



MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE ÚSTRAŠICE

státní podnik

390 02 Tábor 2

Česká republika

XXXXXXXX

XXXXXXXX (No. 1224)

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XXXXXXXX (VT č. 1224)

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
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Study monitor:
Dohlížel:

xxxxxx

Study sponsor :
Dohlížel:

xxxxxx

Dezember 2021
Prosinec 2021

Aim of the Project

To determine the effect of xxxxxx, on growth performance, intestinal integrity, and health status in broilers fed diets rich in rye.

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 xxxxxx.

Trial period

Beginning of the trial:	6 October 2021
End of the trial:	9 November 2021
Finishing of the final report:	December 2021

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 7800 day old chicks (males) of xxxxxx. Day-old chicks were randomly distributed into 4 dietary treatments with 15 replicates per treatment and 130 chicken per replicate.

Origin 1-day old chicks:

breeder company – xxxxxx

parent flock – xxxxxx

age of the breeding flock - 64 weeks

Experimental treatments:

Tr. No.	Tr.	Description	No. of pen	No. of chick
1	T1	xxxxxx	15	1950
2	T2	xxxxxx	15	1950
3	T3	xxxxxx	15	1950
4	T4	xxxxxx	15	1950

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 xxxxxx. 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:

<u>Lighting programme:</u>	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
<u>Stocking density:</u>	16 broilers per square meter	

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

Veterinary precautions

The chicken house was disinfected with **xxxxxx** before the chick placement.

On day 1 the chicken were vaccinated with **xxxxxx** (the spray in the eyes). On the first days old chickens was applied the water solution of permanganate.

Feeds and Diets

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

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

Composition of the feed

Ingredients (%)	Control diets			Diets with rye		
	Starter	Grower	Finisher	Starter	Grower	Finisher
Corn	36.77	44.68	50.18	35.38	41.77	35.44
Soyabean meal	34.92	27.58	22.63	35.23	28.23	23.68
Wheat	20.00	20.00	20.00	10.00	-	-
Rye	-	-	-	10.00	20.00	30.00
Soyabean oil	3.32	3.34	2.84	4.40	5.52	6.44
Limestone	1.68	1.40	1.33	1.69	1.44	1.39
Monocalciumphosphate	1.20	1.05	0.96	1.18	1.03	0.93
Salt	0.30	0.30	0.29	0.30	0.31	0.31
Sodium bicarbonate	0.11	0.12	0.12	0.10	0.10	0.11
AMV BR1 plus	0.50	-	-	0.50	-	-
AMV BR2 plus	-	0.50	-	-	0.50	-
AMV BR3 plus	-	-	0.50	-	-	0.50
xxxxxx	1.20	1.03	1.15	0.80	1.10	1.20
Nutritional composition (%)						
crude protein	22.50	19.70	18.00	22.30	19.40	17.70
ME (MJ/kg)	12.56	13.00	13.10	12.65	13.00	13.10
Ca	1.05	0.90	0.85	1.05	0.90	0.85
P available	0.50	0.45	0.42	0.50	0.45	0.42
Na	0.16	0.16	0.16	0.16	0.16	0.16
Cl	0.23	0.23	0.23	0.23	0.23	0.23
Lys (dig.)	1.27	1.09	1.00	1.27	1.09	1.00
Met (dig.)	0.64	0.55	0.52	0.64	0.56	0.53
M+C (dig.)	0.92	0.81	0.76	0.92	0.81	0.76
Threonin (dig.)	0.80	0.70	0.65	0.80	0.70	0.65
Thryptophan (dig.)	0.24	0.20	0.17	0.24	0.20	0.17
Val (dig.)	1.00	0.87	0.80	1.00	0.87	0.80
Ile (dig.)	0.86	0.75	0.71	0.86	0.75	0.71
Arg (dig.)	1.31	1.13	1.05	1.31	1.13	1.05

Parameters recorded and methods applied

Live weight

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

Feed consumption

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

Weight gain

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

Feed conversion ratio

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

Mortality

All pens were checked three times a day to see if there were any dead or ill birds. Dead chickens were registered by date, weight and reason of mortality on the day of death. Mortality was recorded for the periods 1 – 10 days, 11 – 24 days, 25 – 35 days and 1 – 35 days.

Foot pad lesions

One third of the animals were recorded at the end of the feeding trial according the scale.

Statistical analyses

Performance results of Live weight (on days 1, 10, 24 and 35) and Feed conversion ratio were statistically evaluated using the ANOVA single-factor model (Duncan test, Scheffe test) or nonparametric method (Kruskal-Wallis test).

Results

Tab. No.	1 Hatchability
	2 Performance results:
	2a Body weight
	2b Weight gain
	2c Feed conversion per 1 kg of live weight
	2d Feed conversion per 1 kg of weight gain
	2e Feed consumption
	3 Mortality
	4 Foot pad lesions
	5 Statistical analysis of body weight at the age of 35 days (average body weight, standard deviation, coefficient of variation)
	6 -7 Statistical analyses of performance results
	8 Performance results per pen:
	8a Body weight
	8b Weight gain
	8c Feed conversion per 1 kg of live weight
	8d Feed conversion per 1 kg of weight gain
	8e Feed consumption
	8f Foot pad lesions

Results of incubation and hatching

Tab. No. 1

Treatment	Tr. No.	Fertility	Hatchability		Birds housed	Average weight	
			Set eggs	Fertile eggs		Hatching eggs	Day old chicks
		%	%	%		g	g
T1	1	70.95	65.71	92.62	1950	70.00	47.21
T2	2				1950		47.15
T3	3				1950		47.23
T4	4				1950		47.13

Body weight per phases**Tab. No. 2a**

Treatment	Tr. No.	Day 1		Day 10		Day 24		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g
T1	1	1950	47.21	1950	329.77	1907	1437.50	1886	2581.97
T2	2	1950	47.15	1950	320.90	1910	1391.87	1880	2518.77
T3	3	1950	47.23	1950	329.59	1902	1462.22	1880	2585.17
T4	4	1950	47.13	1950	324.51	1901	1390.04	1879	2464.76

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

Treatment	Tr. No.	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 – 35	
		Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain	Weight gain per phase	Daily weight gain
		g	g	g	g	g	g	g	g
T1	1	282.56	28.26	1107.73	79.12	1144.47	104.04	2534.77	72.42
T2	2	273.74	27.37	1070.97	76.50	1126.90	102.45	2471.61	70.62
T3	3	282.36	28.24	1132.63	80.90	1122.95	102.09	2537.94	72.51
T4	4	277.38	27.74	1065.53	76.11	1074.72	97.70	2417.63	69.08

Feed conversion per 1 kg of live weight**Tab. No. 2c**

Treatment	Tr. No.	Feed conversion ratio		
		Day 10	Day 24	Day 35
		g/kg live weight	g/kg live weight	g/kg live weight
T1	1	997.75	1287.58	1560.73
T2	2	1013.74	1330.52	1598.16
T3	3	998.52	1269.12	1561.18
T4	4	995.18	1331.42	1637.21

Feed conversion per 1 kg of weight gain**Tab. No. 2d**

Treatment	Tr. No.	Feed conversion ratio			
		Day 1-10	Day 11-24	Day 25-35	Day 1-35
		g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1164.43	1374.25	1913.03	1590.24
T2	2	1188.37	1425.63	1940.35	1629.18
T3	3	1165.55	1348.27	1952.85	1590.73
T4	4	1164.26	1434.35	2045.75	1669.71

Feed consumption per phases**Tab. No. 2e**

Treatment	Tr. No.	Feed consumption			
		Starter (d 1-10)	Grower (d 11-24)	Finisher (d 25-35)	Total (d 1-35)
		kg	kg	kg	kg
T1	1	641.60	2955.45	4143.50	7740.55
T2	2	634.35	2971.25	4112.60	7718.20
T3	3	641.75	2962.70	4135.70	7740.15
T4	4	629.75	2965.10	4134.30	7729.15

Mortality

Tab. No. 3

Treat.	Tr. No.	Mortality in the period									Mortality according causes														
		Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		birds	g	birds	g	birds	g	birds	g	%															
T1	1	0	0	13	8344	21	37651	34	45995	1.74											34				30
T2	2	0	0	10	7859	30	42706	40	50565	2.05											40				30
T3	3	0	0	18	14538	22	38795	40	53333	2.05											39			1	30
T4	4	0	0	19	15288	22	32106	41	47394	2.10											41				30

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)

Foot pad lesions**Tab. No. 4**

Treatment	Tr. No.	Evaluation	
		right foot	left foot
T1	1	1.02	1.04
T2	2	0.81	0.82
T3	3	1.13	1.17
T4	4	1.05	1.11

Statistical analysis - Body weight at 35 days of age

Tab. No. 5

Treatment	Tr. No.	Cocks			
		No. of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%
T1	1	1886	2581.97	353.24	13.68
T2	2	1880	2493.45	353.07	14.16
T3	3	1880	2585.17	326.50	12.63
T4	4	1879	2464.76	327.94	13.31

Statistical analyses of performance results

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

The following symbols are used for levels of significance:

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

Body weight - day 1

Tab. No. 6a

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	15	47.21	0.49		o	o	o
T2	2	15	47.15	0.43	0.767719		o	o
T3	3	15	47.23	0.53	0.882583	0.678553		o
T4	4	15	47.13	0.43	0.678553	0.882583	0.595037	

Body weight - day 10

Tab. No. 6b

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	15	329.77	9.82		*	o	o
T2	2	15	320.90	6.25	0.048276		*	o
T3	3	15	329.59	8.40	1.000000	0.036393		o
T4	4	15	324.51	5.94	1.000000	1.000000	0.958192	

Body weight - day 24**Tab. No. 6c**

Treatment	Treat. No.	No. of birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	1907	1437.50	199.81		* * *	* *	* * *
T2	2	1910	1391.87	199.99	0.000000		* * *	o
T3	3	1902	1462.22	216.10	0.003592	0.000000		* * *
T4	4	1901	1390.04	212.31	0.000000	0.994753	0.000000	

Body weight - day 35**Tab. No. 6d**

Treatment	Treat. No.	No. of birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	1886	2581.97	353.24		* * *	o	* * *
T2	2	1880	2518.77	329.72	0.000000		* * *	* * *
T3	3	1880	2585.17	326.50	1.000000	0.000000		* * *
T4	4	1879	2464.76	327.94	0.000000	0.000003	0.000000	

FCR - day 10**Tab. No. 7a**

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	15	998.45	29.26		o	o	o
T2	2	15	1014.10	26.56	0.148613		o	o
T3	3	15	999.06	27.87	0.951738	0.141725		o
T4	4	15	995.35	26.77	0.760086	0.094503	0.732170	

FCR - day 24**Tab. No. 7b**

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	15	1290.20	59.36		o	o	o
T2	2	15	1333.24	62.41	0.080873		*	o
T3	3	15	1271.96	58.56	0.454495	0.018816		*
T4	4	15	1336.59	82.02	0.074553	0.890663	0.016087	

FCR - day 35**Tab. No. 7c**

Treatment	Treat. No.	No. of box	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	15	1562.34	42.54		o	o	* * *
T2	2	15	1600.34	64.22	0.069262		o	o
T3	3	15	1562.54	48.41	0.992001	0.057216		* * *
T4	4	15	1638.77	55.50	0.000480	0.053295	0.000408	

Performance results per replicate

Body weight per phases

Tab. No. 8a (page 1)

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 24		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T1	1	1	130	46.54	130	323.85	126	1380.24	124	2359.84
		5	130	46.92	130	318.08	128	1410.39	126	2567.62
		9	130	47.31	130	315.77	127	1453.46	126	2539.68
		13	130	46.92	130	332.31	127	1384.02	124	2453.55
		17	130	47.69	130	329.23	128	1421.33	128	2690.55
		21	130	46.92	130	340.77	127	1507.40	126	2562.54
		25	130	46.92	130	336.54	125	1461.84	122	2670.00
		29	130	47.31	130	343.85	128	1500.23	128	2602.50
		34	130	47.31	130	325.38	126	1370.71	124	2453.55
		38	130	47.31	130	318.46	128	1423.98	128	2495.16
		42	130	46.92	130	319.23	128	1332.27	126	2614.60
		46	130	47.31	130	324.62	128	1372.19	125	2670.88
		50	130	46.54	130	334.62	126	1424.37	125	2862.08
		54	130	48.46	130	340.00	127	1564.09	126	2586.98
		58	130	47.69	130	343.85	128	1555.63	128	2597.27
T2	2	2	130	46.54	130	318.46	128	1370.94	127	2358.66
		6	130	46.92	130	322.31	128	1414.06	126	2582.86
		10	130	47.31	130	312.31	128	1397.73	119	2391.43
		14	130	46.92	130	323.85	128	1291.80	126	2436.27
		18	130	47.69	130	323.08	125	1417.12	124	2535.08
		22	130	46.92	130	319.62	128	1391.56	128	2453.91
		26	130	46.92	130	324.62	127	1417.56	125	2642.64
		30	130	47.31	130	325.38	127	1433.46	126	2500.16
		33	130	47.31	130	316.15	128	1312.66	128	2486.17
		37	130	46.92	130	314.62	128	1359.77	127	2452.68
		41	130	47.31	130	309.62	128	1323.28	123	2466.26
		45	130	46.92	130	318.08	126	1325.87	124	2669.60
		49	130	46.54	130	323.46	127	1372.13	125	2746.08
		53	130	48.08	130	333.08	128	1536.09	127	2527.09
		57	130	47.69	130	328.85	126	1515.87	125	2533.12

Performance results per replicate

Body weight per phases

Tab. No. 8a (page 2)

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 24		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T3	3	3	130	46.54	130	328.85	127	1435.98	126	2531.90
		7	130	46.92	130	318.08	127	1424.57	127	2608.43
		11	130	47.31	130	326.15	128	1385.00	124	2466.29
		15	130	46.92	130	323.85	127	1389.06	123	2571.46
		19	130	47.69	130	331.92	127	1501.18	126	2534.52
		23	130	46.92	130	335.38	126	1456.43	125	2665.60
		27	130	46.92	130	331.92	128	1482.03	128	2540.70
		32	130	47.31	130	335.38	126	1431.51	124	2543.95
		36	130	47.31	130	322.69	127	1399.13	124	2541.21
		40	130	47.31	130	321.54	127	1447.87	125	2494.40
		44	130	46.92	130	317.69	127	1385.59	126	2786.98
		48	130	47.31	130	326.15	128	1431.09	128	2716.09
		52	130	46.54	130	341.54	127	1489.61	126	2576.19
		56	130	48.46	130	336.54	124	1605.97	124	2576.45
		60	130	48.08	130	346.15	126	1673.73	124	2618.55
T4	4	4	130	46.54	130	316.92	125	1375.20	122	2447.87
		8	130	46.92	130	320.77	126	1436.67	126	2534.68
		12	130	47.31	130	321.15	125	1334.48	125	2414.48
		16	130	46.92	130	328.85	128	1401.02	127	2533.94
		20	130	47.69	130	326.54	128	1432.58	126	2379.37
		24	130	46.54	130	319.23	126	1435.63	124	2578.87
		28	130	47.31	130	325.38	126	1423.57	125	2464.80
		31	130	47.31	130	329.62	128	1181.41	126	2293.02
		35	130	46.92	130	313.85	127	1258.35	125	2290.56
		39	130	47.31	130	324.23	128	1389.30	128	2458.44
		43	130	46.92	130	325.00	128	1328.13	126	2585.16
		47	130	47.31	130	328.85	126	1357.22	125	2602.48
		51	130	46.54	130	321.15	127	1397.80	126	2412.22
		55	130	48.08	130	328.46	126	1511.03	124	2427.42
		59	130	47.31	130	337.69	127	1590.55	124	2549.03

Weight gain per phases (WG) and daily weight gain

Tab. No. 8b (page 1)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T1	1	1	277.31	27.73	1056.39	75.46	979.60	89.05	2313.30	66.09
		5	271.15	27.12	1092.31	78.02	1157.23	105.20	2520.70	72.02
		9	268.46	26.85	1137.70	81.26	1086.22	98.75	2492.37	71.21
		13	285.38	28.54	1051.71	75.12	1069.53	97.23	2406.63	68.76
		17	281.54	28.15	1092.10	78.01	1269.22	115.38	2642.85	75.51
		21	293.85	29.38	1166.63	83.33	1055.14	95.92	2515.62	71.87
		25	289.62	28.96	1125.30	80.38	1208.16	109.83	2623.08	74.95
		29	296.54	29.65	1156.39	82.60	1102.27	100.21	2555.19	73.01
		34	278.08	27.81	1045.33	74.67	1082.83	98.44	2406.24	68.75
		38	271.15	27.12	1105.52	78.97	1071.17	97.38	2447.85	69.94
		42	272.31	27.23	1013.03	72.36	1282.34	116.58	2567.68	73.36
		46	277.31	27.73	1047.57	74.83	1298.69	118.06	2623.57	74.96
		50	288.08	28.81	1089.75	77.84	1437.71	130.70	2815.54	80.44
		54	291.54	29.15	1224.09	87.44	1022.89	92.99	2538.52	72.53
		58	296.15	29.62	1211.78	86.56	1041.64	94.69	2549.57	72.84
T2	2	2	271.92	27.19	1052.48	75.18	987.72	89.79	2312.12	66.06
		6	275.38	27.54	1091.75	77.98	1168.79	106.25	2535.93	72.46
		10	265.00	26.50	1085.43	77.53	993.69	90.34	2344.12	66.97
		14	276.92	27.69	967.95	69.14	1144.47	104.04	2389.35	68.27
		18	275.38	27.54	1094.04	78.15	1117.96	101.63	2487.39	71.07
		22	272.69	27.27	1071.95	76.57	1062.34	96.58	2406.98	68.77
		26	277.69	27.77	1092.94	78.07	1225.08	111.37	2595.72	74.16
		30	278.08	27.81	1108.08	79.15	1066.69	96.97	2452.85	70.08
		33	268.85	26.88	996.50	71.18	1173.52	106.68	2438.86	69.68
		37	267.69	26.77	1045.15	74.65	1092.91	99.36	2405.75	68.74
		41	262.31	26.23	1013.67	72.40	1142.98	103.91	2418.95	69.11
		45	271.15	27.12	1007.80	71.99	1343.72	122.16	2622.67	74.93
		49	276.92	27.69	1048.66	74.90	1373.95	124.90	2699.54	77.13
		53	285.00	28.50	1203.02	85.93	990.99	90.09	2479.01	70.83
		57	281.15	28.12	1187.03	84.79	1017.25	92.48	2485.43	71.01

Weight gain per phases (WG) and daily weight gain

Tab. No. 8b (page 2)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 24		Day 25 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T3	3	3	282.31	28.23	1107.14	79.08	1095.92	99.63	2485.37	71.01
		7	271.15	27.12	1106.49	79.04	1183.86	107.62	2561.50	73.19
		11	278.85	27.88	1058.85	75.63	1081.29	98.30	2418.98	69.11
		15	276.92	27.69	1065.21	76.09	1182.41	107.49	2524.54	72.13
		19	284.23	28.42	1169.26	83.52	1033.34	93.94	2486.83	71.05
		23	288.46	28.85	1121.04	80.07	1209.17	109.92	2618.68	74.82
		27	285.00	28.50	1150.11	82.15	1058.67	96.24	2493.78	71.25
		32	288.08	28.81	1096.12	78.29	1112.44	101.13	2496.64	71.33
		36	275.38	27.54	1076.44	76.89	1142.08	103.83	2493.90	71.25
		40	274.23	27.42	1126.34	80.45	1046.53	95.14	2447.09	69.92
		44	270.77	27.08	1067.90	76.28	1401.39	127.40	2740.06	78.29
		48	278.85	27.88	1104.94	78.92	1285.00	116.82	2668.79	76.25
		52	295.00	29.50	1148.07	82.00	1086.58	98.78	2529.65	72.28
		56	288.08	28.81	1269.43	90.67	970.48	88.23	2527.99	72.23
		60	298.08	29.81	1327.58	94.83	944.82	85.89	2570.47	73.44
T4	4	4	270.38	27.04	1058.28	75.59	1072.67	97.52	2401.33	68.61
		8	273.85	27.38	1115.90	79.71	1098.02	99.82	2487.76	71.08
		12	273.85	27.38	1013.33	72.38	1080.00	98.18	2367.17	67.63
		16	281.92	28.19	1072.17	76.58	1132.92	102.99	2487.01	71.06
		20	278.85	27.88	1106.04	79.00	946.79	86.07	2331.67	66.62
		24	272.69	27.27	1116.40	79.74	1143.24	103.93	2532.33	72.35
		28	278.08	27.81	1098.19	78.44	1041.23	94.66	2417.49	69.07
		31	282.31	28.23	851.79	60.84	1111.61	101.06	2245.71	64.16
		35	266.92	26.69	944.50	67.46	1032.21	93.84	2243.64	64.10
		39	276.92	27.69	1065.07	76.08	1069.14	97.19	2411.13	68.89
		43	278.08	27.81	1003.13	71.65	1257.03	114.28	2538.24	72.52
		47	281.54	28.15	1028.38	73.46	1245.26	113.21	2555.17	73.00
		51	274.62	27.46	1076.64	76.90	1014.43	92.22	2365.68	67.59
		55	280.38	28.04	1182.57	84.47	916.39	83.31	2379.34	67.98
		59	290.38	29.04	1252.86	89.49	958.48	87.13	2501.72	71.48

Feed conversion ratio (Feed consum. per 1 kg of live weight)

Tab. No. 8c (page 1)

Treatment	Tr. No.	Box	Feed conversion ratio		
			Day 10	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T1	1	1	995.25	1318.04	1605.36
		5	1031.44	1312.54	1542.22
		9	1059.68	1265.87	1559.07
		13	979.17	1338.70	1622.88
		17	1019.86	1305.41	1536.45
		21	974.04	1220.71	1587.15
		25	997.71	1265.54	1539.36
		29	959.73	1230.00	1563.09
		34	990.54	1384.54	1587.98
		38	1025.36	1299.11	1581.31
		42	1024.10	1375.11	1560.23
		46	1004.74	1343.64	1534.52
		50	965.52	1296.34	1444.14
		54	990.95	1196.38	1604.88
		58	958.61	1201.07	1566.51
T2	2	2	1039.86	1309.24	1649.66
		6	1005.97	1318.74	1579.61
		10	1060.34	1315.34	1633.69
		14	983.37	1437.19	1672.11
		18	1010.71	1324.88	1616.64
		22	1026.47	1323.33	1666.35
		26	997.63	1317.66	1552.38
		30	1028.37	1297.36	1559.72
		33	1030.41	1386.38	1615.17
		37	1018.34	1364.71	1623.66
		41	1042.24	1390.81	1661.07
		45	1009.67	1413.42	1522.65
		49	983.35	1363.05	1429.17
		53	956.12	1214.34	1611.49
		57	1018.71	1222.20	1611.71

Feed conversion ratio (Feed consum. per 1 kg of live weight)

Tab. No. 8c (page 2)

Treatment	Tr. No.	Box	Feed conversion ratio		
			Day 10	Day 24	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T3	3	3	989.47	1282.42	1536.62
		7	1003.63	1298.62	1555.76
		11	1024.76	1334.04	1632.83
		15	1003.56	1332.70	1590.49
		19	1010.43	1237.18	1598.87
		23	1001.15	1280.50	1528.47
		27	1011.59	1229.32	1562.60
		32	1001.15	1295.31	1582.20
		36	1010.73	1315.75	1560.22
		40	1039.47	1268.64	1593.45
		44	1030.27	1329.78	1432.74
		48	1001.18	1305.66	1512.38
		52	957.21	1258.95	1579.78
		56	968.00	1188.52	1615.84
		60	933.33	1122.09	1555.89
T4	4	4	1031.55	1344.22	1545.85
		8	1026.38	1299.17	1591.04
		12	1023.95	1393.45	1660.52
		16	991.81	1308.93	1632.32
		20	991.76	1276.65	1673.78
		24	1040.96	1279.92	1600.21
		28	996.45	1302.69	1650.36
		31	984.83	1529.57	1759.74
		35	943.63	1439.85	1700.95
		39	986.95	1336.98	1657.90
		43	990.53	1397.46	1572.29
		47	967.25	1371.16	1579.34
		51	996.41	1322.21	1677.49
		55	996.49	1255.60	1656.03
		59	961.28	1190.97	1623.72

Feed conversion per 1 kg of weight gain

Tab. No. 8d (page 1)

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1	1162.27	1418.27	2026.09	1638.51
		5	1209.93	1394.37	1829.67	1571.27
		9	1246.42	1323.52	1962.58	1589.21
		13	1140.16	1452.83	2007.70	1655.27
		17	1192.62	1391.49	1799.21	1564.38
		21	1129.58	1292.96	2126.78	1617.19
		25	1159.36	1346.69	1885.52	1567.74
		29	1112.84	1310.36	2023.53	1592.22
		34	1159.06	1508.41	1853.51	1619.88
		38	1204.26	1377.88	1962.66	1612.07
		42	1200.56	1485.76	1756.01	1589.01
		46	1176.14	1448.59	1741.12	1562.51
		50	1121.50	1399.12	1594.24	1468.54
		54	1155.67	1253.79	2246.90	1636.01
		58	1112.99	1269.83	2121.05	1595.99
T2	2	2	1217.82	1390.69	2130.15	1683.08
		6	1177.37	1411.06	1904.57	1609.23
		10	1249.64	1388.69	2133.93	1668.18
		14	1150.00	1588.60	1946.55	1705.42
		18	1185.75	1418.92	2001.72	1648.53
		22	1203.10	1411.64	2123.47	1699.03
		26	1166.20	1412.87	1833.14	1580.92
		30	1203.32	1376.63	1921.42	1590.22
		33	1211.73	1499.15	1875.37	1646.71
		37	1196.84	1468.75	1954.92	1655.68
		41	1230.21	1497.34	1990.62	1694.37
		45	1184.40	1541.62	1634.64	1550.56
		49	1148.61	1480.45	1497.36	1454.26
		53	1117.41	1285.78	2239.17	1642.96
		57	1191.52	1279.33	2209.68	1643.35

Feed conversion per 1 kg of weight gain

Tab. No. 8d (page 2)

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-24	Day 25-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T3	3	3	1152.59	1369.81	1879.58	1565.86
		7	1177.30	1383.71	1871.63	1584.61
		11	1198.62	1429.14	2033.29	1665.37
		15	1173.61	1433.06	1907.85	1620.77
		19	1179.97	1301.94	2140.34	1630.07
		23	1164.00	1365.27	1835.14	1556.51
		27	1178.14	1292.10	2036.75	1592.18
		32	1165.55	1385.91	1963.00	1612.75
		36	1184.36	1407.40	1869.09	1590.29
		40	1218.79	1334.20	2058.22	1624.75
		44	1208.81	1419.19	1536.83	1457.62
		48	1171.03	1395.58	1746.11	1539.40
		52	1108.21	1349.19	2028.52	1609.21
		56	1130.84	1247.97	2347.52	1647.64
		60	1083.87	1171.92	2354.48	1585.70
T4	4	4	1209.10	1439.04	1815.71	1576.69
		8	1202.25	1378.30	1982.29	1621.58
		12	1200.84	1511.74	2001.11	1694.45
		16	1156.89	1406.14	2043.05	1663.47
		20	1161.38	1360.79	2298.98	1708.58
		24	1218.62	1348.76	2021.07	1630.39
		28	1165.98	1394.65	2142.08	1683.47
		31	1149.86	1740.45	2009.09	1797.17
		35	1109.51	1604.96	2033.53	1737.28
		39	1155.56	1443.41	2081.84	1690.64
		43	1157.68	1529.25	1761.08	1601.66
		47	1129.78	1501.26	1813.98	1609.22
		51	1165.27	1419.74	2180.93	1710.98
		55	1167.35	1328.03	2342.37	1690.16
		59	1117.88	1253.32	2375.02	1655.13

Feed consumption per phases

Tab. No. 8e (page 1)

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-24)	Finisher (D 25-35)	Total (D 1-35)
			kg	kg	kg	kg
T1	1	1	41.90	192.30	245.85	480.05
		5	42.65	198.05	268.10	508.80
		9	43.50	194.30	267.90	505.70
		13	42.30	197.70	265.80	505.80
		17	43.65	197.55	292.30	533.50
		21	43.15	195.55	282.40	521.10
		25	43.65	194.45	280.60	518.70
		29	42.90	197.00	285.50	525.40
		34	41.90	202.95	251.15	496.00
		38	42.45	198.25	269.10	509.80
		42	42.50	195.60	287.50	525.60
		46	42.40	197.40	287.10	526.90
		50	42.00	195.90	288.10	526.00
		54	43.80	198.30	289.30	531.40
		58	42.85	200.15	282.80	525.80
T2	2	2	43.05	190.40	269.10	502.55
		6	42.15	200.30	281.10	523.55
		10	43.05	196.00	246.80	485.85
		14	41.40	200.45	280.40	522.25
		18	42.45	199.10	276.50	518.05
		22	42.65	197.15	288.75	528.55
		26	42.10	200.40	282.05	524.55
		30	43.50	197.60	259.00	500.10
		33	42.35	194.50	281.70	518.55
		37	41.65	200.00	270.60	512.25
		41	41.95	197.20	280.70	519.85
		45	41.75	200.75	273.55	516.05
		49	41.35	201.35	258.55	501.25
		53	41.40	201.25	283.10	525.75
		57	43.55	194.80	280.70	519.05

Feed consumption per phases

Tab. No. 8e (page 2)

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-24)	Finisher (D 25-35)	Total (D 1-35)
			kg	kg	kg	kg
T3	3	3	42.30	196.30	259.20	497.80
		7	41.50	198.35	281.40	521.25
		11	43.45	197.05	273.50	514.00
		15	42.25	197.85	279.20	519.30
		19	43.60	196.70	277.70	518.00
		23	43.65	196.15	277.90	517.70
		27	43.65	193.35	276.00	513.00
		32	43.65	196.20	273.85	513.70
		36	42.40	196.50	268.60	507.50
		40	43.45	194.95	270.30	508.70
		44	42.55	196.35	273.10	512.00
		48	42.45	200.35	287.20	530.00
		52	42.50	200.30	279.70	522.50
		56	42.35	202.55	282.50	527.40
		60	42.00	199.75	275.55	517.30
T4	4	4	42.50	195.50	240.20	478.20
		8	42.80	198.15	274.25	515.20
		12	42.75	197.15	270.15	510.05
		16	42.40	196.10	293.10	531.60
		20	42.10	195.60	271.90	509.60
		24	43.20	194.30	285.40	522.90
		28	42.15	196.45	277.40	516.00
		31	42.20	192.65	284.75	519.60
		35	38.50	196.80	260.90	496.20
		39	41.60	200.10	284.90	526.60
		43	41.85	199.50	281.65	523.00
		47	41.35	199.25	282.40	523.00
		51	41.60	198.00	278.90	518.50
		55	42.55	202.85	267.10	512.50
		59	42.20	202.70	281.30	526.20

Treatment	Tr. No.	Box	Evaluation	
			right foot	left foot
T1	1	1	0.55	0.68
		5	0.70	0.75
		9	0.80	0.75
		13	1.10	1.25
		17	1.33	1.33
		21	0.93	0.93
		25	1.18	1.25
		29	1.43	1.40
		34	1.43	1.20
		38	0.93	1.00
		42	1.05	0.85
		46	1.00	0.93
		50	0.80	0.80
		54	0.70	1.00
		58	1.43	1.55
T2	2	2	0.35	0.28
		6	0.58	0.68
		10	0.58	0.65
		14	0.93	0.85
		18	0.98	0.95
		22	0.73	0.78
		26	0.88	0.95
		30	1.20	1.10
		33	0.68	0.58
		37	0.65	0.70
		41	1.40	1.50
		45	0.88	0.90
		49	1.00	0.93
		53	0.75	0.63
		57	0.65	0.78

Treatment	Tr. No.	Box	Evaluation	
			right foot	left foot
T3	3	3	0.73	0.70
		7	0.80	0.85
		11	1.03	0.98
		15	1.13	1.13
		19	1.05	1.85
		23	1.20	1.18
		27	1.60	1.63
		32	1.55	1.53
		36	1.13	1.20
		40	1.05	1.13
		44	1.08	0.95
		48	1.05	1.00
		52	1.10	1.10
		56	1.05	1.00
		60	1.38	1.38
T4	4	4	0.40	0.38
		8	0.75	0.83
		12	1.15	1.20
		16	0.73	0.85
		20	1.13	1.38
		24	0.88	1.10
		28	1.08	1.15
		31	1.03	0.98
		35	1.18	1.15
		39	1.43	1.33
		43	1.00	1.05
		47	2.00	2.03
		51	1.08	1.13
		55	1.00	1.05
		59	0.95	1.08