.68
		33	1062.59	1170.04	1533.05	1824.08	1550.75
		43	1036.70	1126.80	1439.65	1910.35	1527.94
		53	1021.85	1147.27	1337.37	1781.61	1462.24
T9	9	9	1057.13	1219.76	1283.71	1969.89	1521.96
		19	1076.68	1136.91	1421.06	1882.77	1527.75
		29	1056.41	1230.15	1284.04	2068.32	1552.01
		32	1049.30	1170.96	1476.90	1760.32	1502.51
		42	1061.65	1049.88	1632.36	1893.75	1563.25
		52	1191.95	1001.48	1444.27	1899.84	1504.84
T10	10	10	1011.36	1180.90	1552.11	1826.54	1550.92
		20	1110.03	1108.94	1376.99	1885.12	1503.56
		30	1009.22	1194.86	1262.61	2137.80	1549.83
		31	1036.21	1200.20	1403.19	1792.99	1500.25
		41	1076.02	1067.87	1460.98	1928.53	1534.80
		51	1035.64	1082.82	1368.37	1869.97	1484.35

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	26.20	49.80	91.60	192.70	360.30
		11	27.00	50.15	99.50	193.30	369.95
		21	24.60	53.70	92.20	188.80	359.30
		40	27.40	59.35	100.00	194.40	381.15
		50	24.70	51.70	96.20	181.10	353.70
		60	27.10	58.50	104.90	202.40	392.90
T2	2	2	26.40	47.00	91.50	177.40	342.30
		12	25.80	45.70	79.60	179.20	330.30
		22	27.60	42.60	78.60	175.90	324.70
		39	27.80	47.70	88.30	184.30	348.10
		49	26.80	48.00	91.00	188.00	353.80
		59	25.30	45.60	91.00	179.40	341.30
T3	3	3	27.00	74.80	130.60	253.40	485.80
		13	26.80	76.60	129.50	252.00	484.90
		23	27.10	76.60	123.30	251.70	478.70
		38	27.60	73.50	129.60	244.10	474.80
		48	27.40	74.70	126.70	252.50	481.30
		58	26.70	75.30	119.70	244.10	465.80
T4	4	4	23.50	69.30	121.20	237.80	451.80
		14	27.30	77.90	129.10	258.30	492.60
		24	27.60	74.70	123.10	256.20	481.60
		37	28.00	74.80	123.80	249.40	476.00
		47	26.70	76.00	124.10	248.40	475.20
		57	27.30	77.00	117.80	245.20	467.30
T5	5	5	27.40	78.00	134.10	255.50	495.00
		15	26.80	79.50	141.70	259.80	507.80
		25	28.20	77.10	125.00	256.50	486.80
		36	27.40	77.70	132.30	258.90	496.30
		46	26.50	77.50	127.80	255.70	487.50
		56	28.50	77.10	125.80	252.70	484.10

**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	25.10	77.00	115.00	245.40	462.50
		16	26.30	77.70	122.00	244.50	470.50
		26	26.00	74.90	127.70	246.40	475.00
		35	26.10	77.60	125.20	177.30	406.20
		45	25.90	76.10	122.60	265.30	489.90
		55	27.20	74.80	126.60	248.80	477.40
T7	7	7	27.30	76.80	131.10	242.60	477.80
		17	28.00	78.70	137.60	247.00	491.30
		27	27.90	76.00	127.30	250.00	481.20
		34	27.60	77.50	136.70	265.60	507.40
		44	26.20	73.70	129.50	238.70	468.10
		54	28.10	78.80	128.10	257.10	492.10
T8	8	8	28.00	78.10	135.00	255.20	496.30
		18	27.90	78.10	135.90	247.40	489.30
		28	28.40	78.70	127.60	245.10	479.80
		33	27.80	74.50	135.00	257.40	494.70
		43	27.30	76.60	137.90	243.10	484.90
		53	26.40	77.20	123.80	246.20	473.60
T9	9	9	27.20	78.70	135.20	248.70	489.80
		19	28.30	78.30	137.80	260.50	504.90
		29	27.30	78.00	132.70	244.00	482.00
		32	27.70	76.70	133.60	245.80	483.80
		42	28.10	76.70	141.30	256.70	502.80
		52	28.40	76.50	135.40	248.10	488.40
T10	10	10	26.70	79.90	138.20	259.60	504.40
		20	27.00	79.50	136.60	249.10	492.20
		30	26.70	77.30	128.40	241.70	474.10
		31	27.20	77.70	132.70	249.80	487.40
		41	27.60	79.10	140.40	261.80	508.90
		51	27.50	76.60	128.90	248.50	481.50

**Foot pad lesions**

**Tab. No. 10f (page 1)**

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T1	1	1	0.45	0.48
		11	0.75	0.65
		21	1.03	1.00
		40	1.53	1.53
		50	1.45	1.30
		60	1.60	1.35
T2	2	2	0.85	0.90
		12	1.10	1.18
		22	1.03	1.05
		39	1.55	1.60
		49	1.33	1.23
		59	1.40	1.23
T3	3	3	1.48	1.45
		13	2.10	2.15
		23	2.25	2.20
		38	2.20	2.25
		48	2.23	2.28
		58	2.23	2.38
T4	4	4	1.50	1.50
		14	2.33	2.05
		24	1.55	1.48
		37	1.98	1.90
		47	1.80	1.85
		57	2.23	2.13
T5	5	5	1.73	1.75
		15	2.10	1.95
		25	2.13	2.03
		36	1.98	1.90
		46	2.33	2.18
		56	2.15	1.88

**Foot pad lesions**

**Tab. No. 10f (page 2)**

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T6	6	6	1.35	1.28
		16	1.45	1.40
		26	1.70	1.63
		35	1.53	1.45
		45	1.60	1.53
		55	1.80	1.78
T7	7	7	1.70	1.70
		17	1.58	1.40
		27	1.88	1.78
		34	1.65	1.73
		44	2.08	2.00
		54	1.98	1.78
T8	8	8	2.38	2.25
		18	1.53	1.38
		28	1.83	1.85
		33	1.53	1.40
		43	1.88	2.05
		53	1.53	1.58
T9	9	9	1.95	1.90
		19	1.40	1.53
		29	1.65	1.58
		32	1.23	1.20
		42	1.73	1.78
		52	1.63	1.53
T10	10	10	1.58	1.43
		20	1.30	1.28
		30	1.93	2.03
		31	1.03	0.90
		41	2.05	2.00
		51	2.13	2.08

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

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

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

<b>Treatment</b>	<b>Tr. No.</b>	<b>Box No.</b>	<b>Litter scoring</b>
T6	6	6	3
		16	2
		26	2
		35	2
		45	2
		55	2
T7	7	7	3
		17	2
		27	2
		34	2
		44	2
		54	3
T8	8	8	3
		18	2
		28	2
		33	2
		43	2
		53	2
T9	9	9	3
		19	2
		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)**

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



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

<b>Treatment</b>	<b>Tr. No.</b>	<b>Box No.</b>	<b>Litter scoring</b>
T6	6	6	4
		16	4
		26	4
		35	5
		45	4
		55	5
T7	7	7	4
		17	4
		27	4
		34	4
		44	4
		54	4
T8	8	8	5
		18	4
		28	4
		33	4
		43	4
		53	4
T9	9	9	5
		19	4
		29	5
		32	4
		42	5
		52	4
T10	10	10	4
		20	4
		30	3
		31	3
		41	5
		51	5