



MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE ÚSTRAŠICE

státní podnik

390 02 Tábor 2

Česká republika

BROILER FEEDING TEST No. 7/2025

Investigation of the effects of a probiotic cocktail in broiler chickens

9 April – 14 May 2025

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Aim of the project

Investigation of the effects of a probiotic cocktail in broiler chickens.

Basic tests information

The basic dates

Beginning of the test: 9 April 2025

End of the test: 14 May 2025

Location of the test

Mezinárodní testování drůbeže s.p., Ústrašice

Material and methods

Material

In total there were 800 day old chicks (males) of xxxxxx. Day old chicks were randomly distributed into 4 treatments (10 pens for sample).

Experimental treatments

Treat. No.	Treatment	Product	Replications
1	xxxxxx	nothing	10
2	xxxxxx	bacterial ecology	10
3	xxxxxx	bacterial ekology	10
4	xxxxxx	bacterial ecology	10

Origin of hatching eggs: Mezinárodní testování drůbeže s.p., Ústrašice

Housing system

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

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

Veterinary precautions

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

Feed

Feed was produced in Mezinárodní testování drůbeže, s.p.

Day 1 – 14 Starter (BR1)

Day 15 – 28 Grower (BR2)

Day 29 – 35 Finisher (BR3)

Diet formulas

Components (%)	Starter BR1	Grower BR2	Finisher BR3
Maize	60.65	68.36	70.22
Soybean meal	30.41	27.00	23.60
Dried distillers maize grains	4.00	-	-
Soybean oil	2.00	2.00	3.61
MCP	1.08	0.76	0.79
Limestone	0.26	0.27	0.30
Salt	0.15	0.15	0.15
Na ₂ CO ₃	0.10	0.15	0.15
L-lysine HCl	0.42	0.37	0.32
DL-methionine	0.32	0.29	0.24
L-threonine	0.11	0.16	0.12
Premix AMVBR1 Plus	0.50	-	-
Premix AMVBR2 Plus	-	0.50	-
Premix AMVBR3 Plus	-	-	0.50
Nutrient content			
Crude protein (g/kg)	192.79	172.40	158.70
ME (MJ/kg)	11.90	12.23	12.68
Lysine (g/kg)	13.23	11.80	10.54
Methionine (g/kg)	8.44	7.41	6.49
Met.+Cys. (g/kg)	11.77	10.50	9.39
Ca (g/kg)	4.90	4.18	4.22
P dig. (g/kg)	4.52	3.69	3.71
Na (g/kg)	1.40	1.47	1.42

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

Nutrient content	Starter BR1	Grower BR2	Finisher BR3
Crude protein (g/kg)	200	178	172
Dry matter (%)	89.50	89.70	89.80
Fat (g/kg)	67.60	48.00	66.10
Ash (g/kg)	43.80	35.50	35.50
Starch (g/kg)	417	494	484
Reducing sugars (g/kg)	43.40	43.30	40.30
Phosphorus (g/kg)	6.45	5.05	4.99
Calcium (g/kg)	5.94	3.76	4.11
ME (MJ/kg)	12.90	13.20	13.50

Parameters recorded and methods applied

Live weight

Live weight was measured on days 1 (all the birds in each pen were weighed altogether). On day 3 each chicken was marked with a wing mark. Chick were individual weighed on days 3, 7, 14, 21, 28 and 35.

Weight gain

Weight gain per phase and average daily weight gains were calculated for the periods 3 – 7 days, 8 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and for the overall experiment (3 – 35 days).

Feed conversion ratio

Feed consumption and feed conversion ratio to gain ratio were calculated for the periods 1 – 3 days, 4 – 7 days, 8 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and for the overall experiment (1 – 35 days). The calculation was included weight of deaths.

Feed consumption

Feed consumption was measured per pen for the feed – starter (1 – 3 days, 4 – 7 days, 8 – 14 days), grower (15 – 21 days, 22 – 28 days) and finisher (29 – 35 days).

Mortality

All pens were checked twice a day to see if there were any dead or ill birds. Dead chickens were registered by date and reason of mortality on the day of death. Mortality was recorded for the periods 1 – 7 days, 8 – 14 days, 15 – 21 days, 22 – 28 days, 29 – 35 days and 1 – 35 days.

Statistical analyses

Performance results of live weight (on days 1, 3, 7, 14, 21, 28 and 35), daily weight gain 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 ratio per 1 kg of live weight

2d Feed consumption per 1 kg of weight gain

2e Feed consumption

3 Mortality

4 Carcass analysis

5 Foot pad lesions

6 Litter scoring

7 Statistical analysis of body weight at the age of 35 days

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

8 - 11 Statistical analyses of performance results

12 Performance results per pen:

12a Body weight

12b Weight gain

12c Feed conversion ratio per 1 kg of live weight

12d Feed consumption per 1 kg of weight gain

12e Feed consumption

12f Foot pad lesions

12g Litter scoring

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	93.30	84.30	90.35	200	69.00	45.95
T2	2				200		45.72
T3	3				200		45.72
T4	4				200		46.43

Body weight per phases

Tab. No. 2a

Treatment	Tr. No.	Day 1		Day 3		Day 7		Day 14		Day 21		Day 28		Day 35	
		Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
			g		g		g		g		g		g		g
T1	1	200	45.95	200	85.04	159	182.41	159	523.52	159	1005.27	158	1657.38	137	2185.62
T2	2	200	45.72	200	87.93	160	184.69	160	521.27	160	1012.02	157	1660.27	136	2177.72
T3	3	200	45.72	200	85.43	158	178.28	156	511.62	153	1000.13	153	1660.82	130	2216.41
T4	4	200	46.43	200	87.62	159	181.48	157	520.47	154	1006.60	154	1644.56	133	2209.98

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

Treatment	Tr. No.	Day 3 - 7	Day 8 - 14	Day 15 - 21	Day 22 - 28	Day 29 - 35	Day 3 - 35
		Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
		g	g		g	g	g
T1	1	97.21	341.11	481.75	647.47	525.59	2100.46
T2	2	97.09	336.58	490.75	648.05	523.25	2090.26
T3	3	92.99	333.05	487.50	660.69	564.68	2131.13
T4	4	93.81	338.15	485.22	637.96	573.41	2122.63

Feed conversion ratio (Feed consumption per 1 kg of live weight)

Tab. No. 2c

Treatment	Tr. No.	Feed conversion ratio					
		Day 3	Day 7	Day 14	Day 21	Day 28	Day 35
		g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW
T1	1	349.84	972.37	1065.16	1233.17	1334.02	1520.24
T2	2	272.96	959.57	1034.39	1214.54	1318.69	1530.35
T3	3	257.54	861.95	1063.82	1216.88	1338.51	1516.61
T4	4	202.58	849.71	1061.29	1221.28	1338.70	1520.09

Feed consumption per 1 kg of weight gain (WG)**Tab. No. 2d**

Treatment	Tr. No.	Feed consumption per 1 kg of weight gain						
		1-3 days	4-7 days	8-14 days	15-21 days	22-28 days	29-35 days	1-35 days
		g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	760.97	1521.12	1127.27	1431.76	1498.77	2112.86	1560.75
T2	2	568.65	1578.27	1085.94	1423.20	1492.66	2215.39	1570.85
T3	3	554.09	1419.17	1201.49	1396.92	1534.06	2062.06	1557.33
T4	4	430.88	1457.27	1205.52	1410.67	1535.53	2051.03	1561.18

Feed consumption per phases

Tab. No. 2e

Treatment	Tr. No.	Feed consumption						
		Starter (day 1-3)	Starter (day 4-7)	Starter (day 8-14)	Grower (day 15-21)	Grower (day 22-28)	Finisher (day 29-35)	Total
		kg	kg	kg	kg	kg		kg
T1	1	5.95	29.35	61.14	109.67	153.33	178.90	538.34
T2	2	4.80	30.80	58.48	111.75	151.45	185.45	542.73
T3	3	4.40	26.30	62.75	104.33	155.07	177.50	530.35
T4	4	3.55	27.20	64.00	106.39	150.86	184.25	536.25

Mortality

Tab. No. 3

Treatment	Tr. No.	Mortality in the period													Mortality according causes														
		Day 1 – 7		Day 8 - 14		Day 15 - 21		Day 22- 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	birds	g	birds	g	%															
T1	1	1	40	0	0	0	0	1	276	1	914	3	1230	1.50										2			1		60
T2	2	0	0	0	0	0	0	3	2723	1	1646	4	4369	2.00										4					60
T3	3	2	200	2	582	3	1479	0	0	3	5462	10	7723	5.00										3	6		1		60
T4	4	1	81	2	231	3	2115	0	0	1	2116	7	4543	3.50										3	3		1		60

Causes:	1 – Viral diseases	6 – Wounds	11 – Sudden death syndrome
	2 – Bacterial diseases	7 – Digestive track diseases	12 – Cannibalism
	3 – Moulds diseases	8 – Respiratory tract diseases	13 – Yolk sac. infam.
	4 – Parasitary diseases	9 – Reproduction tract diseases	14 – Culling and other causes
	5 – Tumors	10 – Locomotion apparatus diseases	15 – Sampling (excluded of calculation)

Results of carcass analysis

Tab. No. 4

Treatment	Tr. No.	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
		g	g	g	g			Total weight	Body carcass		Total weight	Body carcass		Total weight	Body carcass		
		g	g	g	g	%	g	%	%	g	%	%	g	%	%	%	%
T1	1	2277	1615	140	34	1.48	529	23.22	32.74	497	21.82	30.77	1026	45.05	63.51	70.93	77.08
T2	2	2353	1657	145	38	1.60	551	23.39	33.23	505	21.45	30.47	1055	44.84	63.70	70.40	76.54
T3	3	2290	1615	145	35	1.52	527	23.03	32.66	497	21.69	30.76	1024	44.72	63.42	70.52	76.85
T4	4	2275	1611	143	37	1.60	537	23.62	33.34	487	21.41	30.22	1024	45.03	63.56	70.84	77.14

Foot pad lesions

Tab. No. 5

Treatment	Tr. No.	Evaluation	
		right foot	left foot
T1	1	0.23	0.08
T2	2	0.32	0.11
T3	3	0.15	0.08
T4	4	0.17	0.05

Litter scoring**Tab. No. 6**

Treatment	Tr. No.	Day 14	Day 21	Day 28	Day 35
T1	1	1.30	2.30	1.90	1.70
T2	2	1.60	2.60	1.70	1.40
T3	3	1.50	2.40	1.60	1.60
T4	4	1.40	2.20	1.60	1.60

Bedding: day 23 and 30

Statistical analysis - Body weight at 35 days of age**Tab. No. 7**

Treatment	Tr. No.	Cocks			
		Number of birds	Average body weight	Standard deviation	Coefficient of variation
			g/birds	g/birds	%
T1	1	137	2185.62	308.51	14.12
T2	2	136	2177.72	290.36	13.33
T3	3	130	2216.41	273.47	12.34
T4	4	133	2209.98	204.26	9.24

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
T1	1	10	45.95	1.12		o	o	o
T2	2	10	45.72	0.99	0.667721		o	o
T3	3	10	45.72	0.99	0.647224	1.000000		o
T4	4	10	46.43	1.24	0.331398	0.195665	0.180549	

Body weight - day 3

Tab. No. 8b

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	200	85.04	6.90		***	o	***
T2	2	200	87.93	7.13	0.000162		***	o
T3	3	200	85.43	7.96	0.598605	0.000917		**
T4	4	200	87.62	7.23	0.000615	0.676660	0.002693	

Body weight - day 7**Tab. No. 8c**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	159	182.41	18.59		o	o	o
T2	2	160	184.69	18.12	0.761289		*	o
T3	3	158	178.28	20.54	0.286618	0.027978		o
T4	4	159	181.48	18.27	0.979130	0.513014	0.516782	

Body weight - day 14**Tab. No. 8d**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	159	523.52	60.66		o	o	o
T2	2	160	521.27	61.71	1.000000		o	o
T3	3	156	511.62	57.74	0.071526	0.324881		o
T4	4	157	520.47	42.16	0.817989	1.000000	1.000000	

Body weight - day 21**Tab. No. 8e**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	159	1005.27	128.65		o	o	o
T2	2	160	1012.02	114.29	1.000000		o	o
T3	3	153	1000.13	104.34	0.312902	0.377427		o
T4	4	154	1006.60	81.59	1.000000	1.000000	1.000000	

Body weight - day 28**Tab. No. 8f**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	158	1657.38	207.02		o	o	o
T2	2	157	1660.27	206.26	1.000000		o	o
T3	3	153	1660.82	176.18	1.000000	1.000000		o
T4	4	154	1644.56	138.68	0.145416	0.340890	1.000000	

Body weight - day 35**Tab. No. 8g**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	137	2185.62	308.51		o	o	o
T2	2	136	2177.72	290.36	1.000000		o	o
T3	3	130	2216.41	273.47	1.000000	1.000000		o
T4	4	133	2209.98	204.26	1.000000	1.000000	1.000000	

Average weight gain (day 3-7)**Tab. No. 9a**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	159	97.21	14.12		o	o	o
T2	2	160	97.09	13.82	0.999886		o	o
T3	3	158	92.99	14.91	0.072995	0.085895		o
T4	4	159	93.81	13.93	0.206315	0.234131	0.967572	

Average weight gain (day 8-14)**Tab. No. 9b**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	159	341.11	45.36		o	o	o
T2	2	160	336.58	46.74	1.000000		o	o
T3	3	156	333.05	42.09	0.050308	1.000000		o
T4	4	157	338.15	31.59	0.478008	1.000000	1.000000	

Average weight gain (day 15-21)**Tab. No. 9c**

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	159	481.75	80.52		o	o	o
T2	2	160	490.75	62.74	1.000000		o	o
T3	3	153	487.50	60.23	1.000000	1.000000		o
T4	4	154	485.22	49.59	1.000000	0.574608	1.000000	

Average weight gain (day 22-28)

Tab. No. 9d

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	158	647.47	111.70		o	o	o
T2	2	157	648.05	129.81	1.000000		o	**
T3	3	153	660.69	99.10	1.000000	1.000000		*
T4	4	154	637.96	77.87	0.075375	0.008739	0.010272	

Average weight gain (day 29-35)

Tab. No. 9e

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Scheffe test			
					T1	T2	T3	T4
T1	1	137	525.59	150.85		o	o	o
T2	2	136	523.25	152.17	0.999366		o	*
T3	3	130	564.68	151.19	0.182424	0.142523		o
T4	4	133	573.41	121.61	0.061843	0.045178	0.970924	

Average weight gain (day 3-35)

Tab. No. 9f

Treatment	Treat. No.	Birds	Average (g)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	137	2100.46	306.66		o	o	o
T2	2	136	2090.26	289.21	1.000000		o	o
T3	3	130	2131.13	271.03	1.000000	1.000000		o
T4	4	133	2122.63	202.95	1.000000	1.000000	1.000000	

FCR 3**Tab. No. 10a**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	10	349.75	174.45		o	o	o
T2	2	10	274.04	70.25	1.000000		o	o
T3	3	10	257.83	88.15	1.000000	1.000000		o
T4	4	10	202.40	45.85	0.123874	0.267626	1.000000	

FCR 7**Tab. No. 10b**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	973.23	83.80		o	*	*
T2	2	10	959.74	84.65	0.758779		*	*
T3	3	10	861.90	86.95	0.019740	0.031168		o
T4	4	10	851.03	127.53	0.013113	0.022684	0.804698	

FCR 14**Tab. No. 10c**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	10	1067.31	58.31		o	o	o
T2	2	10	1037.47	67.62	1.000000		o	o
T3	3	10	1064.02	41.27	1.000000	1.000000		o
T4	4	10	1061.57	25.28	1.000000	1.000000	1.000000	

FCR 21**Tab. No. 10d**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1234.06	32.95		o	o	o
T2	2	10	1215.37	35.33	0.276594		o	o
T3	3	10	1217.64	43.20	0.321767	0.883569		o
T4	4	10	1221.27	22.94	0.411428	0.721047	0.814586	

FCR 28**Tab. No. 10e**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1335.11	30.80		o	o	o
T2	2	10	1320.26	42.90	0.364714		o	o
T3	3	10	1339.79	33.35	0.787913	0.279599		o
T4	4	10	1339.77	36.47	0.774834	0.263179	0.999260	

FCR 35**Tab. No. 10f**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1522.16	41.24		o	o	o
T2	2	10	1530.83	40.29	0.668376		o	o
T3	3	10	1519.16	52.88	0.889619	0.602104		o
T4	4	10	1521.21	43.85	0.962481	0.655638	0.919299	

FCR weight gain - day 1-3**Tab. No. 11a**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	10	766.30	405.30		o	o	o
T2	2	10	572.75	154.41	1.000000		o	o
T3	3	10	557.13	190.11	1.000000	1.000000		o
T4	4	10	430.45	97.11	0.151368	0.365189	0.975758	

FCR weight gain - day 4-7**Tab. No. 11b**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1524.64	197.45		o	o	o
T2	2	10	1579.52	148.40	0.576323		o	o
T3	3	10	1422.23	232.20	0.328667	0.148431		o
T4	4	10	1461.78	272.78	0.522496	0.261828	0.686930	

FCR weight gain - day 8-14**Tab. No. 11c**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1130.96	70.53		o	o	o
T2	2	10	1092.09	105.31	0.312668		**	**
T3	3	10	1201.66	74.67	0.070770	0.008851		o
T4	4	10	1204.97	84.65	0.072413	0.008647	0.930974	

FCR weight gain - day 15-21**Tab. No. 11d**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Kruskal-Wallis test			
					T1	T2	T3	T4
T1	1	10	1431.17	26.95		o	o	o
T2	2	10	1423.70	73.67	1.000000		o	o
T3	3	10	1399.36	76.98	1.000000	1.000000		o
T4	4	10	1410.35	45.84	1.000000	1.000000	1.000000	

FCR weight gain - day 22-28**Tab. No. 11e**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1500.61	60.78		o	o	o
T2	2	10	1507.72	143.94	0.878644		o	o
T3	3	10	1539.76	81.56	0.430835	0.492195		o
T4	4	10	1542.37	107.46	0.417640	0.485396	0.955261	

FCR weight gain – day29-35**Tab. No. 11f**

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	2124.60	123.52		o	o	o
T2	2	10	2226.79	201.15	0.228876		o	o
T3	3	10	2089.00	222.74	0.672421	0.127113		o
T4	4	10	2061.27	184.37	0.480744	0.076834	0.741693	

FCR weight gain - day 1-35

Tab. No. 11g

Treatment	Treat. No.	No. of box	Average (g/kg live weight)	Standard deviation	Duncan test			
					T1	T2	T3	T4
T1	1	10	1562.98	44.76		o	o	o
T2	2	10	1571.41	42.40	0.695753		o	o
T3	3	10	1560.25	56.68	0.906097	0.640100		o
T4	4	10	1562.42	46.16	0.979599	0.695932	0.919872	

Body weight (BW) per box

Tab. No. 12a (page 1)

Treatment	Tr. No.	Box No.	Day 1		Day 3		Day 7		Day 14		Day 21		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g		g		g		g
T1	1	1	20	45.25	20	87.45	16	192.25	16	545.63	16	1048.50	16	1732.19	14	2228.43
		2	20	45.25	20	85.30	16	189.63	16	553.00	16	1066.19	16	1777.88	14	2416.21
		9	20	47.50	20	84.10	16	182.31	16	533.38	16	984.31	16	1576.63	14	2005.64
		10	20	47.60	20	80.60	16	162.44	16	431.56	16	864.75	16	1449.81	13	2025.85
		17	20	45.25	20	83.90	16	174.38	16	477.88	16	914.38	15	1580.87	13	2026.00
		18	20	47.60	20	82.55	16	178.00	16	516.25	16	1017.31	16	1699.25	14	2341.14
		25	20	45.25	20	85.95	16	184.44	16	545.19	16	1045.19	16	1678.19	14	2233.50
		26	20	45.25	20	86.30	15	183.73	15	538.33	15	1027.53	15	1693.07	13	2210.08
		33	20	45.25	20	89.05	16	188.31	16	544.06	16	1021.56	16	1655.63	14	2115.50
		34	20	45.25	20	85.20	16	188.69	16	550.88	16	1064.38	16	1727.75	14	2232.79
T2	2	3	20	45.25	20	86.15	16	176.75	16	469.81	16	962.56	16	1633.19	14	2120.64
		4	20	47.60	20	85.55	16	168.00	16	457.69	16	909.19	16	1535.69	14	2108.36
		11	20	47.60	20	91.55	16	190.38	16	525.63	16	996.19	16	1667.19	14	2155.93
		12	20	45.25	20	88.95	16	183.63	16	511.25	16	986.13	16	1673.56	14	2217.21
		19	20	45.25	20	89.45	16	195.19	16	564.94	16	1050.75	16	1743.25	14	2218.86
		20	20	45.25	20	84.45	16	181.81	16	530.56	16	1025.69	16	1717.38	13	2194.15
		27	20	45.25	20	88.15	16	188.25	16	536.25	16	1047.75	15	1517.20	13	2167.92
		28	20	45.25	20	88.90	16	189.56	16	545.06	16	1049.75	15	1675.20	13	2144.00
		35	20	45.25	20	88.30	16	188.75	16	557.25	16	1085.25	15	1796.33	13	2348.38
		36	20	45.25	20	87.80	16	184.63	16	514.25	16	1006.94	16	1644.25	14	2112.00

Body weight (BW) per box

Tab. No. 12a (page 2)

Treatment	Tr. No.	Box No.	Day 1		Day 3		Day 7		Day 14		Day 21		Day 28		Day 35	
			Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight	Birds	Average body weight
				g		g		g		g		g		g		g
T3	3	5	20	45.25	20	83.05	16	177.06	15	503.07	13	1048.54	13	1748.00	11	2321.36
		6	20	45.25	20	82.35	16	160.31	16	448.06	16	908.38	16	1601.19	13	2226.08
		13	20	45.25	20	86.95	16	180.19	16	521.44	16	996.69	16	1657.75	14	2259.71
		14	20	47.60	20	87.85	16	189.13	16	535.94	16	1032.81	16	1760.88	13	2449.69
		21	20	45.25	20	87.50	16	181.69	16	511.75	16	1006.69	16	1650.31	13	2059.46
		22	20	45.25	20	84.20	15	174.73	15	496.93	14	953.00	14	1529.14	12	1948.33
		29	20	45.25	20	88.55	15	187.13	14	545.79	14	1044.64	14	1732.50	12	2351.67
		30	20	45.25	20	89.55	16	184.31	16	530.06	16	1016.94	16	1646.50	14	2198.07
		37	20	47.60	20	87.05	16	184.19	16	540.81	16	1042.00	16	1714.31	14	2240.36
		38	20	45.25	20	77.20	16	164.38	16	485.19	16	960.38	16	1576.44	14	2119.00
T4	4	7	20	45.25	20	85.80	16	171.13	16	495.06	15	973.20	15	1534.27	13	2023.69
		8	20	47.60	20	88.55	16	178.81	16	499.44	16	980.63	16	1590.75	14	2171.64
		15	20	45.25	20	87.85	16	184.00	16	518.38	16	989.88	16	1616.00	14	2220.14
		16	20	47.60	20	85.60	16	173.94	15	521.13	15	1023.00	15	1702.07	13	2343.23
		23	20	45.25	20	88.90	16	187.94	15	548.33	15	1059.73	15	1722.87	13	2209.62
		24	20	45.25	20	85.50	16	181.50	16	501.31	16	975.00	16	1610.50	14	2112.71
		31	20	45.25	20	86.80	15	184.40	15	525.87	14	1017.86	14	1629.14	11	2200.36
		32	20	47.60	20	88.45	16	182.81	16	530.69	16	1009.69	16	1648.50	14	2211.86
		39	20	47.60	20	88.75	16	186.69	16	538.31	15	1036.60	15	1734.00	13	2306.15
		40	20	47.60	20	90.00	16	183.81	16	528.31	16	1006.00	16	1662.81	14	2301.43

Weight gain per phases per box

Tab. No. 12b (page 1)

Treatment	Tr. No.	Box No.	Day 3 - 7	Day 8 - 14	Day 15 - 21	Day 22 - 28	Day 29 - 35	Day 3 - 35
			Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
			g	g	g	g	g	g
T1	1	1	105.25	353.38	502.88	683.69	501.00	2141.57
		2	104.81	363.38	513.19	711.69	624.86	2332.00
		9	98.94	351.06	450.94	592.31	459.21	1922.71
		10	81.25	269.13	433.19	585.06	543.38	1945.15
		17	89.44	303.50	436.50	623.73	434.38	1939.31
		18	95.63	338.25	501.06	681.94	630.93	2258.57
		25	99.88	360.75	500.00	633.00	559.64	2150.14
		26	96.27	354.60	489.20	665.53	526.69	2122.69
		33	98.44	355.75	477.50	634.06	466.71	2025.79
		34	102.19	362.19	513.50	663.38	503.93	2145.64
T2	2	3	90.94	293.06	492.75	670.63	497.00	2034.79
		4	83.56	289.69	451.50	626.50	560.93	2023.00
		11	100.06	335.25	470.56	671.00	499.14	2065.79
		12	95.00	327.63	474.88	687.44	548.07	2128.00
		19	104.63	369.75	485.81	692.50	505.29	2129.57
		20	96.94	348.75	495.13	691.69	454.31	2108.46
		27	100.88	348.00	511.50	458.20	661.85	2081.46
		28	101.94	355.50	504.69	629.33	475.69	2056.69
		35	99.69	368.50	528.00	706.53	558.77	2259.46
		36	97.31	329.63	492.69	637.31	475.57	2025.71

Weight gain per phases per box

Tab. No. 12b (page 2)

Treatment	Tr. No.	Box No.	Day 3 - 7	Day 8 - 14	Day 15 - 21	Day 22 - 28	Day 29 - 35	Day 3 - 35
			Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase	Weight gain per phase
			g	g	g	g	g	g
T3	3	5	94.06	327.20	530.54	699.46	545.82	2237.73
		6	77.38	287.75	460.31	692.81	635.62	2143.54
		13	93.38	341.25	475.25	661.06	596.71	2172.71
		14	102.38	346.81	496.88	728.06	704.46	2363.85
		21	94.19	330.06	494.94	643.63	443.00	1972.15
		22	92.13	322.20	461.14	576.14	434.83	1866.25
		29	98.67	353.57	498.86	687.86	644.50	2262.50
		30	94.38	345.75	486.88	629.56	554.29	2107.57
		37	97.00	356.63	501.19	672.31	537.07	2153.79
		38	86.69	320.81	475.19	616.06	545.71	2041.14
T4	4	7	85.56	323.94	470.20	561.07	514.46	1939.92
		8	90.00	320.63	481.19	610.13	601.36	2084.14
		15	96.06	334.38	471.50	626.13	601.07	2132.21
		16	88.44	343.33	501.87	679.07	660.85	2258.77
		23	99.44	355.53	511.40	663.13	495.15	2120.31
		24	95.94	319.81	473.69	635.50	510.29	2027.64
		31	96.07	341.47	491.64	611.29	584.55	2112.27
		32	94.31	347.88	479.00	638.81	544.00	2123.29
		39	98.75	351.63	497.33	697.40	580.54	2218.15
		40	93.63	344.50	477.69	656.81	641.21	2210.71

Feed conversion ratio (Feed consumption per 1 kg of live weight) per box

Tab. No. 12c (page 1)

Treatment	Tr. No.	Box No.	Feed conversion ratio					
			Day 3	Day 7	Day 14	Day 21	Day 28	Day 35
			g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW
T1	1	1	371.64	931.68	1076.91	1238.90	1334.95	1504.63
		2	351.70	1010.50	1091.02	1250.91	1348.30	1526.39
		9	356.72	981.19	1066.12	1214.47	1370.39	1581.74
		10	651.36	1000.62	1131.85	1248.88	1369.20	1552.65
		17	148.99	1068.13	1164.66	1297.70	1368.04	1563.97
		18	121.14	799.44	963.57	1175.12	1277.55	1449.39
		25	145.43	916.82	1054.01	1228.40	1303.18	1482.03
		26	347.62	1072.65	1089.05	1254.88	1341.06	1548.59
		33	533.41	1034.76	1019.98	1205.78	1319.46	1523.92
		34	469.48	916.55	1015.87	1225.52	1318.95	1488.30
T2	2	3	377.25	1046.90	1118.37	1207.68	1303.70	1552.05
		4	233.78	928.38	1139.76	1262.79	1392.63	1577.10
		11	191.15	862.29	957.46	1191.39	1271.12	1570.19
		12	224.85	1025.36	1044.93	1237.16	1316.03	1538.86
		19	279.49	968.49	999.18	1222.60	1312.11	1526.47
		20	414.45	994.75	1070.77	1235.33	1325.03	1556.86
		27	283.61	867.96	960.51	1177.51	1377.57	1527.39
		28	253.09	1107.06	1018.16	1254.97	1333.68	1511.46
		35	226.50	858.83	966.54	1148.87	1249.08	1436.21
		36	256.26	937.33	1099.02	1215.44	1321.62	1511.66

Feed conversion ratio (Feed consumption per 1 kg of live weight) per box

Tab. No. 12c (page 2)

Treatment	Tr. No.	Box No.	Feed conversion ratio					
			Day 3	Day 7	Day 14	Day 21	Day 28	Day 35
			g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW	g/kg LW
T3	3	5	210.72	922.25	1014.09	1155.60	1349.98	1562.79
		6	182.15	1021.99	1097.92	1238.32	1320.25	1516.36
		13	258.77	859.20	998.01	1208.61	1315.64	1473.09
		14	227.66	946.12	1133.21	1237.86	1348.74	1502.61
		21	200.00	875.03	1102.04	1261.79	1357.02	1591.68
		22	385.99	826.92	1085.13	1292.59	1421.17	1611.48
		29	169.40	810.44	1044.83	1220.58	1336.38	1459.08
		30	418.76	837.39	1050.47	1159.54	1324.87	1518.79
		37	201.03	815.44	1054.87	1184.79	1303.22	1483.27
		38	323.83	704.23	1059.65	1216.72	1320.62	1472.45
T4	4	7	233.10	1031.22	1100.99	1214.80	1387.64	1591.88
		8	112.93	863.53	1102.52	1234.64	1387.67	1555.41
		15	199.20	807.11	1060.52	1241.16	1330.60	1477.01
		16	175.23	811.27	1050.44	1224.14	1323.12	1466.89
		23	196.85	865.74	1034.44	1185.70	1306.87	1513.17
		24	204.68	915.40	1026.14	1211.58	1310.97	1512.64
		31	172.81	870.30	1070.94	1219.25	1393.93	1534.81
		32	197.85	978.77	1066.03	1254.08	1340.57	1512.41
		39	253.52	812.03	1044.55	1185.78	1298.65	1577.87
		40	277.78	554.95	1059.09	1241.62	1317.71	1470.00

Feed consumption per 1 kg of weight gain (WG) per box

Tab. No. 12d (page 1)

Treatment	Tr. No.	Box No.	Feed consumption per 1 kg of weight gain						
			1-3 days	4-7 days	8-14 days	15-21 days	22-28 days	29-35 days	1-35 days
			g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T1	1	1	770.14	1394.80	1176.16	1430.52	1489.17	2072.57	1542.34
		2	749.06	1544.68	1143.79	1438.31	1500.83	2052.58	1562.54
		9	819.67	1509.81	1121.60	1405.41	1641.87	2293.04	1627.63
		10	1590.91	1344.74	1230.84	1376.42	1555.39	2066.21	1599.71
		17	323.42	1931.69	1233.53	1456.19	1483.06	2279.12	1610.36
		18	286.12	1384.54	1071.69	1412.00	1437.08	1917.26	1486.48
		25	307.13	1565.56	1143.45	1436.25	1432.66	2041.62	1519.71
		26	730.82	1779.66	1099.83	1454.07	1480.52	2198.39	1590.33
		33	1084.47	1483.90	1010.19	1435.86	1511.09	2250.78	1564.48
		34	1001.25	1307.02	1078.52	1466.65	1474.47	2074.41	1526.19
T2	2	3	794.62	1667.56	1172.96	1301.37	1448.28	2376.25	1593.26
		4	527.01	1634.96	1294.50	1399.50	1590.18	2097.28	1622.21
		11	398.18	1477.96	1025.35	1476.96	1395.31	2582.28	1613.37
		12	457.67	1764.40	1058.76	1463.54	1434.68	2215.36	1577.86
		19	565.61	1560.25	1019.27	1503.92	1453.97	2266.70	1564.81
		20	892.86	1502.59	1120.07	1426.41	1463.81	2452.05	1597.61
		27	582.75	1373.22	1023.71	1425.95	1888.55	1889.41	1568.49
		28	515.46	1843.77	958.16	1534.37	1484.84	2162.90	1552.70
		35	464.58	1428.57	1034.60	1356.53	1420.07	2078.84	1472.22
		36	528.79	1541.96	1213.50	1348.47	1497.50	2146.82	1551.56

Feed consumption per 1 kg of weight gain (WG) per box

Tab. No. 12d (page 2)

Treatment	Tr. No.	Box No.	Feed consumption per 1 kg of weight gain						
			1-3 days	4-7 days	8-14 days	15-21 days	22-28 days	29-35 days	1-35 days
			g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG	g/kg WG
T3	3	5	462.96	1556.63	1076.30	1334.98	1683.71	2300.14	1608.52
		6	404.31	1896.33	1151.17	1387.64	1432.57	2030.74	1555.13
		13	539.57	1417.87	1089.74	1459.76	1484.35	1911.67	1509.99
		14	496.89	1562.50	1261.49	1361.01	1513.43	1915.94	1539.49
		21	414.20	1494.49	1259.23	1442.10	1512.92	2515.59	1635.14
		22	834.40	1234.23	1272.50	1556.03	1658.81	2287.13	1662.58
		29	346.42	1417.87	1218.03	1436.14	1523.36	1800.31	1498.69
		30	846.50	1229.72	1193.06	1288.83	1604.29	2119.03	1558.12
		37	443.60	1367.39	1209.25	1336.83	1494.84	2098.24	1523.10
		38	782.47	1045.30	1285.80	1390.24	1489.30	1911.26	1511.75
T4	4	7	493.22	1802.82	1147.98	1349.95	1715.78	2241.04	1638.11
		8	244.20	1618.40	1267.06	1383.30	1644.13	2013.81	1598.04
		15	410.80	1369.86	1233.64	1456.79	1478.34	1881.30	1514.89
		16	394.74	1415.88	1213.59	1424.02	1480.46	1840.01	1506.13
		23	400.92	1467.61	1153.20	1364.88	1511.01	2229.30	1554.06
		24	434.78	1556.73	1104.16	1424.99	1470.30	2138.00	1552.79
		31	361.01	1533.41	1210.46	1395.86	1720.03	1959.46	1578.53
		32	428.40	1722.28	1122.89	1479.65	1483.22	2041.63	1553.64
		39	546.78	1312.47	1199.79	1362.61	1480.74	2393.42	1619.90
		40	589.62	818.37	1396.95	1461.47	1439.72	1874.70	1508.13

Feed consumption per box

Tab. No. 12e (page 1)

Treatment	Tr. No.	Box No.	Feed consumption						
			Starter (day 1-3)	Starter (day 4-7)	Starter (day 8-14)	Grower (day 15-21)	Grower (22-28 days)	Finisher (29-35 days)	Total
			kg	kg	kg	kg	kg	kg	kg
T1	1	1	0.65	2.95	6.65	11.51	16.29	17.65	55.70
		2	0.60	3.25	6.65	11.81	17.09	20.30	59.70
		9	0.60	3.00	6.30	10.14	15.56	17.70	53.30
		10	1.05	2.20	5.30	9.54	14.56	17.60	50.25
		17	0.25	3.45	5.99	10.17	13.88	15.40	49.14
		18	0.20	2.65	5.80	11.32	15.68	19.65	55.30
		25	0.25	3.20	6.60	11.49	14.51	18.05	54.10
		26	0.60	3.15	5.85	10.67	14.78	18.35	53.40
		33	0.95	2.95	5.75	10.97	15.33	17.25	53.20
		34	0.80	2.55	6.25	12.05	15.65	16.95	54.25
T2	2	3	0.65	3.10	5.50	10.26	15.54	19.25	54.30
		4	0.40	2.75	6.00	10.11	15.94	18.80	54.00
		11	0.35	2.95	5.50	11.12	14.98	20.95	55.85
		12	0.40	3.40	5.55	11.12	15.78	20.10	56.35
		19	0.50	3.25	6.03	11.69	16.11	18.80	56.38
		20	0.70	2.90	6.25	11.30	16.20	17.90	55.25
		27	0.50	2.80	5.70	11.67	12.98	19.10	52.75
		28	0.45	3.80	5.45	12.39	13.61	15.80	51.50
		35	0.40	2.80	6.10	11.46	15.04	17.35	53.15
		36	0.45	3.05	6.40	10.63	15.27	17.40	53.20

Feed consumption per box

Tab. No. 12e (page 2)

Treatment	Tr. No.	Box No.	Feed consumption						
			Starter (day 1-3)	Starter (day 4-7)	Starter (day 8-14)	Grower (day 15-21)	Grower (22-28 days)	Finisher (29-35 days)	Total
			kg	kg	kg	kg	kg	kg	kg
T3	3	5	0.35	2.90	5.60	9.19	15.31	16.40	49.75
		6	0.30	3.00	5.30	10.22	15.88	20.35	55.05
		13	0.45	2.65	5.95	11.10	15.70	18.70	54.55
		14	0.40	3.20	7.00	10.82	17.63	20.65	59.70
		21	0.35	2.85	6.65	11.42	15.58	17.35	54.20
		22	0.65	2.25	6.15	10.22	13.38	14.80	47.45
		29	0.30	2.65	6.00	10.03	14.67	16.30	49.95
		30	0.75	2.35	6.60	10.04	16.16	18.55	54.45
		37	0.35	2.65	6.90	10.72	16.08	17.30	54.00
		38	0.50	1.80	6.60	10.57	14.68	17.10	51.25
T4	4	7	0.40	3.20	5.95	9.86	14.44	17.20	51.05
		8	0.20	2.85	6.50	10.65	16.05	19.25	55.50
		15	0.35	2.60	6.60	10.99	14.81	18.10	53.45
		16	0.30	2.55	6.25	10.72	15.08	18.70	53.60
		23	0.35	2.90	6.15	10.47	15.03	17.15	52.05
		24	0.35	2.95	5.65	10.80	14.95	18.25	52.95
		31	0.30	2.80	6.20	10.18	14.72	15.95	50.15
		32	0.35	3.20	6.25	11.34	15.16	17.95	54.25
		39	0.45	2.60	6.75	10.21	15.49	22.40	57.90
		40	0.50	1.55	7.70	11.17	15.13	19.30	55.35

Foot pad lesions

Tab. No. 12f (page 1)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T1	1	1	0.14	0.07
		2	0.29	0.29
		9	0.21	0.00
		10	0.62	0.00
		17	0.54	0.15
		18	0.07	0.00
		25	0.07	0.00
		26	0.08	0.08
		33	0.21	0.07
		34	0.14	0.14
T2	2	3	0.21	0.21
		4	0.29	0.07
		11	0.43	0.00
		12	0.50	0.21
		19	0.71	0.07
		20	0.46	0.23
		27	0.31	0.08
		28	0.08	0.00
		35	0.08	0.00
		36	0.14	0.21

Foot pad lesions

Tab. No. 12f (page 2)

Treatment	Tr. No.	Box No.	Evaluation	
			right foot	left foot
T3	3	5	0.18	0.18
		6	0.15	0.00
		13	0.50	0.14
		14	0.46	0.08
		21	0.08	0.00
		22	0.08	0.00
		29	0.00	0.08
		30	0.00	0.21
		37	0.07	0.07
		38	0.00	0.00
T4	4	7	0.08	0.08
		8	0.21	0.00
		15	0.79	0.29
		16	0.15	0.00
		23	0.00	0.00
		24	0.21	0.00
		31	0.00	0.00
		32	0.14	0.00
		39	0.00	0.08
		40	0.07	0.00

Litter scoring

Tab. No. 12g (page 1)

Treatment	Tr. No.	Box No.	Day 14	Day 21	Day 28	Day 35
T1	1	1	1	2	2	1
		2	2	2	2	2
		9	1	2	1	1
		10	1	2	1	1
		17	1	2	3	2
		18	2	3	2	2
		25	1	2	2	2
		26	2	3	2	2
		33	1	2	2	2
		34	1	3	2	2
T2	2	3	1	3	2	1
		4	1	2	2	1
		11	1	2	1	1
		12	1	3	2	2
		19	3	3	2	1
		20	3	3	2	2
		27	1	2	1	1
		28	2	3	2	2
		35	1	2	1	1
		36	2	3	2	2

Litter scoring

Tab. No. 12g (page 2)

Treatment	Tr. No.	Box No.	Day 14	Day 21	Day 28	Day 35
T3	3	5	1	3	2	1
		6	1	3	2	2
		13	1	2	1	2
		14	2	3	2	2
		21	2	2	2	1
		22	3	3	2	2
		29	1	1	1	1
		30	2	3	2	2
		37	1	2	1	1
		38	1	2	1	2
T4	4	7	1	2	1	1
		8	1	3	2	1
		15	1	2	1	1
		16	1	3	2	2
		23	1	1	1	1
		24	2	2	2	2
		31	1	2	2	2
		32	2	3	2	2
		39	1	1	1	2
		40	3	3	2	2