



**MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE  
ÚSTRAŠICE**

státní podnik

390 02 Tábor 2

Česká republika

**BROILER FEEDING TEST No. 1236**

**Test compatibility of the probiotics xxxxx and xxxxx  
with 2 different coccidiostats**

**XXXXX**

**8 August – 12 September 2023**

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**October 2023**

Říjen 2023

## Material and methods

### Test term

**Beginning of the test:** 8 August 2023 (transfer to the chicken house)

**End of the test:** 12 September 2023

### Birds

In total there were 6240 day old chicks (males) of xxxxx. Day-old chicks were randomly distributed into 8 dietary treatments with 6 replicates per treatment and 130 chicken per replicate.

Origin 1-day old chicks:

breeder company – xxxxx

parent flock – xxxxx

age of the breeding flock – 52 weeks

### Experimental treatments:

Tr. No.	Tr.	Description
1	T1	xxxxxx
2	T2	xxxxxx
3	T3	xxxxxx
4	T4	xxxxxx
5	T5	xxxxxx
6	T6	xxxxxx
7	T7	xxxxxx
8	T8	xxxxxx

## **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 Ross Broilers. 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: 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 Virkon 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.

On day 3 the chicken were vaccinated with xxxxx in the 1<sup>th</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> treatments (other treatments had feed with content coccidiostats).

## Feed

Feed was produced by International Poultry Testing Station Ústrašice

Day 1 - 10 Starter (BR 1)

Day 11- 28 Grower (BR 2)

Day 29 - 35 Finisher (BR 3)

## Diet formulas:

Components (%)	Starter BR1	Grower BR2	Finisher BR3
Wheat	32.00	36.00	40.00
Soybean extr. groats	38.00	35.00	30.00
Maize	19.81	20.95	21.61
Soybean oil	3.50	4.00	4.50
Limestone	1.51	1.37	1.19
MCP - monocalciumphosphate	1.12	1.10	1.05
Salt	0.30	0.30	0.30
Na <sub>2</sub> CO <sub>3</sub>	0.12	0.15	0.15
L-lysine	0.35	0.35	0.39
DL-methionin	0.08	0.08	0.10
L-threonin	0.20	0.20	0.20
AMV BR1 Plus	3.00	-	-
AMV BR2 Plus	-	0.50	-
AMV BR3 Plus	-	-	0.50
<b>Nutrient content</b>			
Crude protein (g/kg)	218.75	210.44	193.07
ME (MJ/kg)	12.01	12.51	12.73
Lysine (g/kg)	14.95	14.25	13.29
Methionine (g/kg)	6.27	5.78	5.44
Met. + Cys. (g/kg)	10.12	9.54	8.97
Ca (g/kg)	9.60	8.88	7.90
P (g/kg)	6.39	6.32	6.05
Na (g/kg)	1.56	1.65	1.64
Vitamin A (IU/kg)	40500	10000	10000
Vitamin D3 (IU/kg)	15000	5000	5000

Feed analyses for nutrient contents were performed at the laboratory of xxxxx

**Starter BR1:**

<b>Nutrient content</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>
Crude protein (g/kg)	226	229	226	228	226	234	231	231
Dry matter (%)	89.60	89.80	90.00	89.70	89.80	89.70	90.13	89.90
Fat (g/kg)	54.10	54.10	52.20	54.50	54.80	54.30	52.60	64.40
Crude fibre (g/kg)	26.20	26.80	27.70	24.40	25.80	25.80	25.40	24.00
Starch (g/kg)	383	389	383	408	405	402	405	402
Reducing sugars (g/kg)	44.30	46.60	48.50	44.00	45.10	45.60	46.30	44.90
Total methionine (g/kg)	5.22	5.07	4.90	4.93	4.88	4.77	4.99	5.13
ME (MJ/kg)	12.30	12.50	12.30	12.80	12.70	12.80	12.70	12.70
Narasin (mg/kg)	-	-	-	59.7	53.40	55.80	-	-
Lasalocid (mg/kg)	-	-	-	-	-	-	66.30	70.70

**Grower BR2:**

<b>Nutrient content</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>
Crude protein (g/kg)	215	225	224	223	225	217	217	220
Dry matter (%)	90.00	90.00	90.00	90.00	90.07	90.06	90.25	90.39
Fat (g/kg)	61.20	60.50	59.80	61.70	60.90	60.30	59.70	59.10
Crude fibre (g/kg)	26.90	24.60	24.80	25.50	23.70	24.90	24.10	22.80
Starch (g/kg)	405	399	394	389	386	389	389	399
Reducing sugars (g/kg)	42.30	45.80	43.40	42.70	45.70	47.20	50.10	45.50
Total methionine (g/kg)	4.70	4.98	4.63	4.23	4.57	4.28	4.47	4.79
ME (MJ/kg)	12.70	12.80	12.70	12.60	12.60	12.50	12.50	12.70
Narasin (mg/kg)	-	-	-	59.8	55.00	57.9	-	-
Lasalocid (mg/kg)	-	-	-	-	-	-	79.90	83.70

**Finisher BR3:**

<b>Nutrient content</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>
Crude protein (g/kg)	206	207	206	206	207	206	206	207
Dry matter (%)	90.04	89.90	89.90	90.04	89.90	89.90	89.90	89.90
Fat (g/kg)	62.30	61.70	62.90	62.30	61.70	62.90	62.90	61.70
Crude fibre (g/kg)	2.69	2.40	2.69	2.69	2.40	2.69	2.69	2.40
Starch (g/kg)	454	448	448	454	448	448	448	448
Reducing sugars (g/kg)	56.60	58.10	56.80	56.60	58.10	56.80	56.80	58.10
Total methionine (g/kg)	4.23	4.46	4.58	4.23	4.46	4.58	4.58	4.46
ME (MJ/kg)	13.60	13.50	13.60	13.60	13.50	13.60	13.60	13.50

## **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 28 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 – 28 days, 29 – 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 – 28 days, 29 – 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 – 28 days, 29 – 35 days and 1 – 35 days.

### **Statistical analyses**

Performance results of live weight (on days 1, 10, 28 and 35) were statistically evaluated using the ANOVA single-factor model (Scheffe test, Duncan 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 Statistical analysis of body weight at the age of 35 days**

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

**5 – 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**

**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	89.40	84.40	94.40	780	67.50	44.85
T2	2				780		44.99
T3	3				780		45.05
T4	4				780		45.05
T5	5				780		44.94
T6	6				780		44.90
T7	7				780		44.82
T8	8				780		44.90



**Body weight per phases**

**Tab. No. 2a**

Treatment	Tr. No.	Day 1		Day 10		Day 28		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g
T1	1	780	44.85	780	307.63	755	1666.95	752	2421.29
T2	2	780	44.99	780	306.22	757	1684.16	756	2348.64
T3	3	780	45.05	780	306.03	751	1681.58	750	2371.07
T4	4	780	45.05	780	302.44	757	1695.40	754	2384.60
T5	5	780	44.94	780	308.08	751	1745.85	751	2434.79
T6	6	780	44.90	780	306.79	751	1753.45	750	2479.00
T7	7	780	44.82	780	306.54	748	1757.89	748	2464.29
T8	8	780	44.90	780	310.00	752	1788.50	750	2500.91

Weight gain per phases

Tab. No. 2b

Treatment	Tr. No.	Day 1 - 10		Day 11 - 28		Day 29 - 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	262.78	26.28	1359.33	75.52	754.33	94.29	2376.44	67.90
T2	2	261.23	26.12	1377.94	76.55	664.48	83.06	2303.65	65.82
T3	3	260.97	26.10	1375.56	76.42	689.48	86.19	2326.02	66.46
T4	4	257.38	25.74	1392.97	77.39	689.20	86.15	2339.55	66.84
T5	5	263.14	26.31	1437.77	79.88	688.94	86.12	2389.85	68.28
T6	6	261.90	26.19	1446.65	80.37	725.55	90.69	2434.10	69.55
T7	7	261.72	26.17	1451.35	80.63	706.40	88.30	2419.47	69.13
T8	8	265.10	26.51	1478.50	82.14	712.41	89.05	2456.01	70.17

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

**Tab. No. 2c**

Treatment	Tr. No.	Feed conversion ratio		
		Day 10	Day 28	Day 35
		g/kg live weight	g/kg live weight	g/kg live weight
T1	1	913.94	1346.00	1464.17
T2	2	908.10	1302.31	1488.90
T3	3	878.09	1309.35	1472.50
T4	4	913.10	1281.98	1457.16
T5	5	890.55	1273.72	1451.87
T6	6	909.32	1268.47	1426.08
T7	7	917.19	1275.88	1435.94
T8	8	899.92	1266.70	1448.22

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

**Tab. No. 2d**

Treatment	Tr. No.	Feed conversion ratio			
		Day 1-10	Day 11-28	Day 29-35	Day 1-35
		g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	1069.91	1176.95	1733.49	1492.18
T2	2	1064.49	1137.06	1975.58	1518.27
T3	3	1029.67	1148.35	1882.33	1501.53
T4	4	1072.93	1118.68	1900.28	1485.56
T5	5	1042.63	1115.46	1916.91	1479.64
T6	6	1065.21	1108.30	1819.12	1452.84
T7	7	1074.26	1114.52	1847.13	1463.06
T8	8	1052.33	1109.38	1916.60	1475.17

**Feed consumption per phases**

**Tab. No. 2e**

Treatment	Tr. No.	Feed consumption			
		Starter (day 1-10)	Grower (day 11-28)	Finisher (day 29-35)	Total (day 1-35)
		kg	kg	kg	kg
T1	1	219.30	1524.50	985.40	2729.20
T2	2	216.90	1490.30	992.90	2700.10
T3	3	209.60	1492.70	974.20	2676.50
T4	4	215.40	1473.50	989.70	2678.60
T5	5	214.00	1506.20	991.80	2712.00
T6	6	217.60	1503.60	989.80	2711.00
T7	7	219.30	1512.60	976.00	2707.90
T8	8	217.60	1532.30	1026.10	2776.00

**Mortality**

**Tab. No. 3**

Treat.	Tr. No.	Mortality in the period									Mortality according causes														
		Day 1 - 10		Day 11 - 28		Day 29 - 35		Day 1 - 35			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		birds	g	birds	g	birds	g	birds	g	%															
T1	1	0	0	7	4591	3	6190	10	10781	1.28										6			4	18	
T2	2	0	0	5	4445	1	1924	6	6369	0.77									1	4			1	18	
T3	3	0	0	11	5199	1	2121	12	7320	1.54										12				18	
T4	4	0	0	5	2801	3	6250	8	9051	1.03										7			1	18	
T5	5	0	0	11	6997	0	0	11	6997	1.41										11				18	
T6	6	0	0	11	8119	1	1700	12	9819	1.54										10			2	18	
T7	7	0	0	14	10089	0	0	14	10089	1.79										12			2	18	
T8	8	0	0	10	4566	2	4643	12	9209	1.54										10			2	18	

**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)

**Statistical analysis - Body weight at 35 days of age**

**Tab. No. 4**

Treatment	Tr. No.	Cocks			
		No. of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%
T1	1	752	2421.29	323.30	13.35
T2	2	756	2348.64	268.34	11.43
T3	3	750	2371.07	284.19	11.99
T4	4	754	2384.60	251.52	10.55
T5	5	751	2434.79	281.44	11.56
T6	6	750	2479.00	299.71	12.09
T7	7	748	2464.29	306.20	12.43
T8	8	750	2500.91	268.31	10.73

## Statistical analyses of performance results

Performance results were statistically evaluated using the ANOVA single-factor model (Scheffe test, Duncan 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. 5a**

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test							
					T1	T2	T3	T4	T5	T6	T7	T8
T1	1	6	44.85	0.67		o	o	o	o	o	o	o
T2	2	6	44.99	0.31	0.646586		o	o	o	o	o	o
T3	3	6	45.05	0.69	0.508699	0.808961		o	o	o	o	o
T4	4	6	45.05	0.47	0.510352	0.816449	0.995146		o	o	o	o
T5	5	6	44.94	0.31	0.762898	0.852462	0.688644	0.695420		o	o	o
T6	6	6	44.90	0.39	0.857336	0.758328	0.606810	0.611554	0.886615		o	o
T7	7	6	44.82	0.29	0.921023	0.591265	0.460547	0.461225	0.702648	0.793094		o
T8	8	6	44.90	0.36	0.847605	0.767160	0.615387	0.617491	0.894111	1.000000	0.785012	



**Body weight - day 10**

**Tab. No. 5b**

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	307.63	7.21		o	o	o	o	o	o	o	o
T2	2	6	306.22	6.08	0.734943		o	o	o	o	o	o	o
T3	3	6	306.03	4.03	0.707422	0.959248		o	o	o	o	o	o
T4	4	6	302.44	5.04	0.231132	0.346133	0.341670		o	o	o	o	o
T5	5	6	308.08	8.20	0.904935	0.663001	0.636477	0.198949		o	o	o	o
T6	6	6	306.79	4.93	0.824434	0.885908	0.854388	0.306573	0.749233		o	o	o
T7	7	6	306.54	8.56	0.785913	0.932037	0.898625	0.324386	0.711829	0.945605		o	o
T8	8	6	310.00	6.21	0.554287	0.382930	0.365010	0.088377	0.609035	0.441273	0.416796		

**Body weight - day 28**

**Tab. No. 5c**

Treat.	Tr. No.	No. of birds	Average (g)	Standard deviation	Kruskal - Wallis test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	755	1666.95	176.04		o	o	o	***	***	***	***	***
T2	2	757	1684.16	200.60	1.000000		o	o	***	***	***	***	***
T3	3	751	1681.58	222.23	1.000000	1.000000		o	***	***	***	***	***
T4	4	757	1695.40	191.05	0.482369	1.000000	1.000000		***	***	***	***	***
T5	5	751	1745.85	197.53	0.000000	0.000000	0.000000	0.000061		o	o	***	***
T6	6	751	1753.45	196.31	0.000000	0.000000	0.000000	0.000001	1.000000		o	**	**
T7	7	748	1757.89	195.63	0.000000	0.000000	0.000000	0.000000	0.971643	1.000000		o	o
T8	8	752	1788.50	203.44	0.000000	0.000000	0.000000	0.000000	0.000039	0.001193	0.182473		

**Body weight - day 35**

**Tab. No. 5d**

Treat.	Tr. No.	No. of birds	Average (g)	Standard deviation	Kruskal - Wallis test							
					T1	T2	T3	T4	T5	T6	T7	T8
T1	1	752	2421.29	323.30		***	*	o	o	**	*	***
T2	2	756	2348.64	268.34	0.000023		o	o	***	***	***	***
T3	3	750	2371.07	284.19	0.011293	1.000000		o	***	***	***	***
T4	4	754	2384.60	251.52	0.194258	0.710630	1.000000		**	***	***	***
T5	5	751	2434.79	281.44	1.000000	0.000000	0.000170	0.006186		o	o	***
T6	6	750	2479.00	299.71	0.001127	0.000000	0.000000	0.000000	0.051205		o	o
T7	7	748	2464.29	306.20	0.028041	0.000000	0.000000	0.000000	0.601311	1.000000		o
T8	8	750	2500.91	268.31	0.000000	0.000000	0.000000	0.000000	0.000002	0.609050	0.051515	

FCR 10

Tab. No. 6a

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	914,38	34,46		o	o	o	o	o	o	o	o
T2	2	6	908,28	19,91	0,737682		o	o	o	o	o	o	o
T3	3	6	878,12	17,40	0,058816	0,097477		o	o	o	*	o	o
T4	4	6	913,41	28,01	0,952961	0,769876	0,062458		o	o	o	o	o
T5	5	6	891,30	38,82	0,222879	0,332568	0,423408	0,234983		o	o	o	o
T6	6	6	909,59	22,75	0,784493	0,936765	0,091125	0,815737	0,314381		o	o	o
T7	7	6	917,74	37,10	0,837369	0,611431	0,040993	0,804576	0,167922	0,653640		o	o
T8	8	6	900,06	17,06	0,441736	0,616287	0,211470	0,462570	0,593733	0,586340	0,350102		o

FCR 28

Tab. No. 6b

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1346,79	40,36		o	o	o	*	*	*	*	*
T2	2	6	1304,60	62,73	0,183408		o	o	o	o	o	o	o
T3	3	6	1312,55	59,31	0,251312	0,788273		o	o	o	o	o	o
T4	4	6	1283,64	49,53	0,054962	0,480351	0,361029		o	o	o	o	o
T5	5	6	1276,79	66,12	0,037533	0,379622	0,276021	0,817114		o	o	o	o
T6	6	6	1270,26	48,84	0,027210	0,307061	0,216136	0,683559	0,836504		o	o	o
T7	7	6	1276,76	29,83	0,040647	0,396440	0,287079	0,827949	0,999373	0,826189		o	o
T8	8	6	1267,83	39,65	0,024124	0,282160	0,196523	0,638318	0,785209	0,934625	0,777585		o

FCR 35

Tab. No. 6c

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1466,92	62,39		o	o	o	o	o	o	o	o
T2	2	6	1489,58	39,37	0,406741		o	o	o	*	o	o	o
T3	3	6	1474,61	53,21	0,763440	0,558921		o	o	o	o	o	o
T4	4	6	1457,55	18,40	0,714173	0,258405	0,531976		o	o	o	o	o
T5	5	6	1453,00	45,06	0,610122	0,207523	0,445508	0,858727		o	o	o	o
T6	6	6	1428,35	56,85	0,191398	0,042777	0,121870	0,314367	0,384379		o	o	o
T7	7	6	1436,51	26,47	0,294638	0,075980	0,196685	0,457587	0,545740	0,749921		o	o
T8	8	6	1448,90	29,80	0,524912	0,168238	0,375637	0,751486	0,872764	0,451727	0,627998		o

**FCR per 1 kg of weight gain 1 – 10 day**

**Tab. No. 7a**

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1070,68	44,94		o	o	o	o	o	o	o	o
T2	2	6	1064,77	24,52	0,789083		o	o	o	o	o	o	o
T3	3	6	1029,70	19,35	0,086367	0,126603		o	o	o	o	o	o
T4	4	6	1073,38	34,86	0,896403	0,707482	0,071194		o	o	o	o	o
T5	5	6	1043,81	50,19	0,252610	0,343291	0,496406	0,215842		o	o	o	o
T6	6	6	1065,61	28,93	0,806339	0,967723	0,126429	0,725129	0,341856		o	o	o
T7	7	6	1075,09	45,93	0,841907	0,660489	0,063481	0,933970	0,196010	0,679258		o	o
T8	8	6	1052,56	21,36	0,429331	0,555767	0,301550	0,375414	0,672626	0,554798	0,345406		o

**FCR per 1 kg of weight gain 11 – 28 day**

**Tab. No. 7b**

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1177,64	35,63		o	o	*	*	*	*	*	*
T2	2	6	1139,06	54,81	0,161987		o	o	o	o	o	o	o
T3	3	6	1151,11	51,19	0,305802	0,640173		o	o	o	o	o	o
T4	4	6	1119,98	43,18	0,043980	0,460139	0,258513		o	o	o	o	o
T5	5	6	1118,00	55,18	0,041530	0,444026	0,246218	0,938747		o	o	o	o
T6	6	6	1109,83	42,98	0,025923	0,325410	0,170462	0,729021	0,774944		o	o	o
T7	7	6	1115,30	26,62	0,036089	0,405029	0,220573	0,864858	0,916300	0,842542		o	o
T8	8	6	1110,41	36,47	0,025666	0,327024	0,171094	0,737497	0,782480	0,982108	0,849524		o

FCR per 1 kg of weight gain 29 – 35 day

Tab. No. 7c

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1759,12	211,10		o	o	o	o	o	o	o	o
T2	2	6	2015,09	387,77	0,143323		o	o	o	o	o	o	o
T3	3	6	1893,77	161,63	0,411891	0,470336		o	o	o	o	o	o
T4	4	6	1923,86	239,19	0,326998	0,578209	0,838988		o	o	o	o	o
T5	5	6	1937,80	232,00	0,295823	0,624878	0,780687	0,925018		o	o	o	o
T6	6	6	1855,30	298,05	0,516874	0,355566	0,807837	0,676145	0,623597		o	o	o
T7	7	6	1856,28	127,02	0,538920	0,352702	0,800144	0,669016	0,619356	0,994808		o	o
T8	8	6	1946,91	285,75	0,277827	0,645418	0,746306	0,884379	0,950986	0,592021	0,589772		o

FCR per 1 kg of weight gain 1 – 35 day

Tab. No. 7d

Treat.	Tr. No.	No. of box	Average (g)	Standard deviation	Duncan test								
					T1	T2	T3	T4	T5	T6	T7	T8	
T1	1	6	1495,10	65,20		o	o	o	o	o	o	o	o
T2	2	6	1519,00	40,79	0,401596		o	o	o	o	*	o	o
T3	3	6	1503,79	55,69	0,744699	0,568951		o	o	o	o	o	o
T4	4	6	1485,99	19,39	0,732580	0,264076	0,531914		o	o	o	o	o
T5	5	6	1480,83	46,83	0,616251	0,207385	0,437282	0,846761		o	o	o	o
T6	6	6	1455,27	59,28	0,195740	0,043202	0,119814	0,310164	0,387005		o	o	o
T7	7	6	1463,67	27,56	0,299037	0,076125	0,192547	0,450077	0,546650	0,752843		o	o
T8	8	6	1475,90	31,06	0,515788	0,161564	0,356816	0,723073	0,853179	0,468887	0,646765		o

**Performance results per replicate**

**Body weight per phases**

**Tab. No. 8a (page 1)**

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T1	1	4	130	45.38	130	309.62	126	1656.35	126	2345.24
		12	130	43.85	130	316.92	124	1721.37	123	2539.67
		20	130	45.23	130	313.08	124	1654.19	124	2361.83
		41	130	44.46	130	305.38	127	1608.66	125	2218.08
		49	130	45.62	130	304.23	127	1635.98	127	2552.20
		57	130	44.54	130	296.54	127	1726.06	127	2509.21
T2	2	5	130	45.31	130	313.85	126	1609.84	126	2263.49
		13	130	45.00	130	310.77	127	1696.69	127	2360.87
		21	130	45.38	130	306.15	127	1583.31	127	2326.56
		40	130	44.62	130	297.69	126	1808.33	126	2317.30
		48	130	44.92	130	308.08	126	1693.65	125	2378.40
		56	130	44.69	130	300.77	125	1714.08	125	2446.32
T3	3	6	130	45.54	130	306.15	124	1671.94	124	2334.11
		14	130	44.92	130	309.23	125	1674.00	125	2374.88
		22	130	45.85	130	310.38	125	1622.08	125	2352.96
		39	130	45.00	130	306.15	125	1904.80	124	2597.90
		47	130	45.15	130	305.38	127	1628.98	127	2213.94
		55	130	43.85	130	298.85	125	1588.48	125	2356.64
T4	4	7	130	45.62	130	308.46	127	1749.37	127	2444.72
		15	130	44.54	130	306.15	126	1581.35	126	2281.98
		23	130	45.08	130	302.31	126	1681.98	126	2510.86
		38	130	44.77	130	300.77	127	1807.48	125	2366.96
		46	130	45.62	130	303.08	126	1692.70	125	2369.04
		54	130	44.69	130	293.85	125	1657.92	125	2332.88

**Body weight per phases**

**Tab. No. 8a (page 2)**

Treatment	Tr. No.	Pen	Day 1		Day 10		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g
T5	5	8	130	45.46	130	303.85	126	1853.49	126	2527.46
		16	130	44.77	130	308.46	124	1711.45	124	2396.37
		24	130	45.00	130	322.31	125	1612.48	125	2432.80
		37	130	44.62	130	311.54	126	1848.57	126	2436.75
		45	130	45.08	130	299.23	127	1646.06	127	2286.54
		53	130	44.69	130	303.08	123	1803.58	123	2531.67
T6	6	9	130	45.38	130	303.08	125	1711.60	125	2470.56
		17	130	44.85	130	303.85	125	1798.08	125	2661.60
		25	130	45.08	130	316.15	125	1674.48	125	2406.72
		36	130	44.31	130	303.46	123	1893.90	122	2475.41
		44	130	45.15	130	307.31	127	1658.58	127	2284.72
		52	130	44.62	130	306.92	126	1787.54	126	2577.21
T7	7	10	130	45.15	130	317.69	124	1795.97	124	2496.37
		18	130	44.54	130	299.23	126	1650.71	126	2344.21
		26	130	45.15	130	317.31	125	1837.04	125	2589.36
		35	130	44.46	130	300.77	125	1824.40	125	2418.72
		43	130	44.85	130	302.31	123	1735.93	123	2531.06
		51	130	44.77	130	301.92	125	1704.08	125	2408.29
T8	8	11	130	45.08	130	314.62	124	1819.19	124	2505.73
		19	130	44.85	130	311.92	126	1724.05	126	2463.73
		27	130	45.23	130	316.92	127	1821.89	126	2619.68
		34	130	44.85	130	308.46	127	1870.63	127	2404.49
		42	130	45.15	130	308.85	124	1735.00	123	2484.31
		50	130	44.23	130	299.23	124	1758.47	124	2528.40



Weight gain per phases (WG) and daily weight gain

Tab. No. 8b (page 1)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 28		Day 29 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T1	1	4	264.24	26.42	1346.73	74.82	688.89	86.11	2299.86	65.71
		12	273.07	27.31	1404.45	78.02	818.30	102.29	2495.82	71.31
		20	267.85	26.78	1341.12	74.51	707.64	88.45	2316.60	66.19
		41	260.92	26.09	1303.28	72.40	609.42	76.18	2173.62	62.10
		49	258.61	25.86	1331.75	73.99	916.22	114.53	2506.58	71.62
		57	252.00	25.20	1429.52	79.42	783.15	97.89	2464.67	70.42
T2	2	5	268.54	26.85	1296.00	72.00	653.65	81.71	2218.18	63.38
		13	265.77	26.58	1385.92	77.00	664.17	83.02	2315.87	66.17
		21	260.77	26.08	1277.15	70.95	743.25	92.91	2281.18	65.18
		40	253.07	25.31	1510.64	83.92	508.97	63.62	2272.68	64.93
		48	263.16	26.32	1385.57	76.98	684.75	85.59	2333.48	66.67
		56	256.08	25.61	1413.31	78.52	732.24	91.53	2401.63	68.62
T3	3	6	260.61	26.06	1365.78	75.88	662.18	82.77	2288.57	65.39
		14	264.31	26.43	1364.77	75.82	700.88	87.61	2329.96	66.57
		22	264.53	26.45	1311.70	72.87	730.88	91.36	2307.11	65.92
		39	261.15	26.12	1598.65	88.81	693.10	86.64	2552.90	72.94
		47	260.23	26.02	1323.59	73.53	584.96	73.12	2168.79	61.97
		55	255.00	25.50	1289.63	71.65	768.16	96.02	2312.79	66.08
T4	4	7	262.84	26.28	1440.91	80.05	695.35	86.92	2399.10	68.55
		15	261.61	26.16	1275.20	70.84	700.63	87.58	2237.44	63.93
		23	257.23	25.72	1379.68	76.65	828.87	103.61	2465.78	70.45
		38	256.00	25.60	1506.71	83.71	559.48	69.93	2322.19	66.35
		46	257.46	25.75	1389.62	77.20	676.34	84.54	2323.42	66.38
		54	249.16	24.92	1364.07	75.78	674.96	84.37	2288.19	65.38

Weight gain per phases (WG) and daily weight gain

Tab. No. 8b (page 2)

Treatment	Tr. No.	Box	Day 1 - 10		Day 11 - 28		Day 29 - 35		Day 1 - 35	
			WG	DWG	WG	DWG	WG	DWG	WG	DWG
			g	g	g	g	g	g	g	g
T5	5	8	258.39	25.84	1549.65	86.09	673.97	84.25	2482.00	70.91
		16	263.69	26.37	1402.99	77.94	684.92	85.61	2351.60	67.19
		24	277.31	27.73	1290.17	71.68	820.32	102.54	2387.80	68.22
		37	266.92	26.69	1537.03	85.39	588.17	73.52	2392.13	68.35
		45	254.15	25.42	1346.83	74.82	640.47	80.06	2241.46	64.04
		53	258.39	25.84	1500.50	83.36	728.09	91.01	2486.98	71.06
T6	6	9	257.70	25.77	1408.52	78.25	758.96	94.87	2425.18	69.29
		17	259.00	25.90	1494.23	83.01	863.52	107.94	2616.75	74.76
		25	271.07	27.11	1358.33	75.46	732.24	91.53	2361.64	67.48
		36	259.15	25.92	1590.44	88.36	581.51	72.69	2431.10	69.46
		44	262.16	26.22	1351.27	75.07	626.14	78.27	2239.57	63.99
		52	262.30	26.23	1480.62	82.26	789.67	98.71	2532.59	72.36
T7	7	10	272.54	27.25	1478.28	82.13	700.40	87.55	2451.22	70.03
		18	254.69	25.47	1351.48	75.08	693.49	86.69	2299.67	65.70
		26	272.16	27.22	1519.73	84.43	752.32	94.04	2544.21	72.69
		35	256.31	25.63	1523.63	84.65	594.32	74.29	2374.26	67.84
		43	257.46	25.75	1433.63	79.65	795.12	99.39	2486.21	71.03
		51	257.15	25.72	1402.16	77.90	704.21	88.03	2363.52	67.53
T8	8	11	269.54	26.95	1504.58	83.59	686.53	85.82	2460.65	70.30
		19	267.07	26.71	1412.12	78.45	739.68	92.46	2418.88	69.11
		27	271.69	27.17	1504.97	83.61	797.79	99.72	2574.45	73.56
		34	263.61	26.36	1562.17	86.79	533.86	66.73	2359.64	67.42
		42	263.70	26.37	1426.15	79.23	749.31	93.66	2439.16	69.69
		50	255.00	25.50	1459.24	81.07	769.94	96.24	2484.17	70.98

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 28	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T1	1	4	906.83	1381.37	1529.75
		12	873.79	1317.29	1415.04
		20	921.38	1351.21	1491.75
		41	879.09	1358.71	1543.59
		49	955.75	1389.41	1411.68
		57	949.42	1282.75	1409.70
T2	2	5	884.80	1364.44	1530.02
		13	925.74	1330.49	1480.89
		21	891.96	1365.27	1481.77
		40	917.31	1201.84	1543.70
		48	896.38	1272.12	1449.73
		56	933.50	1293.43	1451.36
T3	3	6	864.32	1316.21	1488.99
		14	898.01	1334.55	1475.13
		22	852.54	1324.07	1471.24
		39	894.47	1195.59	1390.78
		47	879.09	1345.57	1557.12
		55	880.31	1359.32	1464.42
T4	4	7	895.26	1288.52	1465.89
		15	909.55	1341.59	1479.23
		23	885.50	1317.56	1425.25
		38	907.93	1199.91	1466.53
		46	916.24	1259.29	1452.48
		54	965.97	1294.97	1455.91

Feed conversion per 1 kg of live weight

Tab. No. 8c (page 2)

Treatment	Tr. No.	Box	Feed conversion ratio		
			Day 10	Day 28	Day 35
			g/kg live weight	g/kg live weight	g/kg live weight
T5	5	8	926.58	1248.41	1430.44
		16	895.26	1319.56	1491.47
		24	847.26	1349.82	1431.39
		37	841.98	1174.32	1437.79
		45	933.16	1324.80	1523.65
		53	903.55	1243.84	1403.26
T6	6	9	928.93	1311.10	1439.70
		17	921.52	1256.48	1335.47
		25	878.35	1307.29	1433.13
		36	935.36	1181.99	1442.35
		44	903.63	1299.88	1510.79
		52	889.72	1264.82	1408.69
T7	7	10	891.04	1258.90	1425.77
		18	897.17	1294.20	1439.26
		26	880.00	1243.12	1397.63
		35	979.54	1248.94	1447.13
		43	918.58	1309.14	1431.16
		51	940.13	1306.28	1478.07
T8	8	11	897.31	1257.75	1443.42
		19	877.93	1298.84	1444.69
		27	888.35	1262.45	1400.78
		34	927.68	1200.43	1486.33
		42	901.62	1314.73	1474.39
		50	907.46	1272.78	1443.81

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

**Tab. No. 8d (page 1)**

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-28	Day 29-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T1	1	4	1062.57	1211.37	1896.31	1560.31
		12	1014.10	1154.48	1628.18	1440.53
		20	1076.96	1175.19	1832.54	1521.52
		41	1028.89	1192.44	2048.15	1575.38
		49	1124.35	1211.90	1452.39	1437.59
		57	1117.22	1120.43	1697.16	1435.29
T2	2	5	1034.10	1191.36	1948.76	1561.67
		13	1082.49	1161.22	1874.33	1509.84
		21	1047.18	1193.38	1736.36	1511.43
		40	1079.05	1050.50	2792.76	1574.30
		48	1049.39	1109.16	1905.06	1477.94
		56	1096.42	1128.73	1833.28	1478.81
T3	3	6	1015.35	1155.53	1938.86	1519.39
		14	1050.63	1167.08	1820.57	1504.13
		22	1000.31	1159.32	1807.14	1501.07
		39	1048.60	1050.59	1946.36	1415.78
		47	1031.61	1181.08	2160.45	1589.72
		55	1031.69	1193.04	1689.23	1492.65
T4	4	7	1050.65	1130.90	1922.77	1493.95
		15	1064.40	1165.22	1798.82	1509.03
		23	1040.68	1157.95	1649.78	1451.66
		38	1066.71	1048.77	2360.97	1495.10
		46	1078.60	1094.72	1947.57	1481.33
		54	1139.23	1122.35	1863.22	1484.87

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

**Tab. No. 8d (page 2)**

Treatment	Tr. No.	Box	Feed conversion ratio			
			Day 1-10	Day 11-28	Day 29-35	Day 1-35
			g/kg weight gain	g/kg weight gain	g/kg weight gain	g/kg weight gain
T5	5	8	1089.60	1095.88	1944.18	1456.97
		16	1047.26	1156.19	1935.71	1520.55
		24	984.74	1178.98	1596.45	1458.91
		37	982.73	1032.45	2291.19	1464.83
		45	1098.68	1155.44	2046.96	1554.48
		53	1059.83	1089.09	1812.29	1429.26
T6	6	9	1092.52	1145.09	1738.17	1467.17
		17	1081.10	1099.98	1505.47	1358.75
		25	1024.42	1140.04	1729.49	1461.01
		36	1095.29	1029.55	2332.16	1469.43
		44	1059.26	1132.98	2083.75	1541.41
		52	1041.07	1111.35	1742.75	1433.86
T7	7	10	1038.65	1099.07	1867.59	1452.68
		18	1054.07	1131.28	1794.46	1467.46
		26	1025.99	1089.93	1786.47	1422.89
		35	1149.45	1086.19	2074.30	1474.69
		43	1078.59	1147.00	1708.59	1457.71
		51	1103.80	1138.30	1906.25	1506.60
T8	8	11	1047.39	1099.91	1949.96	1470.58
		19	1025.36	1139.55	1793.99	1471.82
		27	1036.24	1108.16	1725.85	1425.60
		34	1085.51	1047.41	2510.32	1514.77
		42	1055.99	1151.45	1854.70	1502.44
		50	1064.85	1115.99	1846.61	1470.20

**Feed consumption per phases**

**Tab. No. 8e (page 1)**

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-28)	Finisher (D 29-35)	Total (D 1-35)
			kg	kg	kg	kg
T1	1	4	36.50	259.70	164.60	460.80
		12	36.00	254.90	164.90	455.80
		20	37.50	250.00	160.80	448.30
		41	34.90	249.90	157.30	442.10
		49	37.80	257.70	169.00	464.50
		57	36.60	252.30	168.80	457.70
T2	2	5	36.10	248.10	160.50	444.70
		13	37.40	256.20	158.10	451.70
		21	35.50	246.10	163.90	445.50
		40	35.50	246.10	179.10	460.70
		48	35.90	244.00	163.50	443.40
		56	36.50	249.80	167.80	454.10
T3	3	6	34.40	247.00	159.20	440.60
		14	36.10	251.20	159.50	446.80
		22	34.40	241.70	165.10	441.20
		39	35.60	257.60	167.70	460.90
		47	34.90	250.20	160.50	445.60
		55	34.20	245.00	162.20	441.40
T4	4	7	35.90	257.20	169.80	462.90
		15	36.20	238.80	158.80	433.80
		23	34.80	252.10	172.30	459.20
		38	35.50	246.00	165.10	446.60
		46	36.10	239.80	166.50	442.40
		54	36.90	239.60	157.20	433.70

**Feed consumption per phases**

**Tab. No. 8e (page 2)**

Treatment	Tr. No.	Box	Feed consumption			
			Starter (D 1-10)	Grower (D 11-28)	Finisher (D 29-35)	Total (D 1-35)
			kg	kg	kg	kg
T5	5	8	36.60	262.60	165.10	464.30
		16	35.90	253.70	164.40	454.00
		24	35.50	244.60	163.70	443.80
		37	34.10	247.80	169.80	451.70
		45	36.30	247.30	166.50	450.10
		53	35.60	250.20	162.30	448.10
T6	6	9	36.60	252.10	164.90	453.60
		17	36.40	255.50	162.50	454.40
		25	36.10	245.70	158.30	440.10
		36	36.90	248.90	165.00	450.80
		44	36.10	244.70	165.70	446.50
		52	35.50	256.70	173.40	465.60
T7	7	10	36.80	252.70	162.20	451.70
		18	34.90	242.00	156.80	433.70
		26	36.30	257.90	168.00	462.20
		35	38.30	255.30	154.10	447.70
		43	36.10	255.00	167.10	458.20
		51	36.90	249.70	167.80	454.40
T8	8	11	36.70	255.40	166.00	458.10
		19	35.60	254.30	167.20	457.10
		27	36.60	262.50	174.00	473.10
		34	37.20	254.30	170.20	461.70
		42	36.20	254.90	172.40	463.50
		50	35.30	250.90	176.30	462.50